Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35% RC Prepreg Qualification Material Property Data Report

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			- Added Section 11: Composite Material Data Collection, to document the dates manufacture of fiber lot, resin lot, prepreg lot, composite, testing and data submittal.

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1. Introduction

1.1 Scope

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

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

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

This report contains material property data only. Statistical analysis of the data including the calculations of b-basis values is given in a separate report, Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35% RC Material Allowables Statistical Analysis Report NCP-RP-2025-010 Rev A. The qualification material was procured to NCAMP Material Specification NMS 380/1 Rev – dated May 2, 2024. The qualification test panels were cured in accordance with NCAMP Process Specification NPS 83800 Rev B dated October 22, 2024 using baseline cure cycle “C”. The NCAMP Test Plan NTP 3800Q1 Rev E was used for this qualification program.

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

DOT/FAA/AR-03/19 and Section 8.4.1 of CMH-17 Volume 1 are adequate for the given program.

Aircraft companies should not use the data published in this report without specifying NCAMP Material Specification NMS 380/1. NMS 380/1 may have additional requirements that are listed in its prepreg process control document (PCD), fiber specification, fiber PCD, and other raw material specifications and PCDs which impose essential quality controls on the raw materials and raw material manufacturing equipment and processes. *Aircraft companies and certifying agencies should assume that the material property data published in this report is not applicable when the material is not procured to NMS 380/1.* NMS 380/1 is a free, publicly available, non-proprietary aerospace industry material specification.

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

1.2 Symbols

ν_{12}^{t}	major Poisson's ratio, tension
με	micro-strain
E_1^{c}	compressive modulus, longitudinal / warp direction
E_1^{t}	tensile modulus, longitudinal / warp direction
E_2^{c}	compressive modulus, transverse / fill direction
E_2^{t}	tensile modulus, transverse / fill direction
F_1^{cu}	ultimate compressive strength, longitudinal / warp direction
F_1^{tu}	ultimate tensile strength, longitudinal / warp direction
F_2^{cu}	ultimate compressive strength, transverse / fill direction
F_2^{tu}	ultimate tensile strength, transverse / fill direction
SBS	short beam strength
ν_{12}^{c}	major Poisson's Ratio, compression
ν_{21}^{c}	minor Poisson's Ratio, compression
$F_{12}^{s5\% \text{ strain}}$	in-plane shear strength at 5% strain
$F_{12}^{s0.2\%}$	in-plane shear strength at 0.2% offset
G_{12}^{s}	in-plane shear modulus

Superscripts

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

Subscripts

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

Acronyms and Definitions

ASTM	American Society for Testing and Materials
B – Basis	95% lower confidence limit on the tenth population percentile
CV	Coefficient of Variation
CTD	Cold Temperature Dry
CPT	Cured Ply Thickness
ETD	Elevated Temperature Dry
ETW	Elevated Temperature Wet
Gr/Ep	Graphite/Epoxy
norm	normalized
RTD	Room Temperature Dry
SACMA	Suppliers of Advanced Composite Materials Association
SRM	SACMA Recommended Method
Tply	thickness divided by the number of plies provides the thickness average per specimen
wet	specimen with an “equilibrium” moisture content
T, RH	Temperature, Relative Humidity

1.3 NIAR–Specimen Naming Format

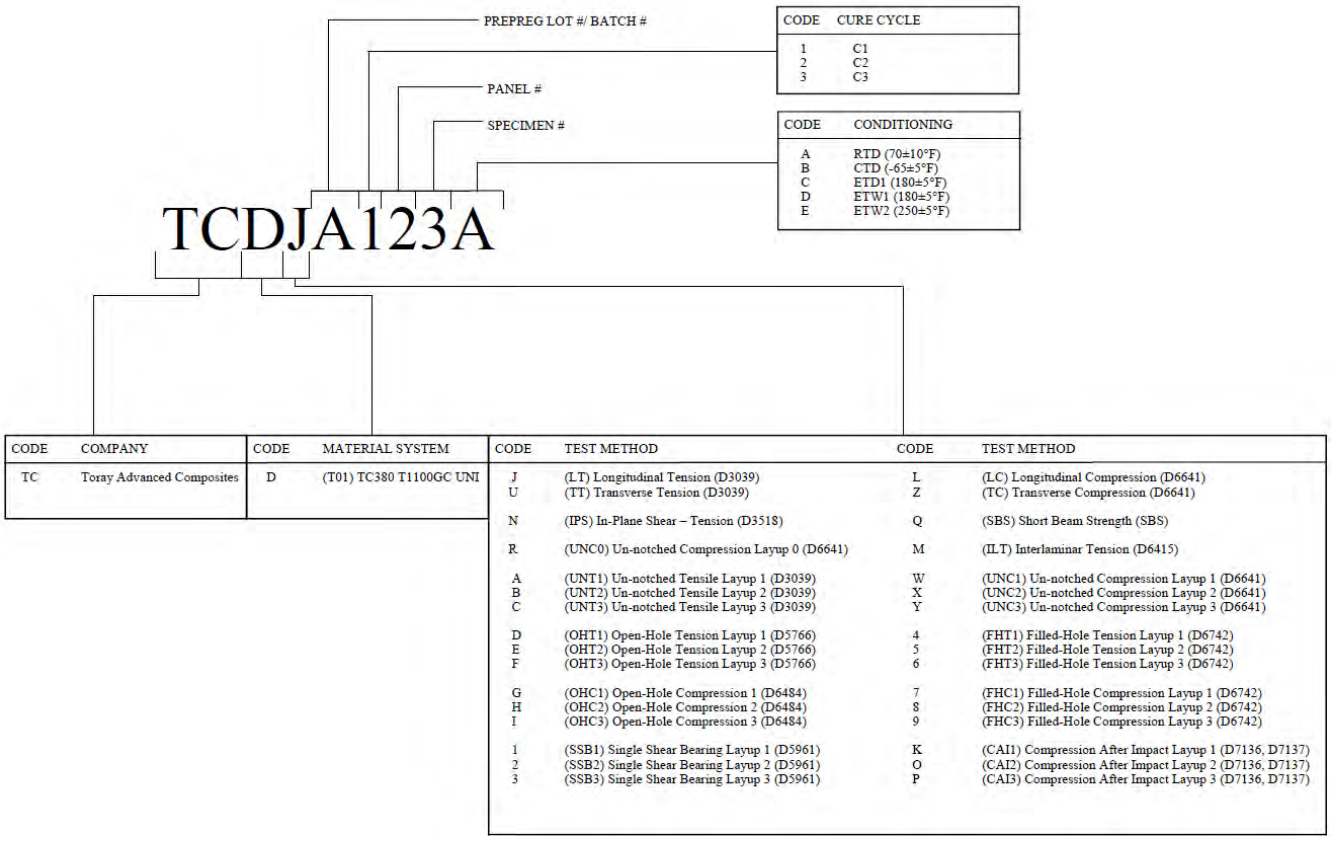


Figure 1-1: Naming Format

1.4 References

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

Cured Laminate Physical Testing

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

Lamina/Laminate Level Testing and Fluid Sensitivity Testing

- ASTM D2344/D2344M-22 – Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
- ASTM D3039/D3039M-17 – Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
- ASTM D3518/D3518M-18 – Standard Test Method for In-Plane Shear Response of Polymer Matrix Composite Materials by Tensile Test of a ± 45º 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

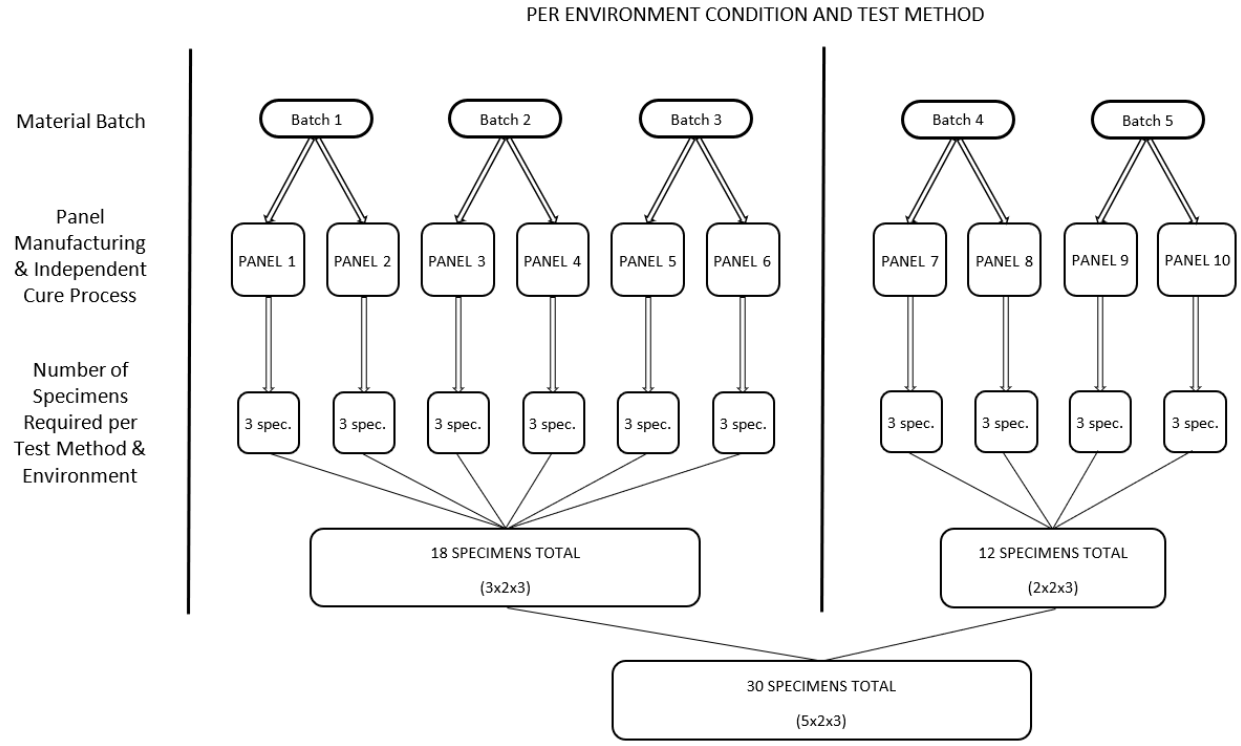
- ASTM D7136/D7136M-20 – Standard Test Method for Measuring the Damage Resistance of a Fiber-Reinforced Polymer Matrix Composite to a Drop-Weight Impact Event
- ASTM D7137/D7137M-23 – Standard Test Method for Compressive Residual Strength Properties of Damaged Polymer Matrix Composite Plates
- ASTM D910-21 – 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.



Note: Batch 4 and 5 are applicable to selected properties only.

Figure 1-2: Specimen Selection Methodology

All panels were fabricated in accordance with NCAMP Process Specification NPS 83800 Rev B using baseline cure cycle “C”.

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

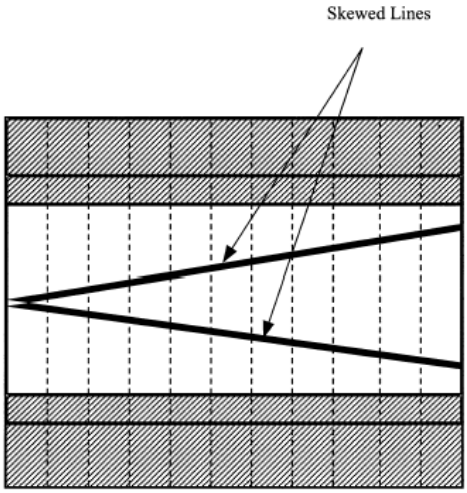


Figure 1-3: Specimen Traceability Line

1.5.2 Specimen & Testing Details

1.5.2.1 Tabbing

1.5.2.1.1 Longitudinal Tension (LT)

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

1.5.2.2 Specimen Dimensions & Test Configuration

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

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

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

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

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

Table 1-1: Fastener Identifications

1.5.2.4 Specimen Strain Device Used

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

Uniaxial gages were used on:

- All of CTD Tension specimens except Longitudinal Tension specimens.
- All conditions of combined loading compression specimens except Longitudinal Compression specimens.
- Two RTD Tension specimens except Longitudinal Tension for obtaining full stress strain curves.
- Two RTD Open Hole Compression specimens for detecting buckling.
- One CAI un-impacted specimen for balancing.

Biaxial gages were used on:

- All conditions of IPS specimens.
- All of CTD Longitudinal Tension specimens.
- All conditions of Longitudinal Compression specimens.
- Two RTD Longitudinal Tension specimens for obtaining full stress strain curves.

Uniaxial extensometers were used on:

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

Biaxial extensometers were used on:

- All of RTD, ETD1, ETW1 and ETW2 Longitudinal Tension specimens.
- All conditions of IPS Fluid Sensitivity specimens.

1.5.3 Test Matrix

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

Layup	Test Type Code	Test Type and Direction	Property	Number of Batches x No. of Panels x No. of Specimens[6]				
				Test Temperature/Moisture Condition				
				CTD (-65°F)	RTD (70°F)	ETD1 (180°F)	ETW1 (180°F)	ETW2 (250°F)
$[0]_{10}$	LT	ASTM D3039 Longitudinal Tension	Strength, Modulus & Poisson's Ratio	5x2x3[6]	3x2x3[3]	3x2x3	3x2x3	3x2x3
$[0]_{20}$	LC	ASTM D6641 Longitudinal Compression	Modulus & Poisson's Ratio	3x2x3	3x2x3[1&3]	3x2x3	3x2x3	3x2x3
$[90]_{18}$	TT	ASTM D3039 Transverse Tension	Strength & Modulus	3x2x3	5x2x3[3&6]	5x2x3[6]	5x2x3[6]	3x2x3
$[90]_{20}$	TC	ASTM D6641 Transverse Compression	Strength & Modulus	3x2x3	3x2x3[1&3]	3x2x3	3x2x3	3x2x3
$[90/0/90]_{7}$	UNC0	ASTM D6641 Unnotched Cross-Ply Compression 0[4]	Strength & Modulus	3x2x3	3x2x3[1&3]	3x2x3	3x2x3	3x2x3
$[45/-45]_{4S}$	IPS	ASTM D3518 In-Plane Shear[2]	0.2% Offset Strength, 5% Strain Strength & Modulus	5x2x3[6]	5x2x3[3&6]	3x2x3	5x2x3[6]	5x2x3[6]
$[0]_{32}$	SBS	ASTM D2344 Short Beam Strength	Strength	3x2x3	3x2x3	1x2x3[5]	5x2x3[6]	5x2x3[6]

Notes:

1. Back-to-back strain gages are needed on the first two specimens. If no buckling is observed, the remaining modulus specimens will require a strain gage on one side of the specimens only.
2. Gripped length is 1.5 to 2.5 inches on each end of the 10 inches long specimen. Once the samples have reached the 5% strain level, the actuator/crosshead displacement rate can be increased by four times the initial rate. Continue testing at the higher strain rate until ultimate failure is observed.
3. At least two specimens must be gaged to obtain full stress-strain curve to failure. An appropriate extensometer may be used in place of the strain gage for the remaining specimens.
4. Derive the 0° lamina compressive strength $\mathrm{F}^{cu}_{0°\,plies}$ as follows:

$$\mathrm{F}^{cu}_{0°\,plies} = BF\frac{P^{f}}{wh}$$

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

Where:

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

5. Specimens were machined from Batch A panels.
6. Two additional batches are added on selected properties due to batch to batch variability within the first three batches.

Table 1-2: Lamina Level Test Matrix

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

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

(%0°/%±45°/%90°) Test Type Code	Test Type and Layup[2]	Property	Number of Batches x Number of Panels x Number of Test Specimens[6]				
			Test Temperature/Moisture Condition				
			CTD (-65°F)	**RTD** (70°F)	**ETD1** (180°F)	**ETW1** (180°F)	**ETW2** (250°F)
(25/50/25 - QI) UNT1	ASTM D3039 Un-notched Tension $[45/0/-45/90]_{3S}$	Strength & Modulus	3x2x3	3x2x3[3]		3x2x3	3x2x3
(10/80/10 - SF) UNT2	ASTM D3039 Un-notched Tension $[45/-45/0/45/-45/45/-45/90/45/-45]_S$	Strength & Modulus	3x2x3	3x2x3[3]		3x2x3	3x2x3
(50/40/10 - HD) UNT3	ASTM D3039 Un-notched Tension $[45/90/-45/0/0/45/0/0/-45/0]_S$	Strength & Modulus	3x2x3	3x2x3[3]		3x2x3	3x2x3
(25/50/25 - QI) UNC1	ASTM D6641 Un-notched Compression $[45/0/-45/90]_{3S}$	Strength & Modulus	3x2x3	3x2x3[1&3]	1x2x3[5]	3x2x3	5x2x3[6]
(10/80/10 -SF) UNC2	ASTM D6641 Un-notched Compression $[45/-45/0/45/-45/45/-45/90/45/-45]_S$	Strength & Modulus	3x2x3	3x2x3[1&3]	1x2x3[5]	3x2x3	5x2x3[6]
(50/40/10 - HD) UNC3	ASTM D6641 Un-notched Compression $[45/90/-45/0/0/45/0/0/-45/0]_S$	Strength & Modulus	3x2x3	3x2x3[1&3]	1x2x3[5]	3x2x3	5x2x3[6]
(25/50/25 - QI) OHT1	ASTM D5766 Open Hole Tension $[45/0/-45/90]_{3S}$	Strength	3x2x3	3x2x3	3x2x3	3x2x3	3x2x3
(10/80/10 - SF) OHT2	ASTM D5766 Open Hole Tension $[45/-45/0/45/-45/45/-45/90/45/-45]_S$	Strength	3x2x3	3x2x3	1x2x3[5]	3x2x3	3x2x3
(50/40/10 - HD) OHT3	ASTM D5766 Open Hole Tension $[45/90/-45/0/0/45/0/0/-45/0]_S$	Strength	3x2x3	3x2x3	1x2x3[5]	5x2x3[6]	5x2x3[6]
(25/50/25 - QI) FHT1	ASTM D6742 Filled Hole Tension $[45/0/-45/90]_{3S}$	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(10/80/10 - SF) FHT2	ASTM D6742 Filled Hole Tension $[45/-45/0/45/-45/45/-45/90/45/-45]_S$	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(50/40/10 - HD) FHT3	ASTM D6742 Filled Hole Tension $[45/90/-45/0/0/45/0/0/-45/0]_S$	Strength	3x2x3	3x2x3		3x2x3	3x2x3
(25/50/25 - QI) OHC1	ASTM D6484 Open Hole Compression $[45/0/-45/90]_{3S}$	Strength	1x2x3[5]	3x2x3[1]	3x2x3	3x2x3	3x2x3
(10/80/10 - SF) OHC2	ASTM D6484 Open Hole Compression $[45/-45/0/45/-45/45/-45/90/45/-45]_S$	Strength	1x2x3[5]	3x2x3[1]	1x2x3[5]	3x2x3	3x2x3
(50/40/10 - HD) OHC3	ASTM D6484 Open Hole Compression $[45/90/-45/0/0/45/0/0/-45/0]_S$	Strength	1x2x3[5]	3x2x3[1]	1x2x3[5]	3x2x3	3x2x3
(25/50/25 - QI) FHC1	ASTM D6742 Filled Hole Compression $[45/0/-45/90]_{3S}$	Strength	1x2x3[5]	3x2x3		3x2x3	3x2x3
(10/80/10 - SF) FHC2	ASTM D6742 Filled Hole Compression $[45/-45/0/45/-45/45/-45/90/45/-45]_S$	Strength	1x2x3[5]	3x2x3		3x2x3	3x2x3
(50/40/10 - HD) FHC3	ASTM D6742 Filled Hole Compression $[45/90/-45/0/0/45/0/0/-45/0]_S$	Strength	1x2x3[5]	3x2x3		3x2x3	3x2x3
(25/50/25 - QI) SSB1	ASTM D5961 Single Shear Bearing (Proc. C) $[45/0/-45/90]_{3S}$	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3
(10/80/10 - SF) SSB2	ASTM D5961 Single Shear Bearing (Proc.C) $[45/-45/0/45/-45/45/-45/90/45/-45]_S$	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3
(50/40/10 - HD) SSB3	ASTM D5961 Single Shear Bearing (Proc. C) $[45/90/-45/0/0/45/0/0/-45/0]_S$	2% Offset Strength, Ultimate Strength & Chord Stiffness		3x2x3		3x2x3	3x2x3

(%0°/%±45°/%90°) Test Type Code	Test Type and Layup[2]	Property	Number of Batches x Number of Panels x Number of Test Specimens[6]				
			Test Temperature/Moisture Condition				
			CTD (-65°F)	RTD (70°F)	ETD1 (180°F)	ETW1 (180°F)	ETW2 (250°F)
(100/0/0) ILT	ASTM D6415 Interlaminar Tension $[0]_{16S}$	Strength	1x2x3[5]	1x2x3[5]		1x2x3[5]	
(25/50/25 - QI) CAI1	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in)[4] $[45/0/-45/90]_{5S}$	Strength	3x2x3	5x2x3[6]			
(10/80/10 - SF) CAI2	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in)[4] $[45/-45/0/45/-45/45/-45/90/45/-45]_{2S}$	Strength	1x2x3[5]	1x2x3[5]			
(50/40/10 - HD) CAI3	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in)[4] $[45/90/-45/0/0/45/0/0/-45/0]_{2S}$	Strength	1x2x3[5]	1x2x3[5]			

Notes:
1. Back-to-back strain gages needed on the first two specimens. If no buckling is observed, the remaining modulus specimens will require strain gage on one side of the specimens only.
2. Loading direction is generally along the 0° direction.
3. At least two specimens must be gaged to obtain full stress-strain curve to failure. An appropriate extensometer may be used in place of the strain gage for the remaining specimens.
4. Back-to-back strain gages on two locations (a total of four strain gages) are needed on the first specimen. The specimen should be equivalent to the test specimens in terms of material, layup and geometry, shall be un-damaged. Alternatively, an instrumented metallic plate, equivalent in thickness to the test specimens to within ±0.25mm [±.010 in.], may be used.
5. Specimens were machined from Batch A panels.
6. Two additional batches are added on selected properties due to batch to batch variability within the first three batches.

Table 1-3: Laminate Level Test Matrix

1.5.4 Cured Laminate Physical Testing

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

Property	Condition/Method[1]	Min Replicates per Panel
Cured Ply Thickness	ASTM D3171-22 Section 14.3.6	Every test panel and mechanical test specimens
Laminate Density	ASTM D792-20	3
Fiber Volume, % by Volume	ASTM D3171-22[2]	3
Resin Content, % by Weight	ASTM D3171-22[2]	3
Void Content, % by Volume	ASTM D2734-16	3 Per[5]
Ultrasonic Through Transmission, C-Scan	ASTM E2580-24[3]	1
Glass Transition Temperature, Tg by DMA Flexural Loading	Dry and Wet ASTM D7028-07(2024)	1 Dry, 1 Wet[4]

Notes:
1. Where the applicable standard allows variations in specimen form or test method, the specific parameters to be used will be specified in the test work instructions and reported in the final test report.
2. Method II.
3. Five MHz is preferred for solid laminates. Panels with anomaly should be segregated. Microscopy images may be taken from questionable areas. NCAMP must be involved in the review of all C-scans.
4. DRY: minimum 24 dry DMA per batch. One DMA specimen is to be machined from a panel, these specimens are to be machined from Lamina and Laminate panels.
   WET: minimum 24 wet DMA per batch. One DMA specimen is to be machined from a panel, these specimens are to be machined from Lamina and Laminate panels
5. Required on panels that appear voidy in C-scan or visually only via ASTM D3171 Method 1.

Table 1-4: Cured Laminate Physical Test Matrix

1.5.5 Environmental Conditioning

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

Specimen dimensions were taken before moisture conditioning.

Test environments are defined as:

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

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

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

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

For wet conditioning, specimens were dried at 250°F±5°F for a minimum of 24 hours before being conditioned to equilibrium at 160°F±5°F and 85%±5%RH. Effective moisture equilibrium is achieved when the average moisture content of the traveler specimen changes by less than 0.02% for two consecutive determinations which are 7 ±0.5 days apart and may be expressed by:

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

Where:

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

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

1.5.6 Non-ambient Testing

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

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

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

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

1.5.7 Fluid Sensitivity Screening

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

Five replicates with a single cure cycle per each fluid type was subjected to fluid exposure. Specimens were cleaned with a dry towel prior to the tests. In addition to short beam strength, load versus displacement curves, in-plane shear modulus, 0.2% offset strength, 5% strength and stress strain curves were plotted to aid in the identification of matrix/resin softening. Since load versus displacement curves are influenced by test machine and fixture compliance, all the tests were performed with the identical machine and fixture, through a single setup. It was intended that the fluid resistance testing was performed on a limited number of reinforcement types and that engineering judgement was used to determine the necessity of repetition for other reinforcement configurations.

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

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

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

Notes:
1. Specimens were machined from Batch A panels.

Table 1-5: SBS Fluid Sensitivity Screening Matrix

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

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

Notes:
1. Specimens were machined from Batch A panels.

Table 1-6: IPS Fluid Sensitivity Screening Matrix

1.5.8 Normalization Procedures

Most lamina level tension and compression strength and modulus properties, and all laminate level properties were normalized according to nominal cured ply thickness. Lamina level properties that were not normalized include:

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

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

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

Normalized Value = Measured Value x Measured CPT / Nominal CPT.

For Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35% RC Prepreg material the defined CPT was 0.004800 inches. The average as measured CPT of the qualification panels was 0.004867 inches. The lowest and highest CPT measured were 0.004546 inches and 0.005203 inches respectively.

1.5.9 Inspection Verification

The 3-batch (5-batch on selected properties) qualification panels have been fabricated according to the requirements of the test plan and conformed by an NCAMP AIR. The test specimens and test setup have also been conformed by an NCAMP AIR.

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

1.5.10 Material Pedigree Information

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

2. Test Results

2.1 Lamina Level Test Summary

Prepreg Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Material Specification: NMS 380/1
Process Specification: NPS 83800
Fabric: T1100GC 24K 71E **Resin:** TC380

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

Tg(dry): 407.84°F **Tg(wet):** 334.32°F **Tg METHOD:** ASTM D7028

LAMINA MECHANICAL PROPERTY SUMMARY
Data reported as: Normalized & Measured
(Normalized by CPT=0.004800 inch)

Properties	CTD (-65°F) Mean		RTD (70°F) Mean		ETD1 (180°F) Mean		ETW1 (180°F) Mean		ETW2 (250°F) Mean	
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F_1^{tu} [ksi]	469.4	463.7	472.6	475.3	475.0	463.2	478.9	469.8	450.9	437.2
E_1^t [Msi]	23.52	23.22	22.84	22.97	23.20	22.64	23.48	23.04	23.76	23.03
v_{12}^t		0.3274		0.3132		0.3142		0.3076		0.2952
F_2^{tu} [ksi]		11.86		10.80		9.903		5.260		4.199
E_2^t [Msi]		1.273		1.108		1.001		0.9079		0.7605
F_1^{cu} [ksi] from UNC0*	251.4	246.2	226.7	236.2	206.3	201.3	172.8	174.2	150.2	151.9
E_1^c [Msi]	21.66	21.13	20.85	20.83	21.44	20.79	21.44	20.96	21.25	21.23
v_{12}^c		0.3880		0.3621		0.3862		0.3847		0.4063
F_2^{cu} [ksi]		41.47		29.33		22.78		17.29		13.07
E_2^c [Msi]		1.313		1.198		1.098		1.030		0.8591
(0/90) UNC0 Strength [ksi]	93.84	92.12	84.16	87.69	75.72	74.12	63.10	63.70	54.09	54.68
(0/90) UNC0 Modulus [Msi]	7.818	7.671	7.729	8.079	7.858	7.627	7.760	7.829	7.688	7.762
$F_{12}^{s0.2\%}$ [ksi]		8.021		6.203		5.311		4.248		3.117
$F_{12}^{s5\%strain}$ [ksi]		14.75		10.98		8.857		6.640		5.006
G_{12}^s [Msi]		0.6695		0.5582		0.4882		0.3996		0.3042
SBS [ksi]		19.21		14.40		11.15		8.715		6.787

LT (CTD), TT (RTD, ETD1, ETW1), IPS (CTD, RTD, ETW1, ETW2), SBS (ETW1, ETW2) and DMA (Dry, Wet): Two additional batches (4 and 5) were included.
*** Derived from cross-ply using back-out factor.**

Table 2-1: Lamina Summary Data

2.2 Laminate Level Test Summary

Prepreg Material: Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Material Specification: NMS 380/1
Process Specification: NPS 83800
Fabric: T1100GC 24K 71E **Resin:** TC380

Tg(dry): 407.84°F **Tg(wet):** 334.32°F **Tg METHOD:** ASTM D7028

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

LAMINATE MECHANICAL PROPERTY SUMMARY
Data reported as: Normalized & Measured
(Normalized by CPT=0.004800 inch)

	Layup	25/50/25 (Quasi)		10/80/10 (Soft)		50/40/10 (Hard)	
Properties	**Test Condition**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHT Strength [ksi]	**CTD (-65°F)**	75.88	73.46	60.58	58.99	117.9	114.3
	RTD (70°F)	80.97	79.56	55.09	53.86	127.7	124.6
	ETD1 (180°F)	83.39	81.61	52.78	52.61	135.2	134.5
	ETW1 (180°F)	88.15	85.26	52.50	51.54	152.2	150.2
	ETW2 (250°F)	91.07	88.13	51.51	50.45	167.1	163.8
OHC Strength [ksi]	**CTD (-65°F)**	48.89	48.90	43.69	43.94	64.57	63.89
	RTD (70°F)	43.04	42.29	37.42	36.93	57.23	56.29
	ETD1 (180°F)	39.09	38.10	31.92	31.77	52.95	52.73
	ETW1 (180°F)	37.67	37.04	30.05	29.51	48.83	47.57
	ETW2 (250°F)	32.87	32.10	25.42	24.75	42.37	40.92
UNT Strength [ksi]	**CTD (-65°F)**	168.5	166.1	92.00	91.53	264.0	261.2
	RTD (70°F)	169.7	169.6	85.68	88.03	271.1	275.1
	ETW1 (180°F)	162.3	164.8	75.76	77.54	266.0	267.2
	ETW2 (250°F)	157.4	152.6	70.87	69.14	269.0	260.9
UNT Modulus [Msi]	**CTD (-65°F)**	8.600	8.481	5.349	5.322	13.62	13.48
	RTD (70°F)	8.254	8.254	4.933	5.070	13.14	13.34
	ETW1 (180°F)	8.299	8.426	4.699	4.811	13.36	13.40
	ETW2 (250°F)	8.128	7.888	4.480	4.371	13.59	13.18
UNC Strength [ksi]	**CTD (-65°F)**	100.9	100.6	72.30	71.28	156.3	154.8
	RTD (70°F)	86.75	89.70	60.99	63.93	138.3	142.4
	ETD1 (180°F)	77.70	78.42	51.13	51.74	119.1	119.4
	ETW1 (180°F)	65.48	64.97	43.29	42.95	97.71	97.46
	ETW2 (250°F)	58.62	59.93	34.93	35.72	73.35	75.35
UNC Modulus [Msi]	**CTD (-65°F)**	8.047	8.021	5.125	5.055	12.57	12.46
	RTD (70°F)	7.882	8.191	4.865	5.101	12.41	12.97
	ETD1 (180°F)	7.878	7.952	4.683	4.740	12.46	12.50
	ETW1 (180°F)	7.545	7.488	4.411	4.383	11.98	11.90
	ETW2 (250°F)	7.433	7.549	4.246	4.353	12.08	12.45
FHT Strength [ksi]	**CTD (-65°F)**	81.91	79.72	69.97	68.50	117.8	114.5
	RTD (70°F)	84.29	82.78	60.28	59.45	126.0	123.1
	ETW1 (180°F)	91.79	90.63	57.14	56.72	141.1	138.3
	ETW2 (250°F)	91.56	89.52	54.75	54.07	146.2	143.0
FHC Strength [ksi]	**CTD (-65°F)**	81.42	81.92	65.41	65.94	101.5	100.8
	RTD (70°F)	68.03	66.91	55.34	54.61	83.98	82.84
	ETW1 (180°F)	56.58	55.65	45.84**	45.23**	67.44	66.15
	ETW2 (250°F)	49.16	47.54	37.23**	36.37**	56.72	55.08
SSB Proc. C 2% Offset Strength [ksi]	**RTD (70°F)**	114.0	118.8	119.0	123.7	113.5	119.3
	ETW1 (180°F)	107.7	111.9	103.1	107.3	96.88	100.6
	ETW2 (250°F)	96.06	93.47	96.10	93.64	88.21	86.05
SSB Proc. C Ultimate Strength [ksi]	**RTD (70°F)**	147.8	154.1	141.2	146.8	140.7	147.9
	ETW1 (180°F)	123.8	128.6	121.7	126.6	114.6	119.0
	ETW2 (250°F)	112.2	109.1	113.6	110.7	106.0	103.5
SSB Proc. C Chord Stiffness [Msi]	**RTD (70°F)**	1.829	1.907	1.500	1.560	2.305	2.421
	ETW1 (180°F)	1.721	1.789	1.397	1.454	2.211	2.296
	ETW2 (250°F)	1.689	1.640	1.354	1.318	2.109	2.055
CBS* [lb]	**CTD (-65°F)**		831.1				
	RTD (70°F)		588.7				
	ETW1 (180°F)		219.7				
ILT* [ksi]	**CTD (-65°F)**		24.98				
	RTD (70°F)		17.78				
	ETW1 (180°F)		6.422				
CAI Strength [ksi]	**CTD (-65°F)**	55.71	54.94	46.91	47.53	64.65	63.48
	RTD (70°F)	49.58	49.73	41.13	41.99	58.38	58.31

CAI1 (RTD), UNC1 (ETW2), UNC2 (ETW2), UNC3 (ETW2), OHT3 (ETW1, ETW2) and DMA (Dry, Wet): Two additional batches (4 and 5) were included.
*** The actual layup for ILT is [0]16S, (100/0/0).**
**** In some cases of FHC>UNC, UNC data is recommended for design. The FHC data is for informational purposes only and is not appropriate to be used for design.**

Table 2-2: Laminate Summary Data

2.3 Fluid Sensitivity Test Summary

2.3.1 Short Beam Strength Fluid Sensitivity Test (SBSFS)

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

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

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

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

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

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

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

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

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

2.3.2 In-Plane Shear Fluid Sensitivity Test (IPSFS)

Fluid Sensitivity Screening
In-Plane Shear Properties (IPSFS)--RT(70°F) Strength and Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

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

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

Fluid Sensitivity Screening
In-Plane Shear Properties (IPSFS)--ET1(180°F) Strength and Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

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

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

Fluid Sensitivity Screening
In-Plane Shear Properties (IPSFS)--ET2(250°F) Strength and Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

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

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

2.4 Cured Laminate Physical Test Summary

2.4.1 DMA

DMA Results Summary
Toray Advanced Composites TC380 T1100GC Unitape Qualification

Test Temperature	Mean			
	Onset Storage Modulus		Peak of Tangent Delta	
	T_g [°C]	T_g [°F]	T_g [°C]	T_g [°F]
DMA Tg (Dry)	208.80	407.84	216.97	422.54
DMA Tg (Wet)	167.95	334.32	190.75	375.35

DMA (Dry, Wet): Reported DMA data is from 5 batches.

Table 2-9: DMA Summary Data

2.5 Individual Test Summaries

2.5.1 Longitudinal Tension Properties (LT)

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

Resin content: 33.76 %wt **Comp. density:** 1.518 g/cc
Fiber volume: 56.17 %vol
Ply count: 10

Test method: ASTM D3039-17 **Modulus calculation:** 1000-3000 microstrain

Normalized by: 0.004800 in. CPT

Tension, 1-axis
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[0]10

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDJX XXXB		TCDJX XXXA		TCDJX XXXC		TCDJX XXXD		TCDJX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_1^{tu} [ksi]	**Mean**	469.4	463.7	472.6	475.3	475.0	463.2	478.9	469.8	450.9	437.2
	Minimum	405.0	389.2	442.4	440.4	408.7	421.6	456.6	444.0	405.2	390.4
	Maximum	517.7	517.3	510.7	514.6	525.1	506.6	502.3	493.5	513.3	492.0
	C.V.(%)	6.082	6.935	3.715	4.028	6.536	4.921	3.093	2.691	6.538	6.571
	No. Specimens	30		18		18		18		18	
	No. Prepreg Lots	5		3		3		3		3	
E_1^t [Msi]	**Mean**	23.52	23.22	22.84	22.97	23.20	22.64	23.48	23.04	23.76	23.03
	Minimum	21.86	21.73	21.30	21.53	21.34	21.78	22.09	22.15	23.12	22.35
	Maximum	25.51	25.23	23.84	24.42	24.30	23.74	24.38	23.84	24.85	24.08
	C.V.(%)	3.239	3.694	2.924	3.280	3.375	2.516	2.513	1.837	2.076	2.068
	No. Specimens	30		18		18		18		18	
	No. Prepreg Lots	5		3		3		3		3	
ν_{12}^t	**Mean**		0.3274		0.3132		0.3142		0.3076		0.2952
	Minimum		0.2689		0.2896		0.2939		0.2913		0.2654
	Maximum		0.3813		0.3531		0.3308		0.3196		0.3272
	C.V.(%)		6.919		5.196		3.779		2.559		5.281
	No. Specimens	30		18		18		18		18	
	No. Prepreg Lots	5		3		3		3		3	

LT (CTD): Two additional batches (4 and 5) were included.

2.5.2 Transverse Tension Properties (TT)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg										
Resin content:	31.38 %wt	**Comp. density:**	1.538 g/cc								
Fiber volume:	58.97 %vol										
Ply count:	18										
Test method:	ASTM D3039-17	**Modulus calculation:**	1000-3000 microstrain								
Normalized by:	NA										

Tension, 2-axis
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[90]18

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDUX XXXB		TCDUX XXXA		TCDUX XXXC		TCDUX XXXD		TCDUX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		11.86		10.80		9.903		5.260		4.199
	Minimum		10.32		9.548		7.972		4.380		3.654
	Maximum		13.18		11.94		11.61		6.619		4.744
F_2^{tu} **[ksi]**	**C.V.(%)**		6.464		6.443		8.950		10.10		8.629
	No. Specimens	19		30		32		31		21	
	No. Prepreg Lots	3		5		5		5		3	
	Mean		1.273		1.108		1.001		0.9079		0.7605
	Minimum		1.207		1.054		0.9622		0.8657		0.7302
	Maximum		1.371		1.209		1.033		0.9795		0.8008
E_2^t **[Msi]**	**C.V.(%)**		3.264		3.642		2.125		3.514		3.011
	No. Specimens	18		30		32		31		21	
	No. Prepreg Lots	3		5		5		5		3	

TT (RTD, ETD1, ETW1): Two additional batches (4 and 5) were included.

2.5.3 Longitudinal Compression Properties (LC)

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

Compression, 1-axis
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[0]20

Resin content: 37.47 %wt **Comp. density:** 1.509 g/cc
Fiber volume: 52.73 %vol
Ply count: 20

Test method: ASTM D6641-23 **Modulus calculation:** 1000-3000 microstrain

Normalized by: 0.004800 in. CPT

		CTD		RTD		ETD1		ETW1		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		TCDLX XXXB		TCDLX XXXA		TCDLX XXXC		TCDLX XXXD		TCDLX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
E_1^c [Msi]	**Mean**	21.66	21.13	20.85	20.83	21.44	20.79	21.44	20.96	21.25	21.23
	Minimum	20.58	20.05	20.22	20.02	20.67	19.73	20.48	20.24	20.10	19.63
	Maximum	23.04	22.20	21.87	21.59	22.25	21.61	22.27	21.81	21.97	22.88
	C.V.(%)	3.054	3.105	2.215	1.790	2.412	2.650	2.717	2.230	2.445	3.892
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	
ν_{12}^c	**Mean**		0.3880		0.3621		0.3862		0.3847		0.4063
	Minimum		0.3420		0.3069		0.3098		0.3445		0.3610
	Maximum		0.4603		0.4110		0.4276		0.4599		0.4680
	C.V.(%)		8.029		8.246		7.318		7.731		6.001
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	

2.5.4 Longitudinal Compression (LC) Back-out Factor Properties

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

Compression, 1-axis, Back-out Factor
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
UNC0 Layup: [90/0/90]7

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDRX XXXB		TCDRX XXXA		TCDRX XXXC		TCDRX XXXD		TCDRX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_1^{cu} [ksi] from UNC0	**Mean**	251.4	246.2	226.7	236.2	206.3	201.3	172.8	174.2	150.2	151.9
	Minimum	225.7	221.3	203.5	211.1	183.9	176.6	153.3	151.6	139.8	134.5
	Maximum	269.9	270.1	245.5	255.2	232.2	232.5	193.5	196.0	175.3	172.6
	C.V.(%)	4.756	5.648	5.000	5.073	6.622	6.918	6.894	7.496	6.123	5.869
	No. Specimens	18		20		20		19		19	
	No. Prepreg Lots	3		3		3		3		3	

2.5.5 Transverse Compression Properties (TC)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		**Compression, 2-axis** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [90]20
Resin content:	37.47 %wt	**Comp. density:** 1.509 g/cc	
Fiber volume:	52.73 %vol		
Ply count:	20		
Test method:	ASTM D6641-23	**Modulus calculation:** 1000-3000 microstrain	
Normalized by:	NA		

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDZX XXXB		TCDZX XXXA		TCDZX XXXC		TCDZX XXXD		TCDZX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		41.47		29.33		22.78		17.29		13.07
	Minimum		39.14		27.65		21.86		16.06		12.17
	Maximum		43.42		31.24		23.53		18.32		14.02
F_2^{cu} [ksi]	**C.V.(%)**		2.809		3.153		1.941		2.923		3.442
	No. Specimens	20		18		20		22		28	
	No. Prepreg Lots	3		3		3		3		3	
	Mean		1.313		1.198		1.098		1.030		0.8591
	Minimum		1.250		1.131		1.030		0.9537		0.8093
	Maximum		1.411		1.242		1.173		1.080		0.9332
E_2^c [Msi]	**C.V.(%)**		2.997		2.941		3.167		3.179		3.368
	No. Specimens	20		18		20		22		28	
	No. Prepreg Lots	3		3		3		3		3	

2.5.6 In-Plane Shear Properties (IPS)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg									
Resin content:	33.77 %wt	**Comp. density:**	1.519 g/cc							
Fiber volume:	56.21 %vol									
Ply count:	16									
Test method:	ASTM D3518-18	**Modulus calculation:**	2000-6000 microstrain							
Normalized by:	NA									

In-Plane Shear
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[45/-45]4S

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDNX XXXB		TCDNX XXXA		TCDNX XXXC		TCDNX XXXD		TCDNX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
$F_{12}^{s0.2\%}$ [ksi]	**Mean**		8.021		6.203		5.311		4.248		3.117
	Minimum		7.419		5.670		4.920		3.730		2.764
	Maximum		10.42		7.109		5.742		4.864		3.595
	C.V.(%)		7.504		6.234		4.239		7.297		6.258
	No. Specimens		32		30		18		30		33
	No. Prepreg Lots		5		5		3		5		5
$F_{12}^{s5\% \text{ strain}}$ [ksi]	**Mean**		14.75		10.98		8.857		6.640		5.006
	Minimum		14.23		10.38		8.427		5.960		4.461
	Maximum		17.08		11.87		9.304		7.514		5.681
	C.V.(%)		3.563		3.949		2.854		6.152		5.758
	No. Specimens		31		30		18		30		33
	No. Prepreg Lots		5		5		3		5		5
G_{12}^{s} [Msi]	**Mean**		0.6695		0.5582		0.4882		0.3996		0.3042
	Minimum		0.6129		0.5003		0.4481		0.3445		0.2718
	Maximum		0.9841		0.6475		0.5218		0.4655		0.3462
	C.V.(%)		10.67		7.201		4.632		6.713		5.571
	No. Specimens		32		30		18		30		33
	No. Prepreg Lots		5		5		3		5		5

IPS (CTD, RTD, ETW1, ETW2): Two additional batches (4 and 5) were included.

2.5.7 Lamina Short-Beam Strength Properties (SBS)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		**Short-Beam Strength** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [0]32
Resin content:	34.96 %wt	**Comp. density:** 1.515 g/cc	
Fiber volume:	55.04 %vol		
Ply count:	32		
Test method:	ASTM D2344-22		
Normalized by:	NA		

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDQX XXXB		TCDQX XXXA		TCDQX XXXC		TCDQX XXXD		TCDQX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
SBS [ksi]	**Mean**		19.21		14.40		11.15		8.715		6.787
	Minimum		18.46		13.81		10.72		7.506		5.472
	Maximum		20.11		14.79		11.41		9.590		7.760
	C.V.(%)		2.236		2.139		2.345		7.870		9.829
	No. Specimens	18		18		6		33		32	
	No. Prepreg Lots	3		3		1		5		5	

SBS (ETW1, ETW2): Two additional batches (4 and 5) were included.

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

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

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

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

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

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

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

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

2.5.12 "25/50/25" Unnotched Compression 1 Properties (UNC1)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		**Unnotched Compression 1** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/0/-45/90]3S
Resin content:	34.17 %wt	**Comp. density:** 1.520 g/cc	
Fiber volume:	55.92 %vol		
Ply count:	24		
Test method:	ASTM D6641-23	**Modulus calculation:** 1000-3000 microstrain	
Normalized by:	0.004800	in. CPT	

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDWX XXXB		TCDWX XXXA		TCDWX XXXC		TCDWX XXXD		TCDWX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
UNC1 Strength [ksi]	**Mean**	100.9	100.6	86.75	89.70	77.70	78.42	65.48	64.97	58.62	59.93
	Minimum	90.18	92.45	81.77	78.67	75.66	76.61	56.74	54.40	50.88	53.58
	Maximum	106.5	107.2	93.29	98.90	79.75	80.40	71.87	74.08	64.90	66.28
	C.V.(%)	4.372	4.226	3.698	4.970	2.470	2.395	5.389	7.611	4.785	5.548
	No. Specimens	18		21		6		18		32	
	No. Prepreg Lots	3		3		1		3		5	
UNC1 Modulus [Msi]	**Mean**	8.047	8.021	7.882	8.191	7.878	7.952	7.545	7.488	7.433	7.549
	Minimum	7.635	7.440	7.603	7.715	7.645	7.688	6.974	6.687	6.942	7.094
	Maximum	8.516	8.568	8.099	8.547	8.185	8.252	8.071	8.466	8.361	8.361
	C.V.(%)	2.900	3.818	1.873	3.283	2.318	2.351	3.940	7.157	4.098	3.875
	No. Specimens	18		18		6		18		30	
	No. Prepreg Lots	3		3		1		3		5	

UNC1 (ETW2): Two additional batches (4 and 5) were included.

2.5.13 "10/80/10" Unnotched Compression 2 Properties (UNC2)

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		**Unnotched Compression 2** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S
Resin content:	33.77 %wt	**Comp. density:** 1.523 g/cc	
Fiber volume:	56.34 %vol		
Ply count:	20		
Test method:	ASTM D6641-23	**Modulus calculation:** 1000-3000 microstrain	
Normalized by:	0.004800	in. CPT	

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDXX XXXB		TCDXX XXXA		TCDXX XXXC		TCDXX XXXD		TCDXX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
UNC2 Strength [ksi]	**Mean**	72.30	71.28	60.99	63.93	51.13	51.74	43.29	42.95	34.93	35.72
	Minimum	63.61	61.25	55.78	58.46	50.57	51.00	38.67	39.31	30.58	31.61
	Maximum	76.17	76.18	64.31	69.12	51.73	52.33	46.60	47.49	42.92	43.50
	C.V.(%)	4.373	4.938	3.635	3.841	0.9003	1.066	4.397	4.647	7.950	7.597
	No. Specimens	18		18		6		18		32	
	No. Prepreg Lots	3		3		1		3		5	
UNC2 Modulus [Msi]	**Mean**	5.125	5.055	4.865	5.101	4.683	4.740	4.411	4.383	4.246	4.353
	Minimum	4.881	4.743	4.642	4.882	4.561	4.600	4.106	3.916	3.913	4.011
	Maximum	5.305	5.417	5.004	5.370	4.759	4.828	4.580	4.778	4.478	4.813
	C.V.(%)	2.588	4.282	2.179	3.090	1.605	1.682	3.038	6.213	3.665	5.067
	No. Specimens	18		18		6		18		30	
	No. Prepreg Lots	3		3		1		3		5	

UNC2 (ETW2): Two additional batches (4 and 5) were included.

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		**Unnotched Compression 3** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/90/-45/0/0/45/0/0/-45/0]S
Resin content:	33.22 %wt	**Comp. density:** 1.527 g/cc	
Fiber volume:	56.97 %vol		
Ply count:	20		
Test method:	ASTM D6641-23	**Modulus calculation:** 1000-3000 microstrain	
Normalized by:	0.004800	in. CPT	

		CTD		RTD		ETD1		ETW1		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		TCDYX XXXB		TCDYX XXXA		TCDYX XXXC		TCDYX XXXD		TCDYX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
UNC3 Strength [ksi]	**Mean**	156.3	154.8	138.3	142.4	119.1	119.4	97.71	97.46	73.35	75.35
	Minimum	136.9	135.2	122.2	129.5	105.4	105.8	80.21	80.21	60.52	64.41
	Maximum	169.2	166.6	151.5	154.4	129.5	129.3	113.8	113.4	84.20	87.32
	C.V.(%)	5.273	4.955	5.133	4.174	5.289	5.124	10.00	10.56	9.778	8.950
	No. Specimens	19		18		10		20		36	
	No. Prepreg Lots	3		3		1		3		5	
UNC3 Modulus [Msi]	**Mean**	12.57	12.46	12.41	12.97	12.46	12.50	11.98	11.90	12.08	12.45
	Minimum	11.85	11.47	11.85	11.92	12.19	12.24	10.86	10.47	11.44	11.54
	Maximum	13.30	13.24	13.13	13.91	12.90	13.03	12.96	13.21	12.88	13.35
	C.V.(%)	2.974	3.687	2.687	3.770	1.885	2.043	4.801	6.407	3.284	4.607
	No. Specimens	18		19		9		20		30	
	No. Prepreg Lots	3		3		1		3		5	

UNC3 (ETW2): Two additional batches (4 and 5) were included.

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

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

Resin content: 33.62 %wt **Comp. density:** 1.534 g/cc
Fiber volume: 56.88 %vol
Ply count: 24

Test method: ASTM D5766-23

Normalized by: 0.004800 in. CPT

Open-Hole Tension 1
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[45/0/-45/90]3S

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDDX XXXB		TCDDX XXXA		TCDDX XXXC		TCDDX XXXD		TCDDX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHT1 Strength [ksi]	**Mean**	75.88	73.46	80.97	79.56	83.39	81.61	88.15	85.26	91.07	88.13
	Minimum	72.57	68.30	78.26	72.58	78.60	73.28	85.92	81.14	87.67	82.43
	Maximum	79.62	78.76	84.27	86.41	87.82	87.71	90.20	88.71	95.41	93.71
	C.V.(%)	2.786	4.462	2.458	4.843	2.993	4.847	1.494	2.247	3.015	4.206
	No. Specimens	18		18		18		18		18	
	No. Prepreg Lots	3		3		3		3		3	

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg									**Open-Hole Tension 2** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S	
Resin content:	32.99 %wt	**Comp. density:** 1.534 g/cc									
Fiber volume:	57.41 %vol										
Ply count:	20										
Test method:	ASTM D5766-23										
Normalized by:	0.004800	in. CPT									
		CTD		**RTD**		**ETD1**		**ETW1**		**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		TCDEX XXXB		TCDEX XXXA		TCDEX XXXC		TCDEX XXXD		TCDEX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHT2 Strength [ksi]	**Mean**	60.58	58.99	55.09	53.86	52.78	52.61	52.50	51.54	51.51	50.45
	Minimum	58.41	56.66	52.51	50.66	52.16	51.02	50.40	47.55	48.25	46.98
	Maximum	63.74	61.45	56.62	56.61	53.72	54.11	55.03	55.35	55.68	54.68
	C.V.(%)	2.171	2.205	1.857	3.081	1.172	2.329	2.600	3.871	3.943	4.457
	No. Specimens	18		18		6		18		18	
	No. Prepreg Lots	3		3		1		3		3	

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg										
Resin content:	32.39 %wt	**Comp. density:** 1.532 g/cc									
Fiber volume:	57.87 %vol										
Ply count:	20										
Test method:	ASTM D5766-23										
Normalized by:	0.004800	in. CPT									

Open-Hole Tension 3
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[45/90/-45/0/0/45/0/0/-45/0]S

		CTD		RTD		ETD1		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDFX XXXB		TCDFX XXXA		TCDFX XXXC		TCDFX XXXD		TCDFX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHT3 Strength [ksi]	**Mean**	117.9	114.3	127.7	124.6	135.2	134.5	152.2	150.2	167.1	163.8
	Minimum	112.3	106.5	120.6	113.7	125.2	123.3	138.8	129.6	145.8	140.3
	Maximum	123.6	123.5	136.7	134.2	143.4	147.6	182.6	186.8	190.0	186.9
	C.V.(%)	3.072	3.810	3.882	5.462	4.501	6.130	7.626	9.019	7.973	8.798
	No. Specimens	18		18		6		30		31	
	No. Prepreg Lots	3		3		1		5		5	

OHT3 (ETW1, ETW2): Two additional batches (4 and 5) were included.

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg								
Resin content:	32.70 %wt	**Comp. density:**	1.535 g/cc						
Fiber volume:	57.73 %vol								
Ply count:	24								
Test method:	ASTM D6742-23								
Normalized by:	0.004800	in. CPT							

Filled-Hole Tension 1
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[45/0/-45/90]3S

		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD4X XXXB		TCD4X XXXA		TCD4X XXXD		TCD4X XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
FHT1 Strength [ksi]	**Mean**	81.91	79.72	84.29	82.78	91.79	90.63	91.56	89.52
	Minimum	78.46	73.56	79.74	76.27	88.48	82.59	88.09	84.68
	Maximum	85.46	84.75	87.27	88.16	95.05	96.08	96.07	94.73
	C.V.(%)	2.611	4.260	2.102	4.116	2.212	4.795	2.514	3.448
	No. Specimens	18		18		18		18	
	No. Prepreg Lots	3		3		3		3	

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

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

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

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

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg									**Open-Hole Compression 1** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/0/-45/90]3S	
Resin content:	32.91 %wt	**Comp. density:** 1.534 g/cc									
Fiber volume:	57.49 %vol										
Ply count:	24										
Test method:	ASTM D6484-23										
Normalized by:	0.004800	in. CPT									
		CTD		**RTD**		**ETD1**		**ETW1**		**ETW2**	
Test Temperature [°F]		-65		70		180		180		250	
Moisture Conditioning		Dry		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH								160F,85%		160F,85%	
Source code		TCDGX XXXB		TCDGX XXXA		TCDGX XXXC		TCDGX XXXD		TCDGX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHC1 Strength [ksi]	**Mean**	48.89	48.90	43.04	42.29	39.09	38.10	37.67	37.04	32.87	32.10
	Minimum	47.70	47.68	41.25	40.85	37.12	36.55	34.44	34.07	30.95	30.22
	Maximum	50.89	50.99	44.77	44.19	40.76	39.30	39.48	40.02	34.92	33.36
	C.V.(%)	2.586	2.672	1.995	2.387	2.398	2.034	4.090	4.892	2.998	3.031
	No. Specimens	6		18		19		18		18	
	No. Prepreg Lots	1		3		3		3		3	

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg									**Open-Hole Compression 2** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S	
Resin content:	32.89 %wt	**Comp. density:** 1.537 g/cc									
Fiber volume:	57.63 %vol										
Ply count:	20										
Test method:	ASTM D6484-23										
Normalized by:	0.004800	in. CPT									
		CTD		**RTD**		**ETD1**		**ETW1**		**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		TCDHX XXXB		TCDHX XXXA		TCDHX XXXC		TCDHX XXXD		TCDHX XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHC2 Strength [ksi]	**Mean**	43.69	43.94	37.42	36.93	31.92	31.77	30.05	29.51	25.42	24.75
	Minimum	42.12	42.24	35.90	35.58	31.37	30.92	27.83	27.82	24.07	23.88
	Maximum	45.90	46.24	40.90	39.19	32.78	32.56	32.00	31.20	26.94	26.27
	C.V.(%)	3.631	3.759	3.331	3.015	1.524	1.846	3.869	3.525	3.254	2.759
	No. Specimens	6		18		6		18		18	
	No. Prepreg Lots	1		3		1		3		3	

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

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

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg								
Resin content:	32.93 %wt	**Comp. density:**	1.535 g/cc						
Fiber volume:	57.52 %vol								
Ply count:	24								
Test method:	ASTM D6742-23								
Normalized by:	0.004800	in. CPT							

Filled-Hole Compression 1
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
[45/0/-45/90]3S

		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD7X XXXB		TCD7X XXXA		TCD7X XXXD		TCD7X XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
FHC1 Strength [ksi]	**Mean**	81.42	81.92	68.03	66.91	56.58	55.65	49.16	47.54
	Minimum	77.86	78.62	64.26	62.19	52.79	50.00	47.26	44.84
	Maximum	85.89	86.29	73.45	70.25	59.23	59.19	51.83	51.91
	C.V.(%)	3.983	3.686	3.801	3.678	3.075	3.983	2.944	5.001
	No. Specimens	6		18		18		18	
	No. Prepreg Lots	1		3		3		3	

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg		**Filled-Hole Compression 2** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/-45/0/45/-45/45/-45/90/45/-45]S
Resin content:	32.84 %wt	**Comp. density:** 1.535 g/cc	
Fiber volume:	57.60 %vol		
Ply count:	20		
Test method:	ASTM D6742-23		
Normalized by:	0.004800	in. CPT	

		CTD		RTD		ETW1		ETW2	
Test Temperature [°F]		-65		70		180		250	
Moisture Conditioning		Dry		Dry		Equilibrium		Equilibrium	
Equilibrium at T, RH						160F,85%		160F,85%	
Source code		TCD8X XXXB		TCD8X XXXA		TCD8X XXXD		TCD8X XXXE	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
FHC2 Strength [ksi]	**Mean**	65.41	65.94	55.34	54.61	45.84	45.23	37.23	36.37
	Minimum	63.63	63.62	51.78	51.59	41.32	42.00	34.77	32.88
	Maximum	67.69	67.82	60.21	57.21	48.46	48.85	39.25	39.36
	C.V.(%)	2.478	2.628	4.567	3.079	4.566	3.740	3.290	4.187
	No. Specimens	6		20		18		18	
	No. Prepreg Lots	1		3		3		3	

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

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

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

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

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

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

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

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

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

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

Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg					**Compression After Impact 1** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [45/0/-45/90]5S		
Resin content:	33.37 %wt	**Comp. density:** 1.530 g/cc						
Fiber volume:	56.97 %vol							
Ply count:	40							
Test method:	ASTM D7136-20/D7137-23							
Normalized by:	0.004800	in. CPT						
		CTD		**RTD**				
Test Temperature [°F]		-65		70				
Moisture Conditioning		Dry		Dry				
Equilibrium at T, RH								
Source code		TCDKX XXXB		TCDKX XXXA				
		Normalized	**Measured**	**Normalized**	**Measured**			
CAI1 Strength [ksi]	**Mean**	55.71	54.94	49.58	49.73			
	Minimum	50.94	50.94	45.10	45.78			
	Maximum	60.60	60.27	55.93	55.69			
	C.V.(%)	5.350	4.302	5.643	4.813			
	No. Specimens	18		30				
	No. Prepreg Lots	3		5				

CAI1 (RTD): Two additional batches (4 & 5) were included.

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

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

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

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

2.5.33 “100/0/0” Interlaminar Tension Properties (ILT)

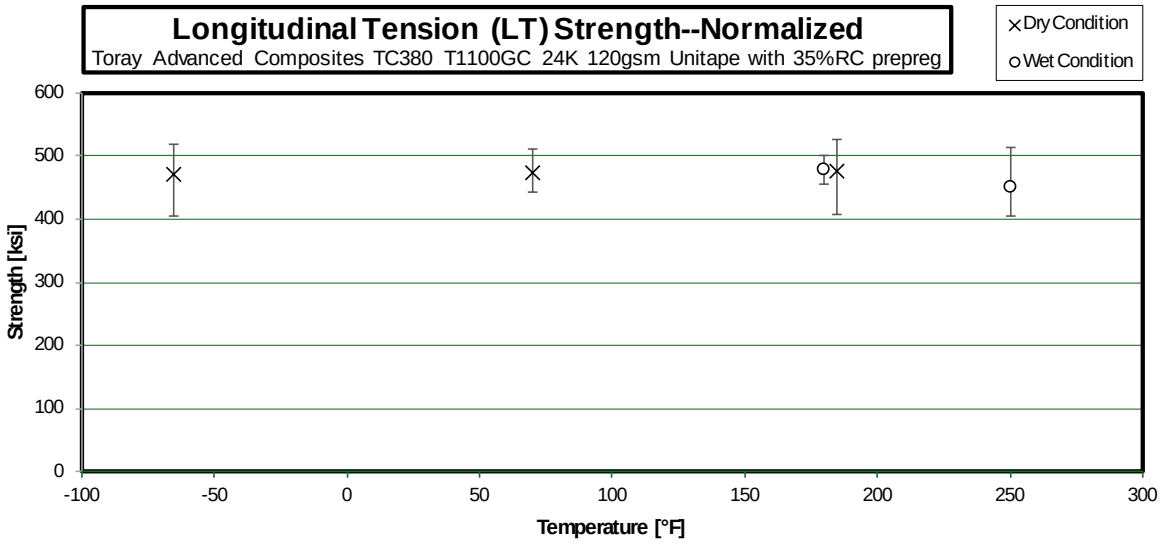
Material:	Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg					**Interlaminar Tension** Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg [0]16S			
Resin content:	36.85 %wt	**Comp. density:**	1.521 g/cc						
Fiber volume:	53.67 %vol								
Ply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

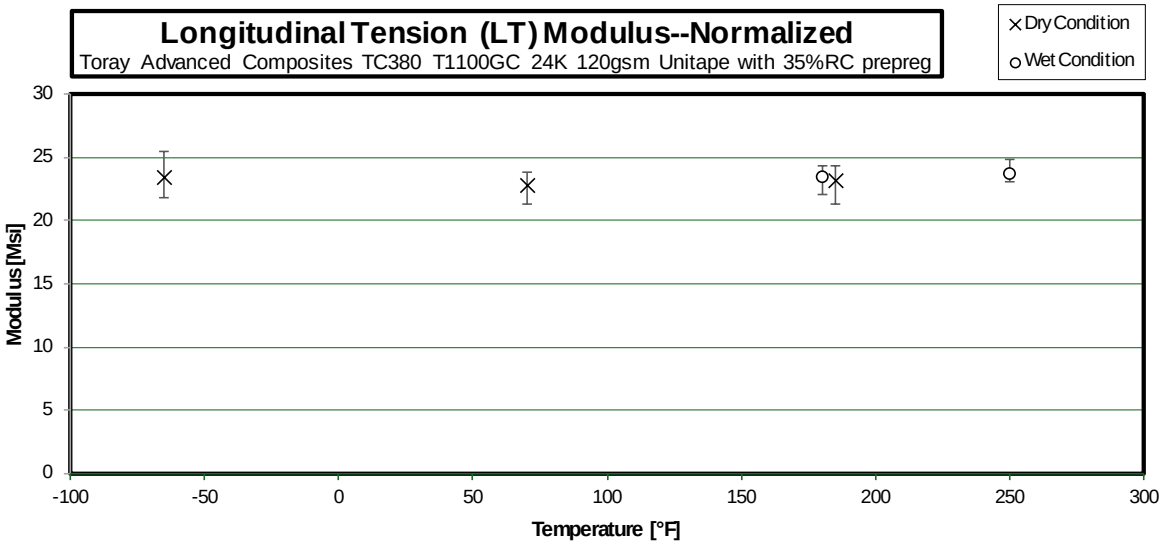
3. Individual Test Charts

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

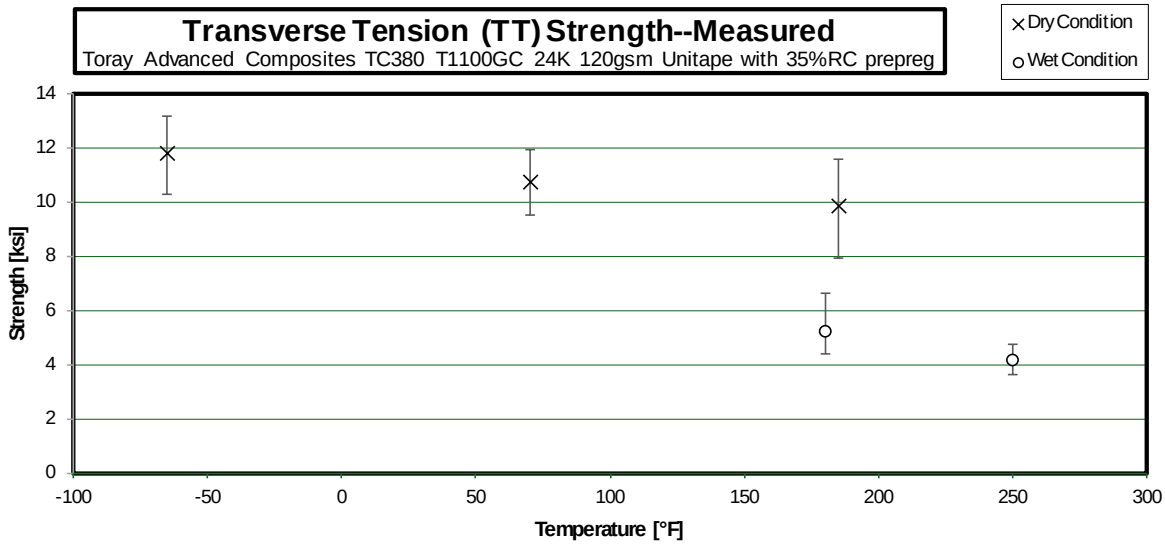
Plots have been offset for ETD1 to 185°F (from 180°F) to improve clarity and readability.

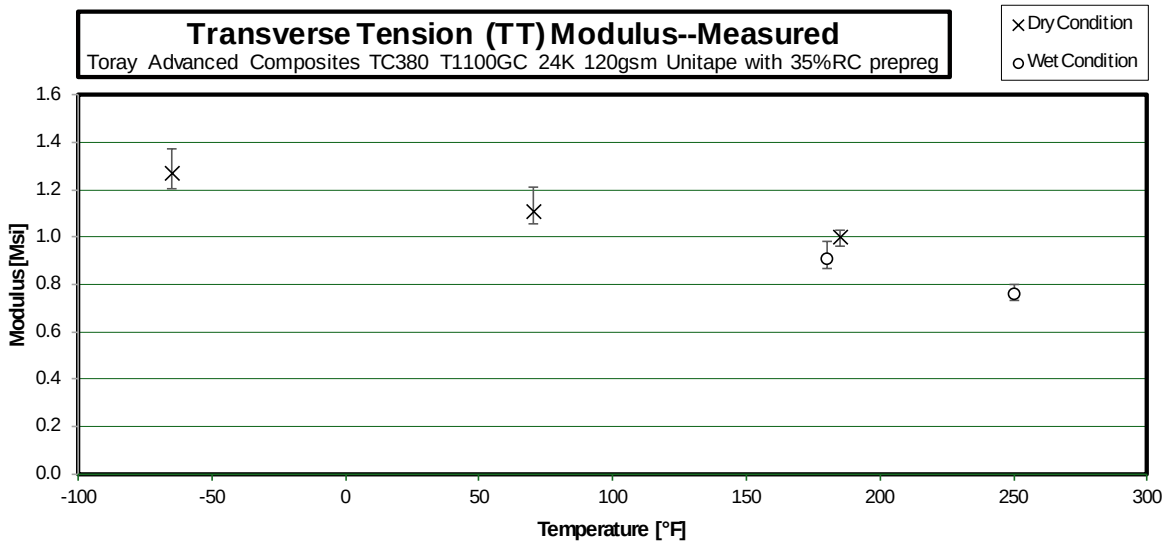
3.1 Longitudinal Tension Properties (LT)



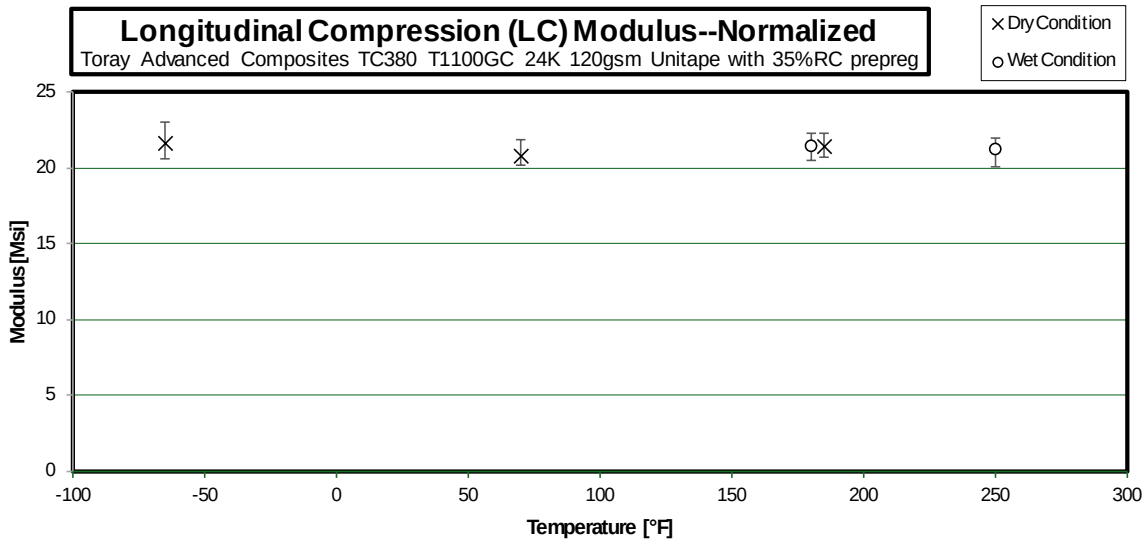


3.2 Transverse Tension Properties (TT)

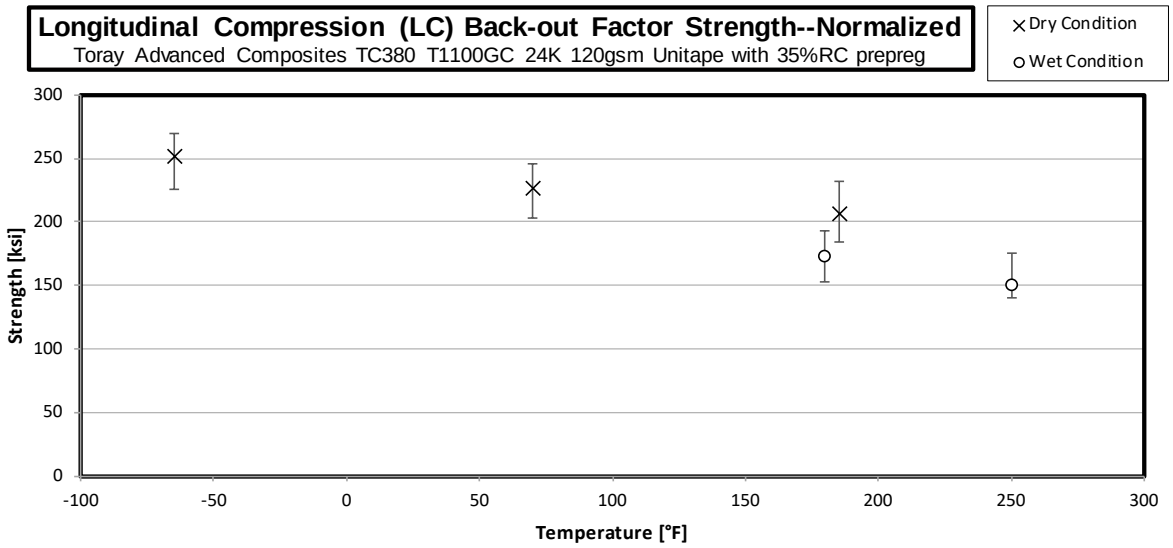




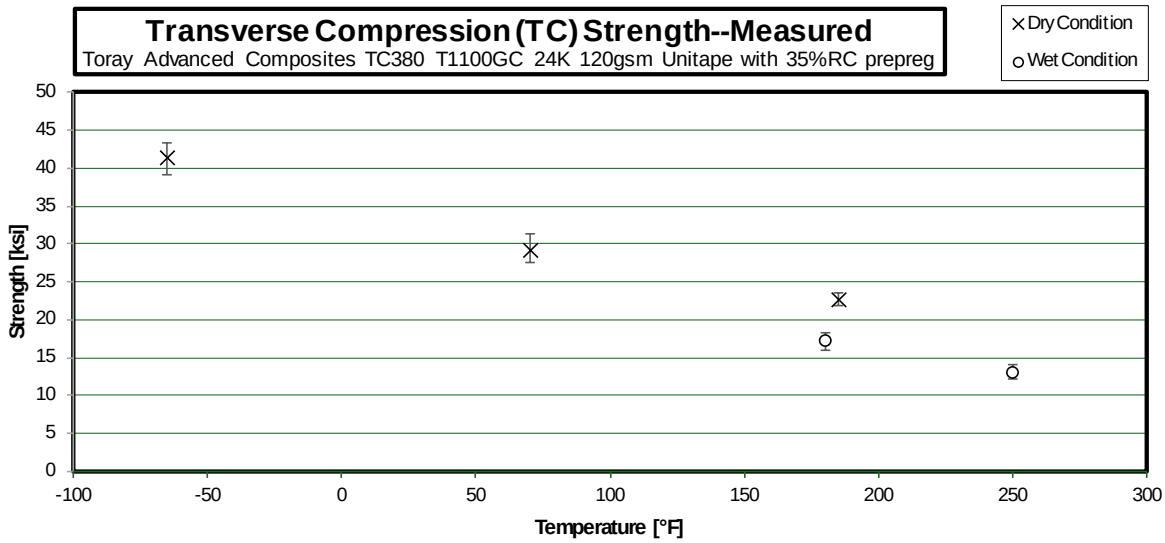
3.3 Longitudinal Compression Properties (LC)

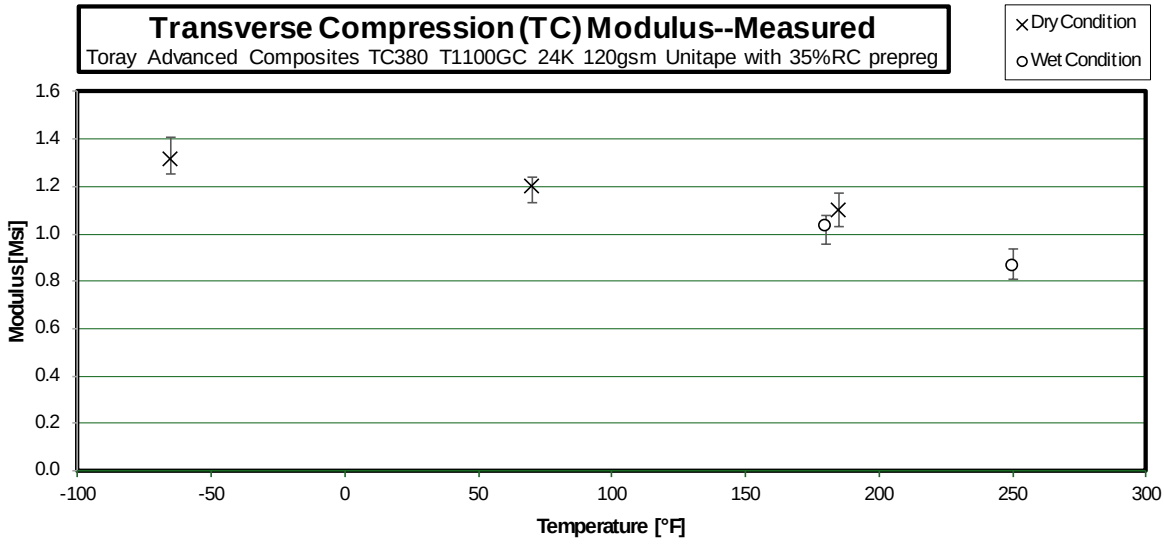


3.4 Longitudinal Compression (LC) Back-out Factor Properties

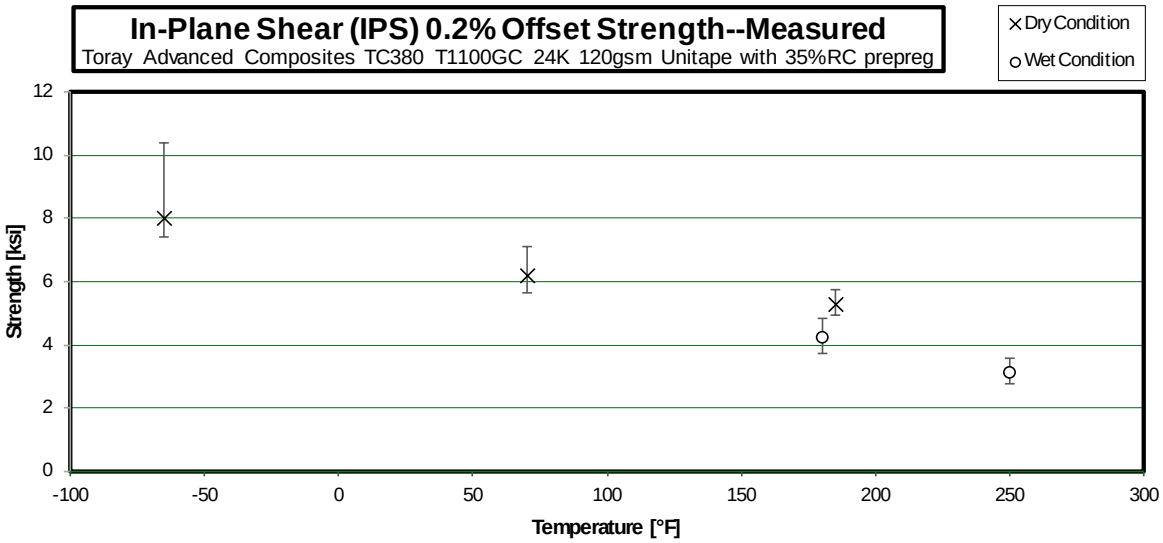


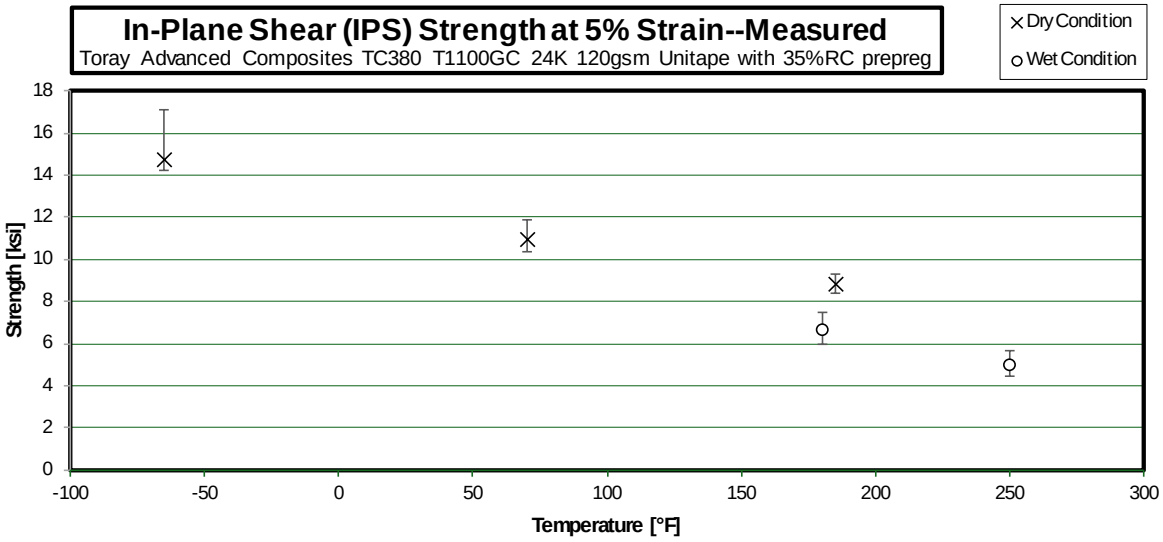
3.5 Transverse Compression Properties (TC)

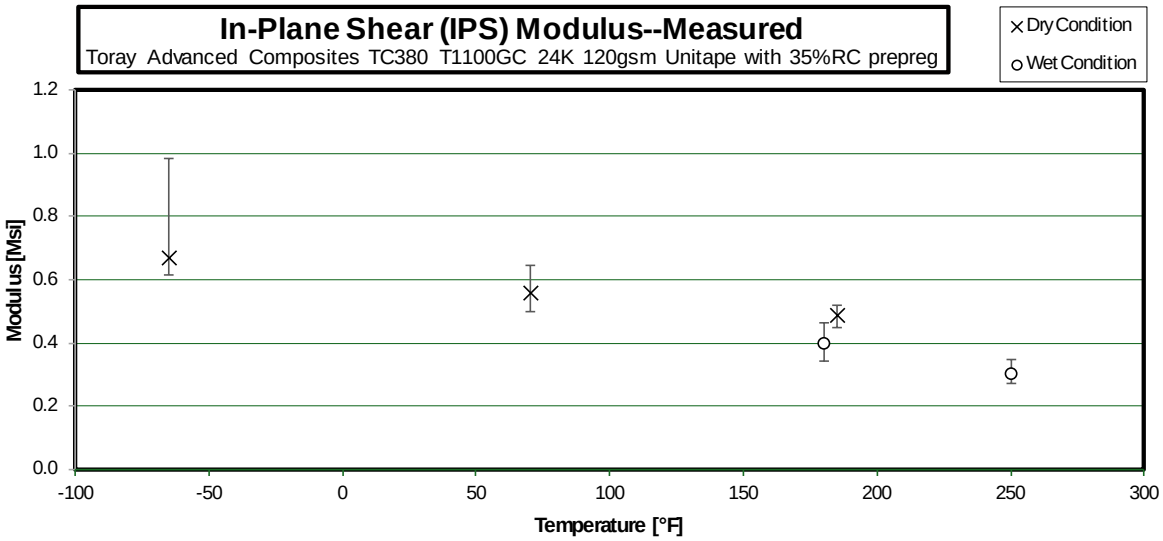




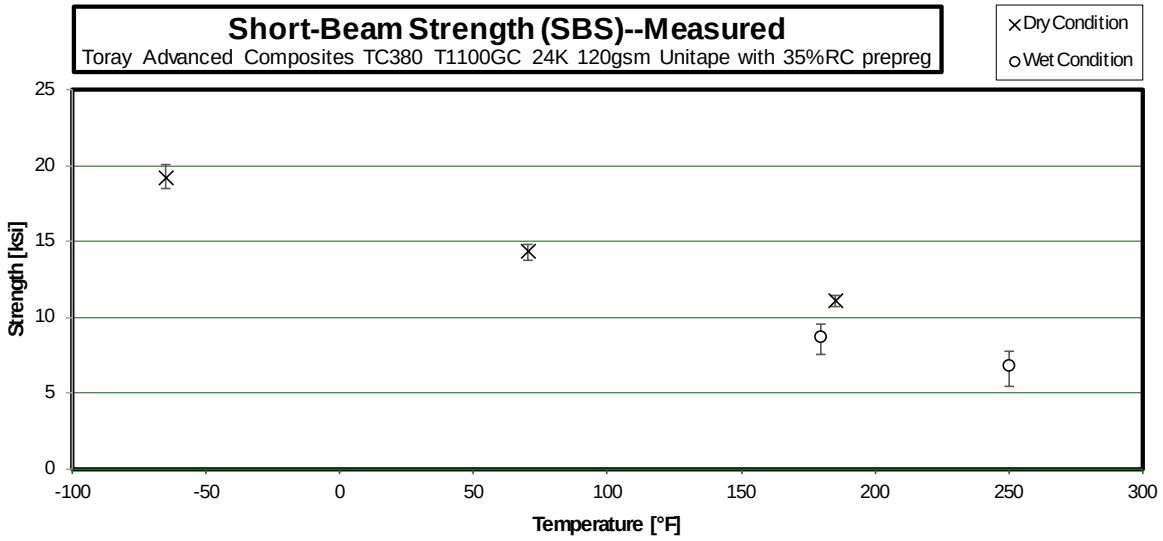
3.6 In-Plane Shear Properties (IPS)



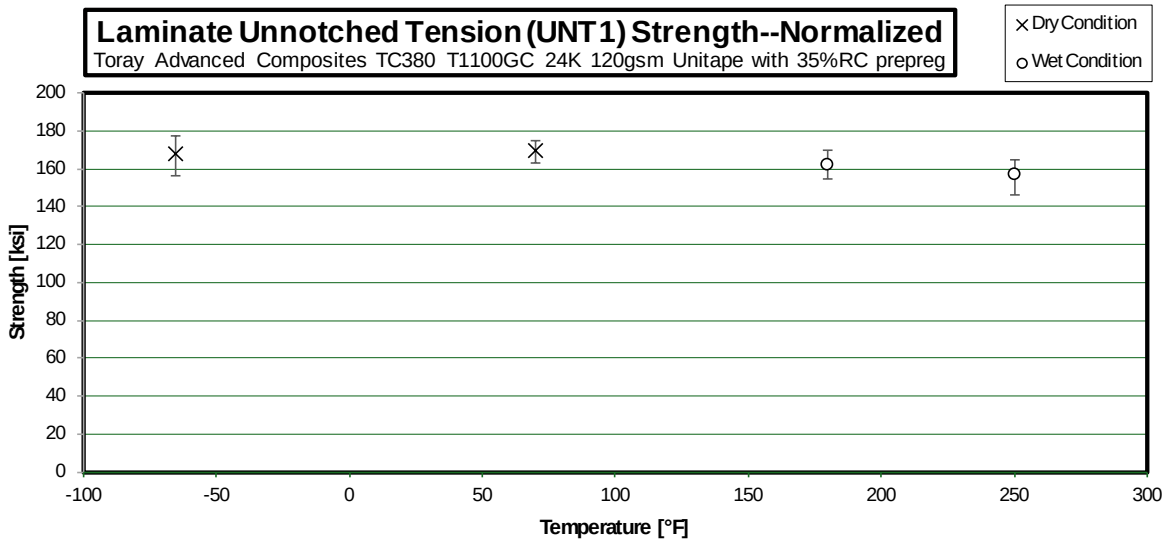


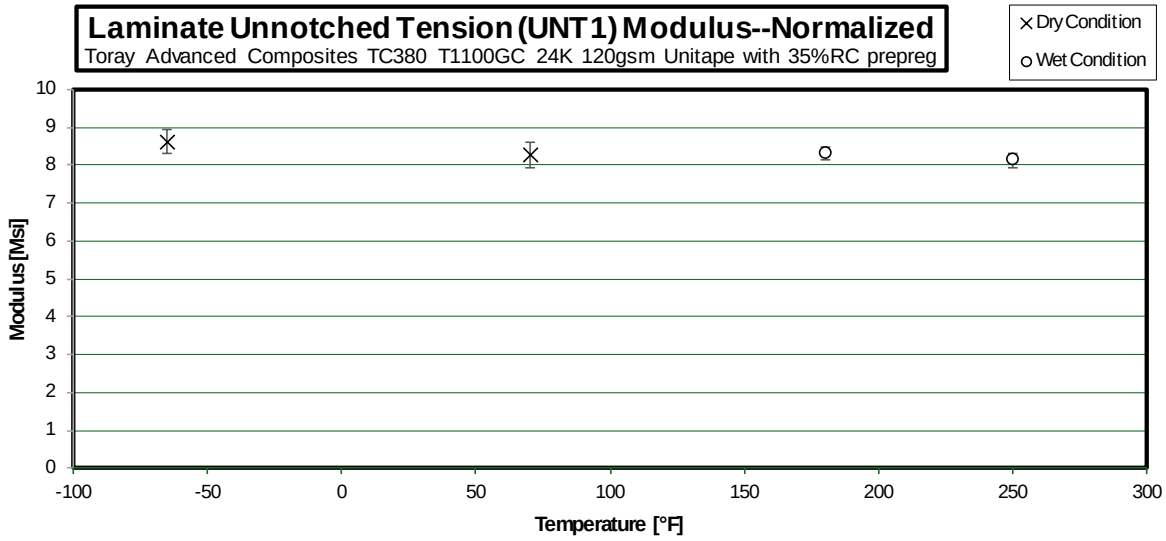


3.7 Lamina Short-Beam Shear Properties (SBS)

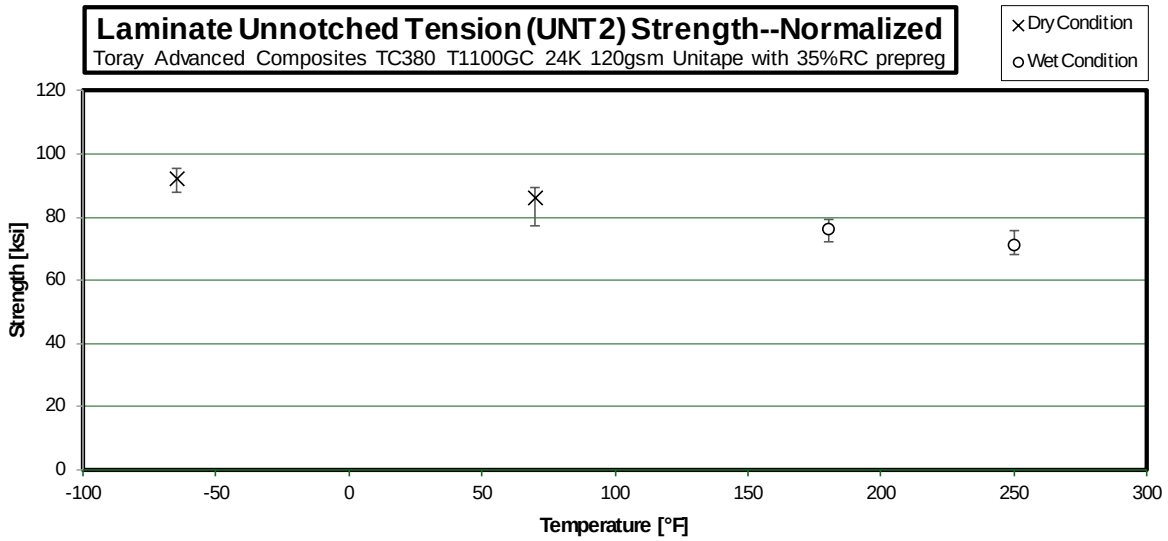


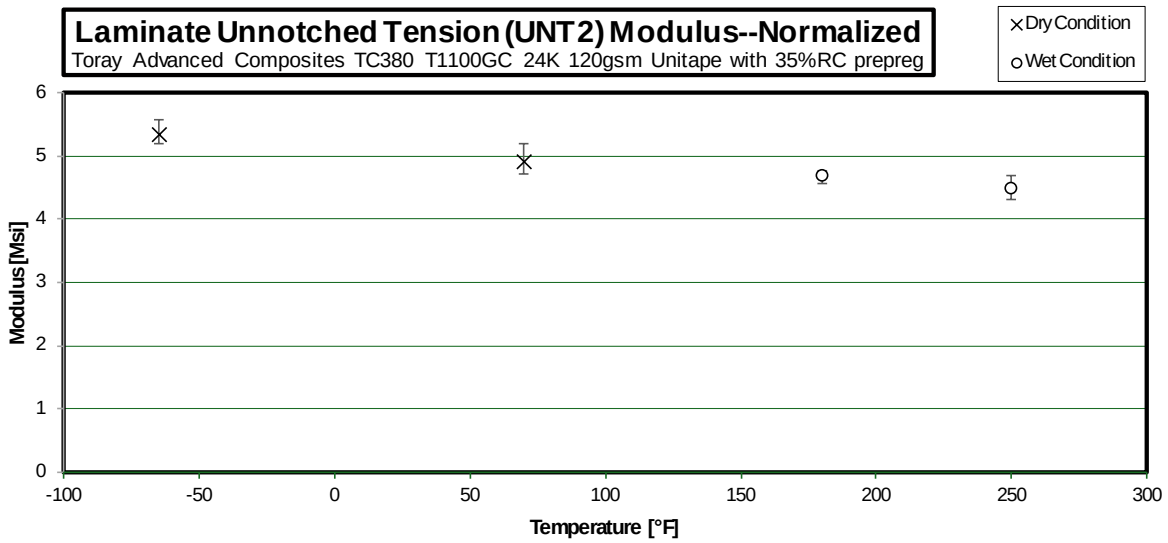
3.8 "25/50/25" Unnotched Tension 1 Properties (UNT1)



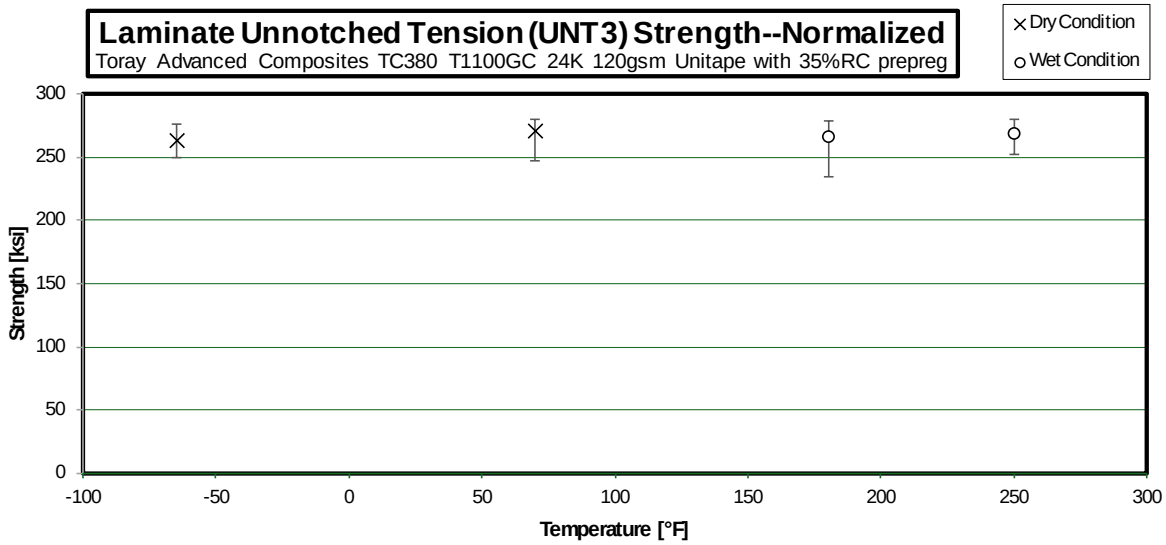


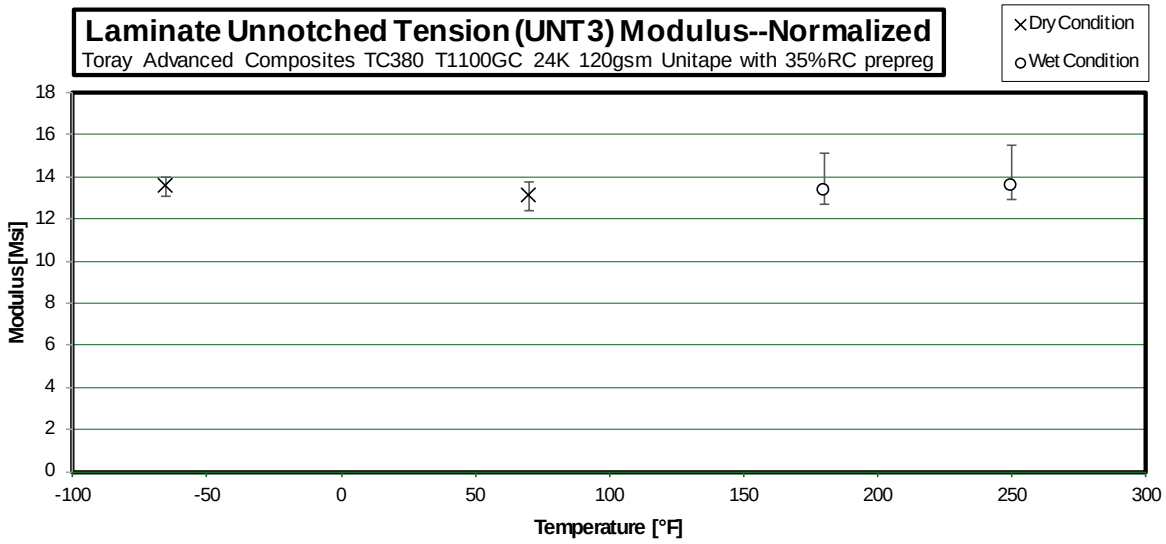
3.9 "10/80/10" Unnotched Tension 2 Properties (UNT2)



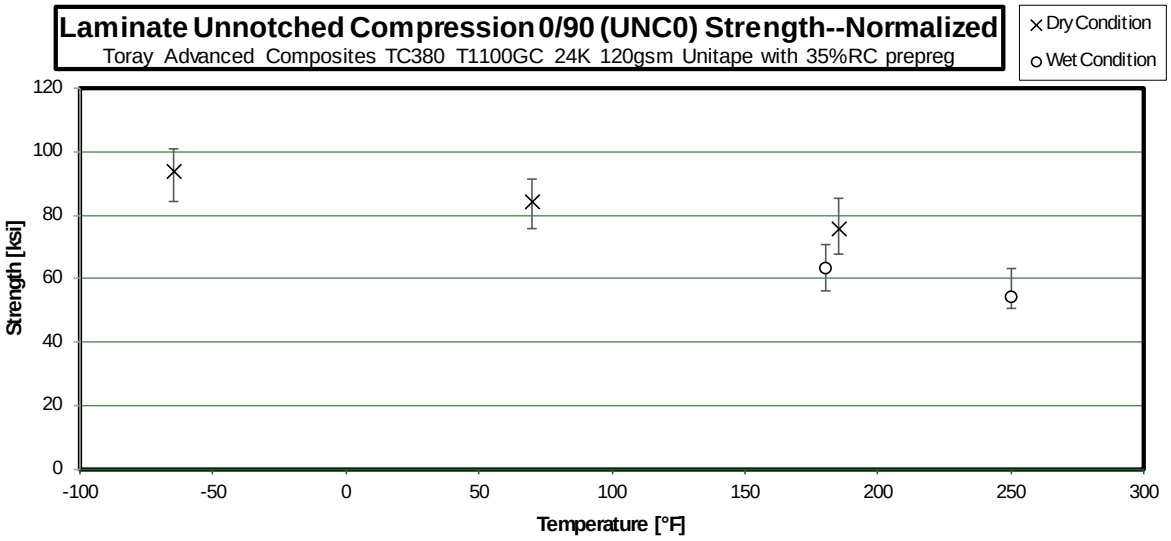


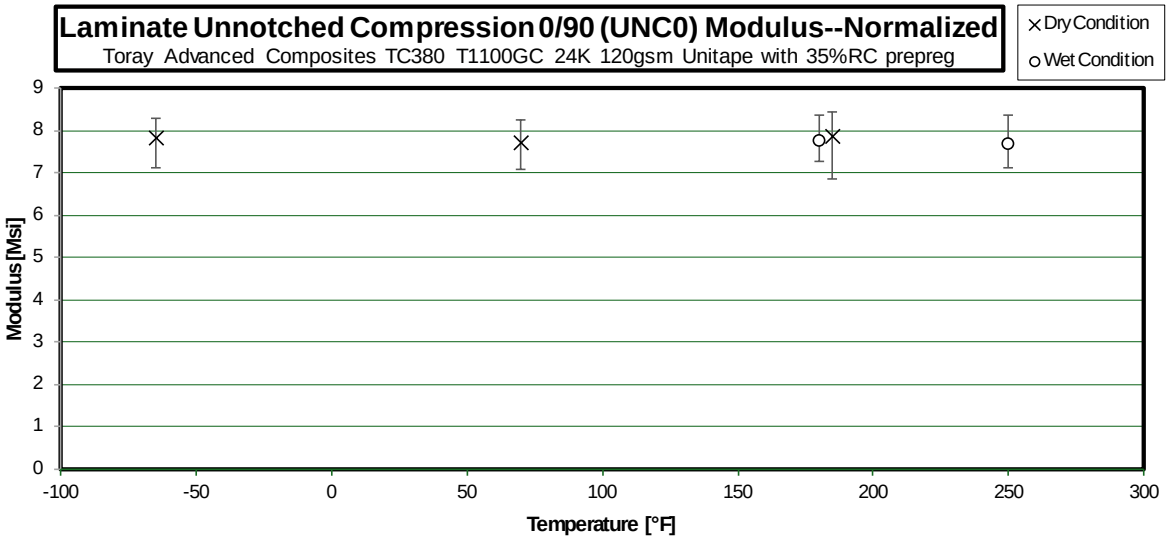
3.10 "50/40/10" Unnotched Tension 3 Properties (UNT3)



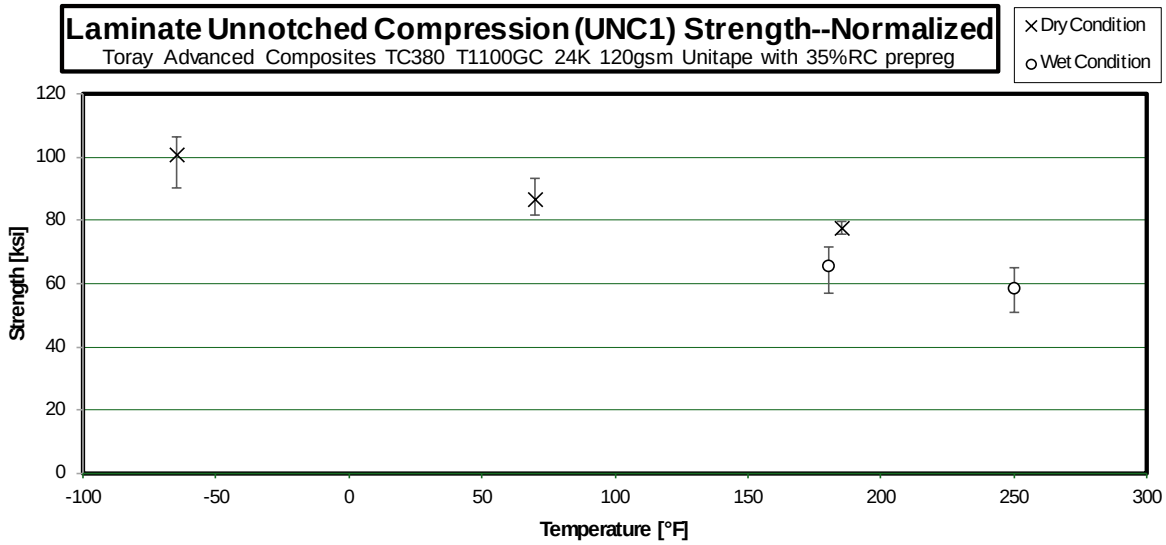


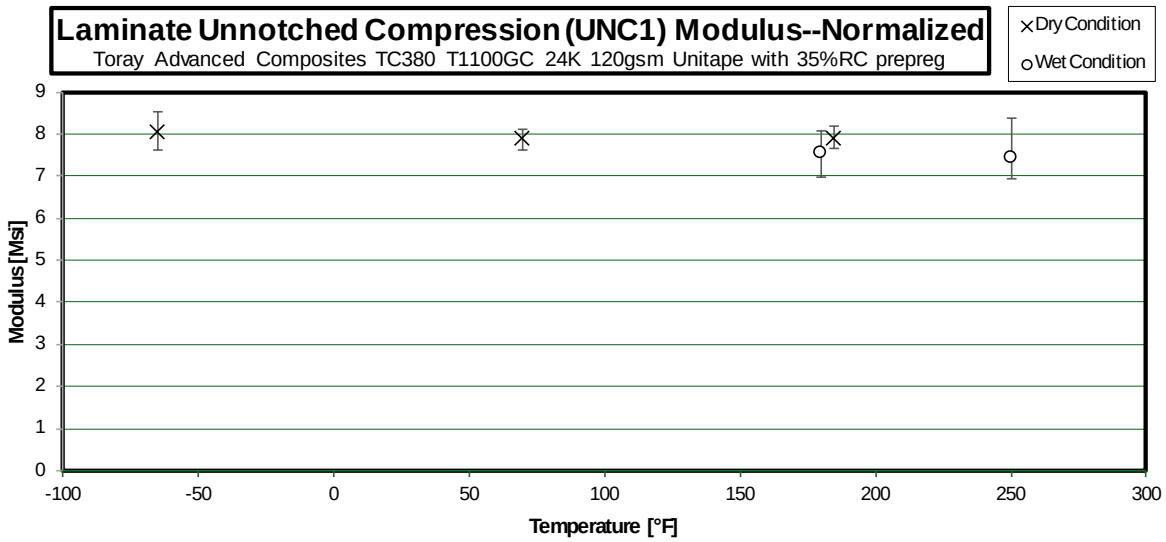
3.11 "33/0/67" Unnotched Compression 0/90 Properties (UNC0)



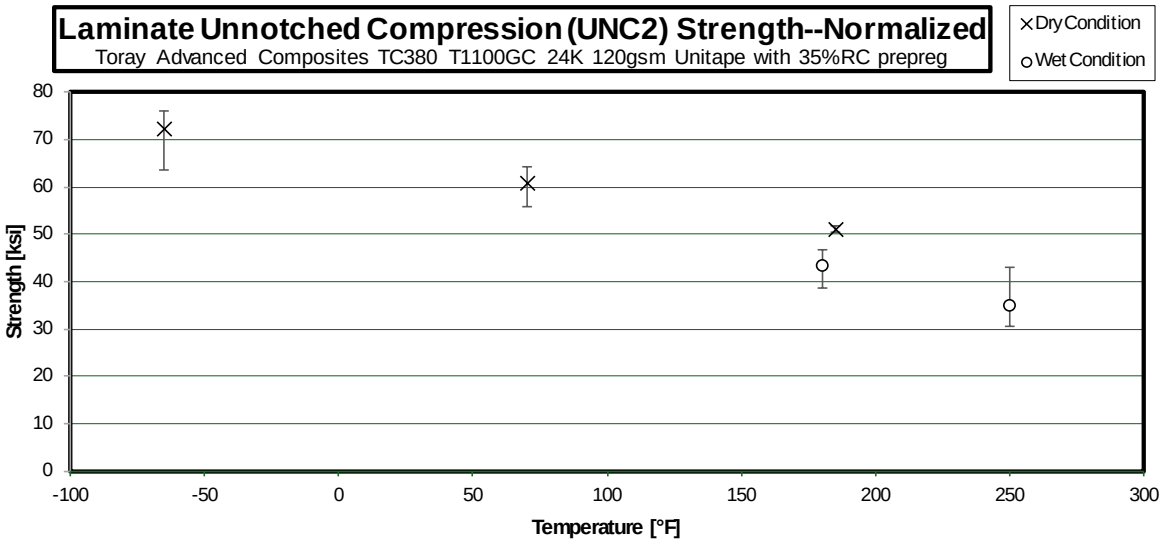


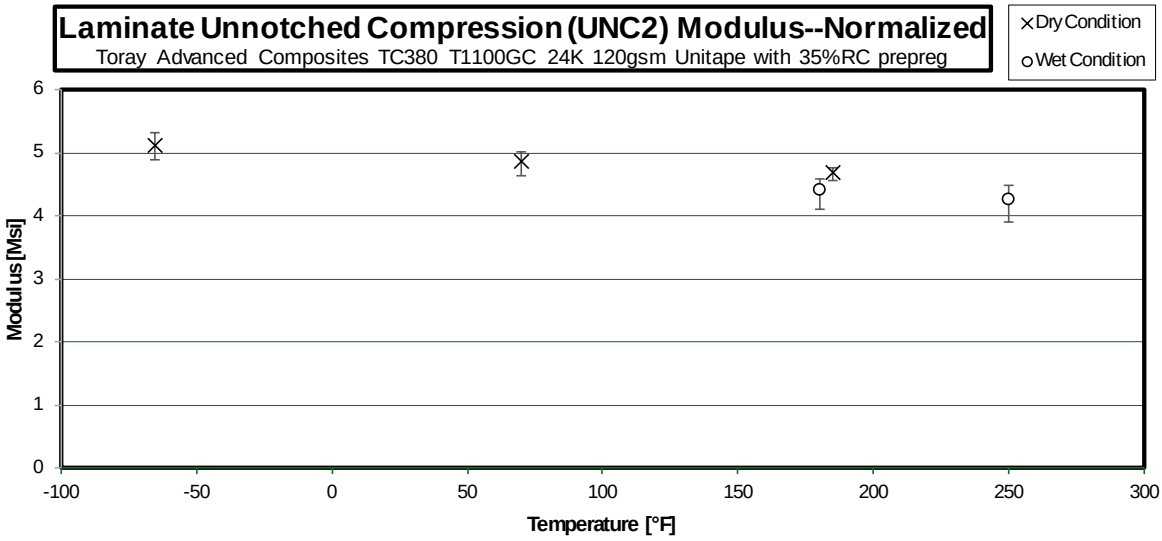
3.12 "25/50/25" Unnotched Compression 1 Properties (UNC1)



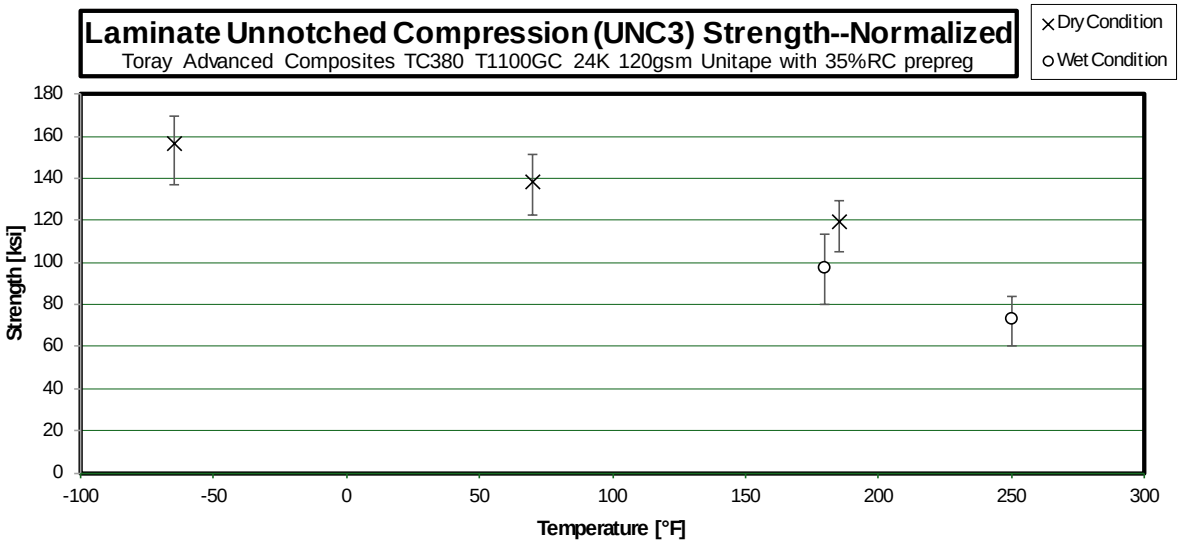


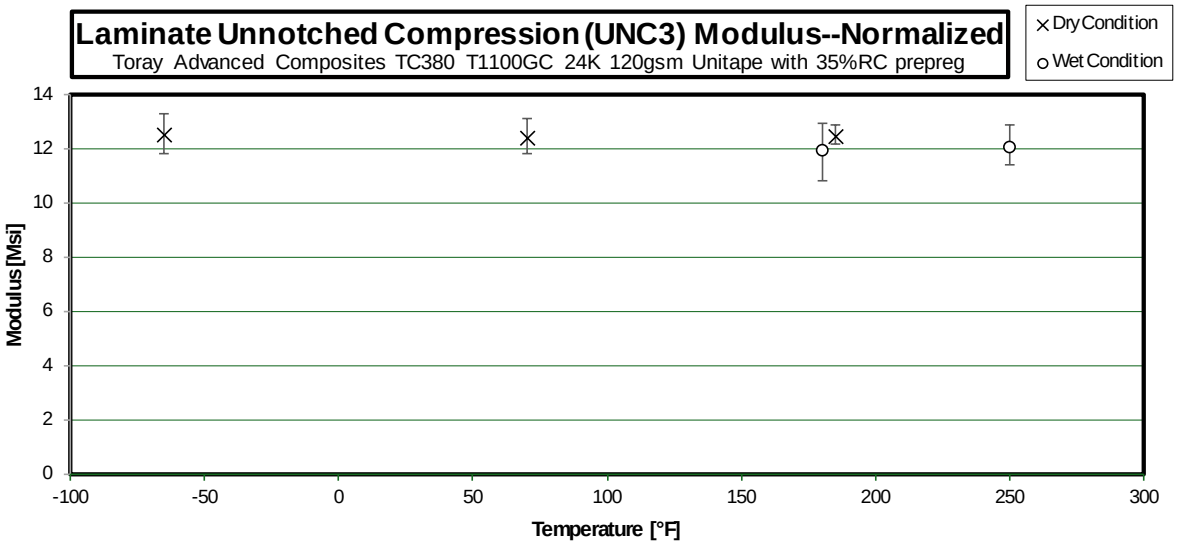
3.13 "10/80/10" Unnotched Compression 2 Properties (UNC2)



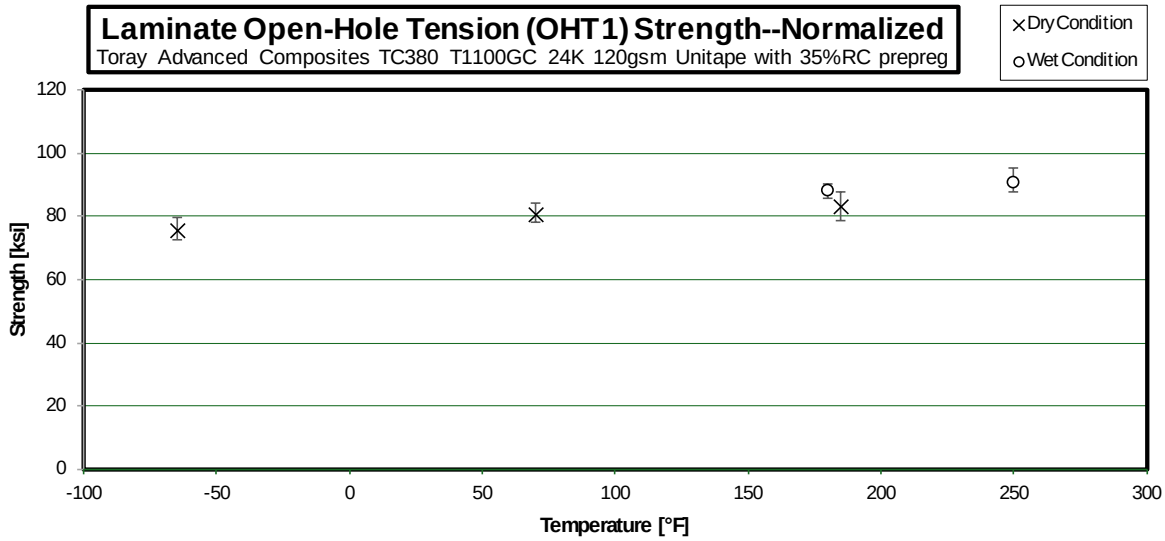


3.14 "50/40/10" Unnotched Compression 3 Properties (UNC3)

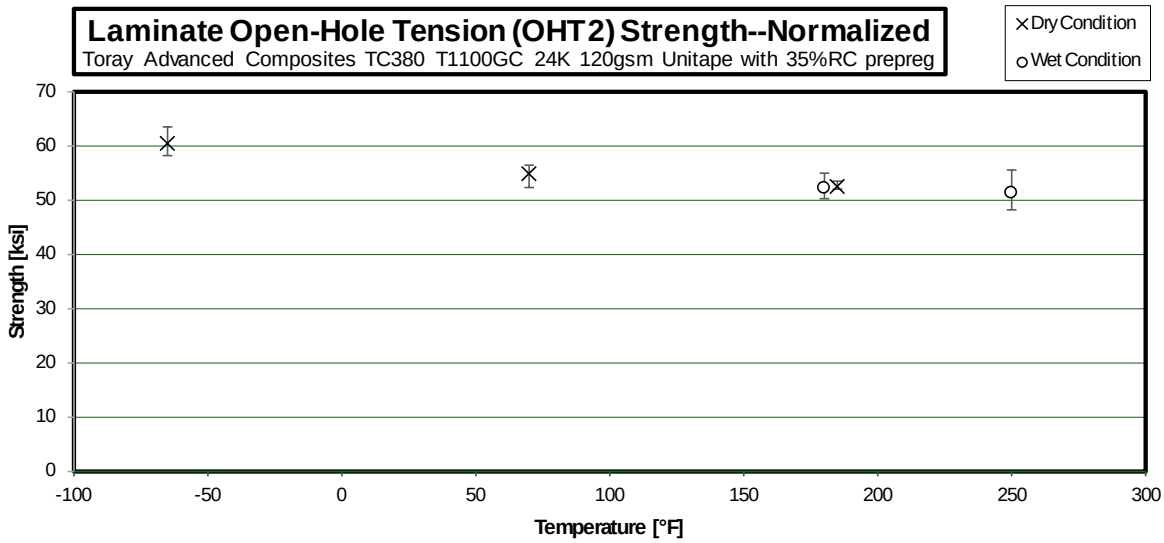




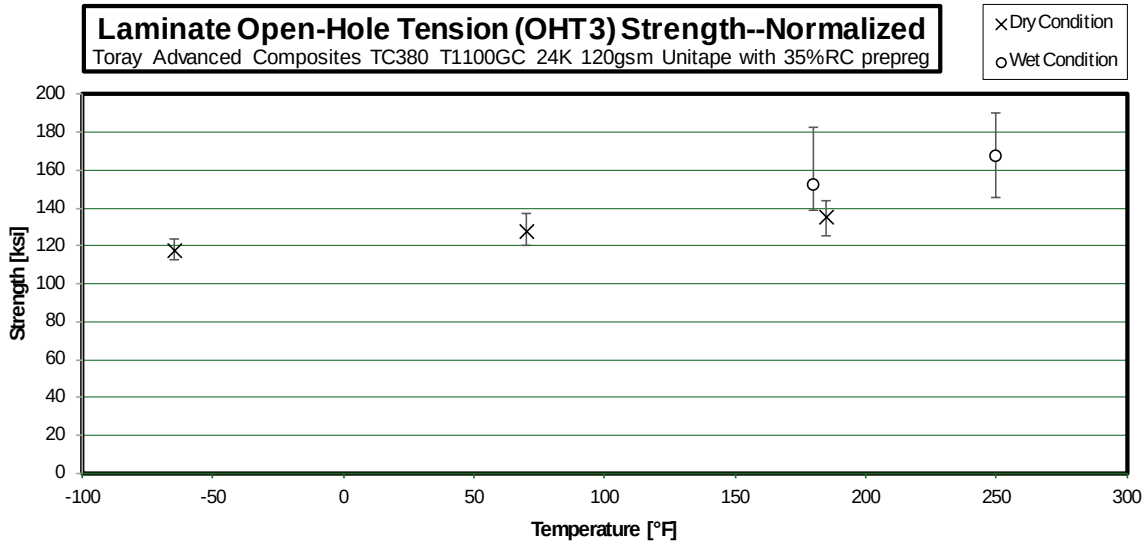
3.15 "25/50/25" Open-Hole Tension 1 Properties (OHT1)



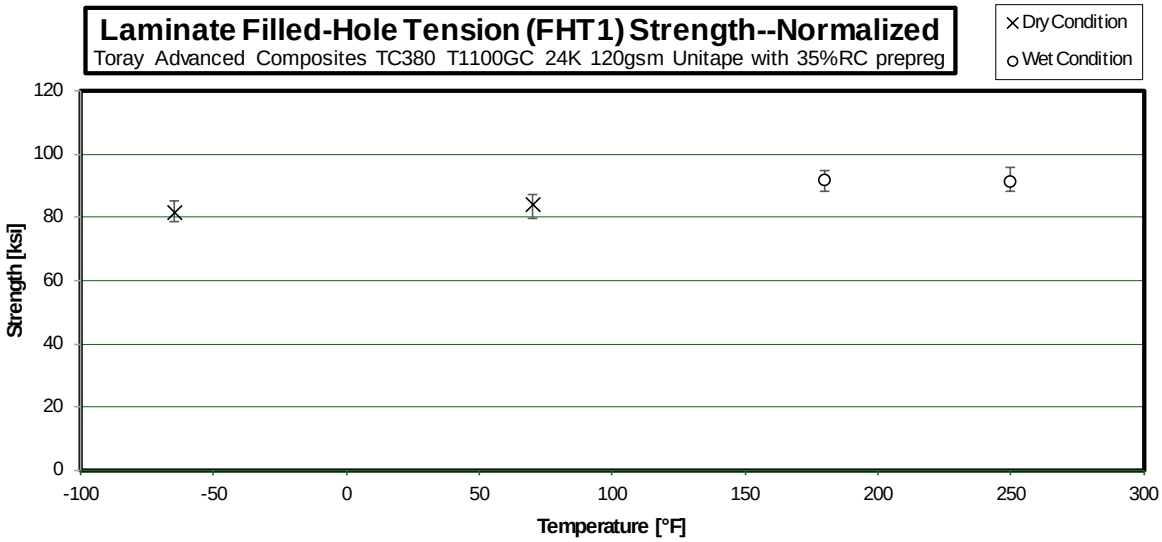
3.16 "10/80/10" Open-Hole Tension 2 Properties (OHT2)



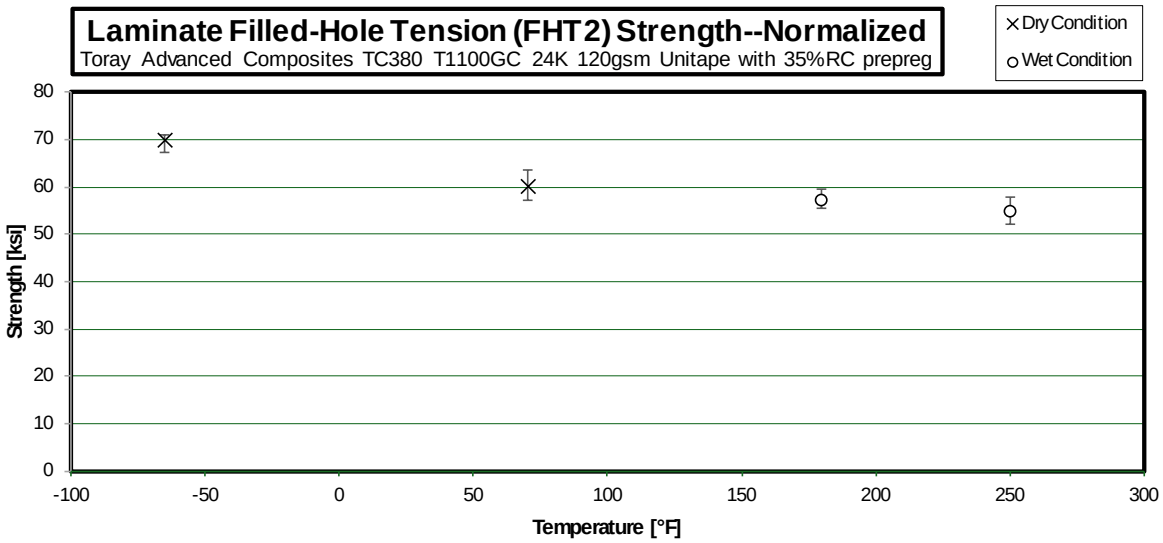
3.17 "50/40/10" Open-Hole Tension 3 Properties (OHT3)



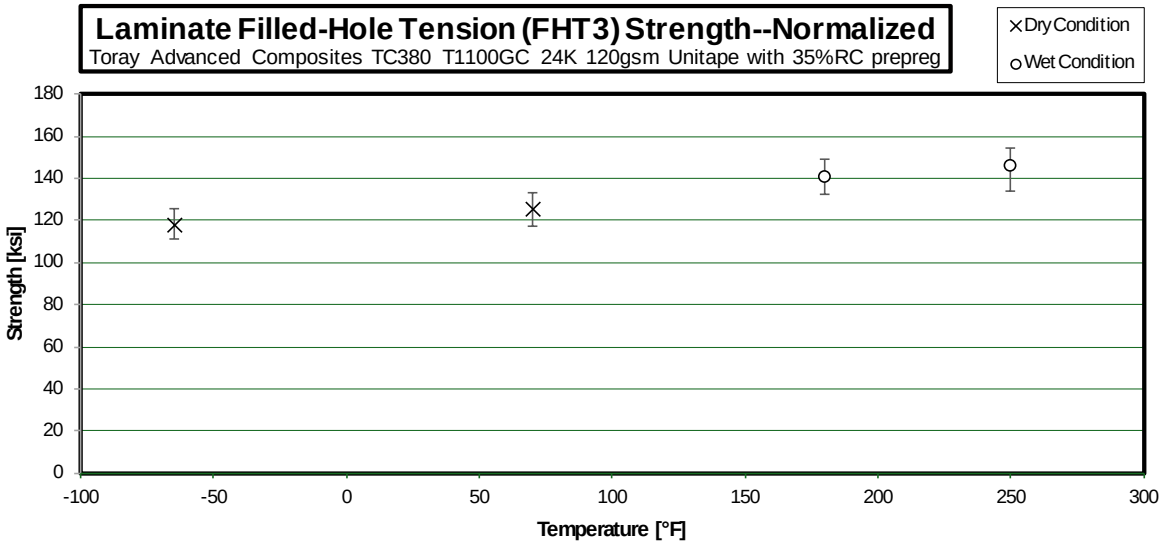
3.18 "25/50/25" Filled-Hole Tension 1 Properties (FHT1)



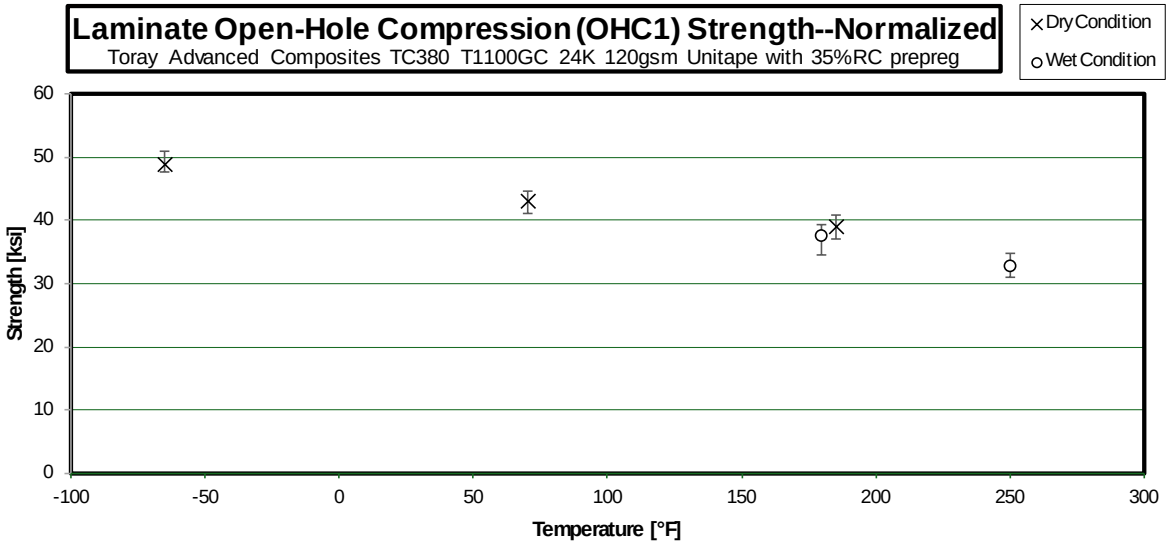
3.19 "10/80/10" Filled-Hole Tension 2 Properties (FHT2)



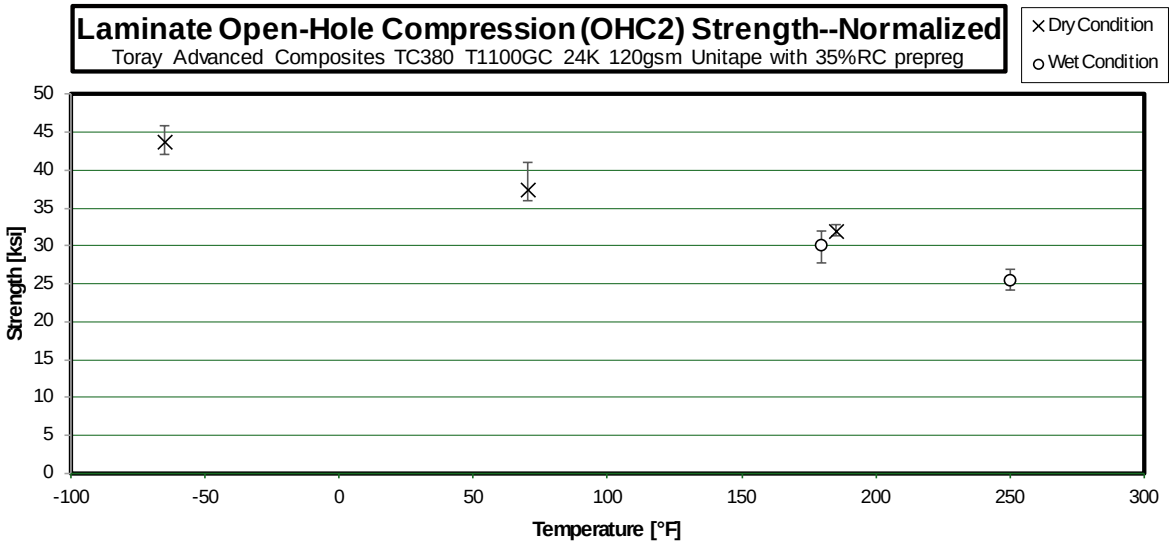
3.20 "50/40/10" Filled-Hole Tension 3 Properties (FHT3)



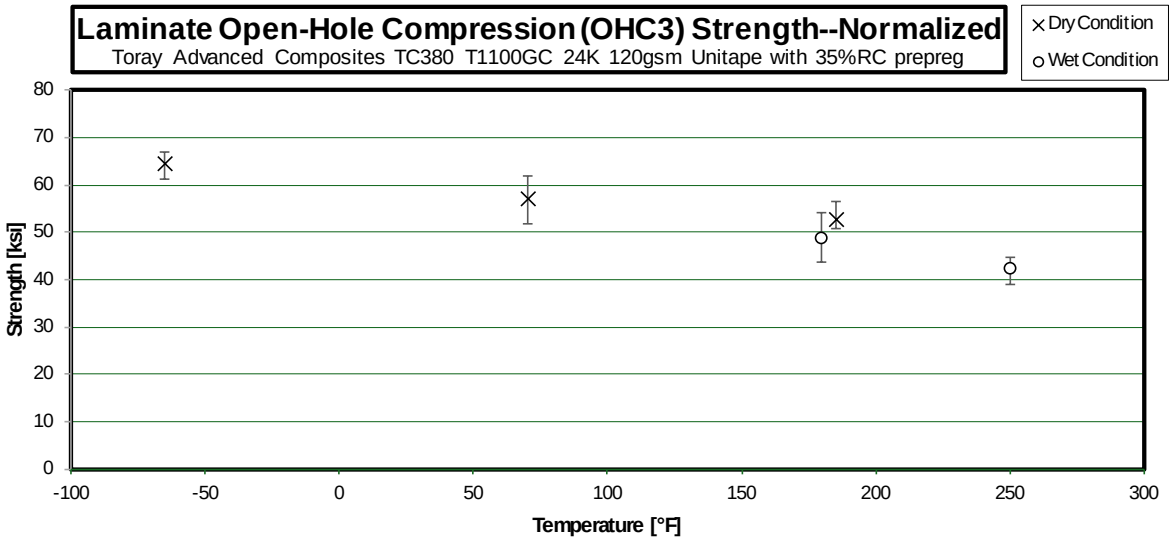
3.21 “25/50/25” Open-Hole Compression 1 Properties (OHC1)



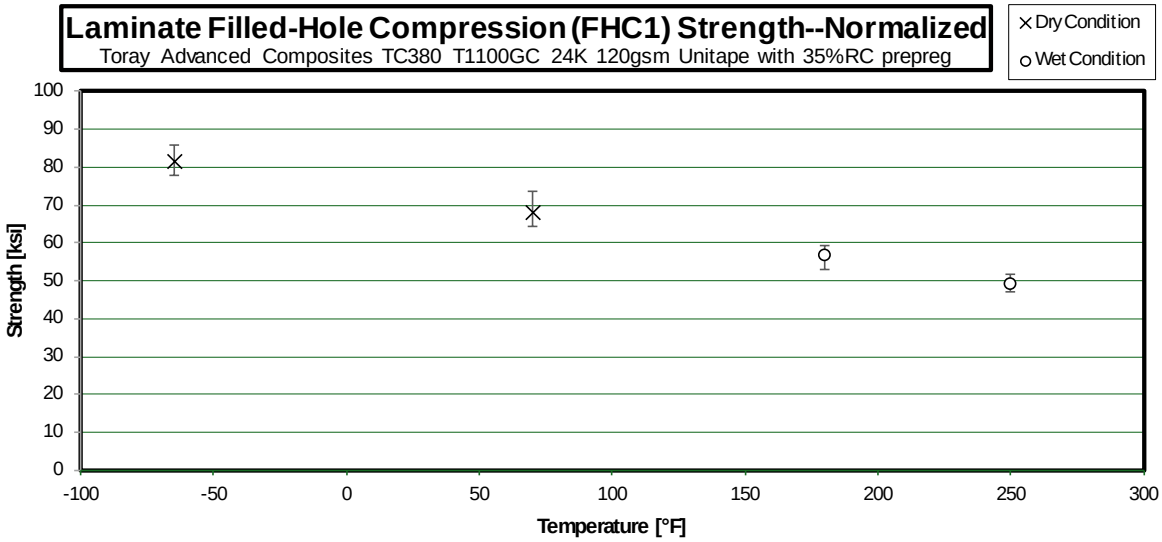
3.22 “10/80/10” Open-Hole Compression 2 Properties (OHC2)



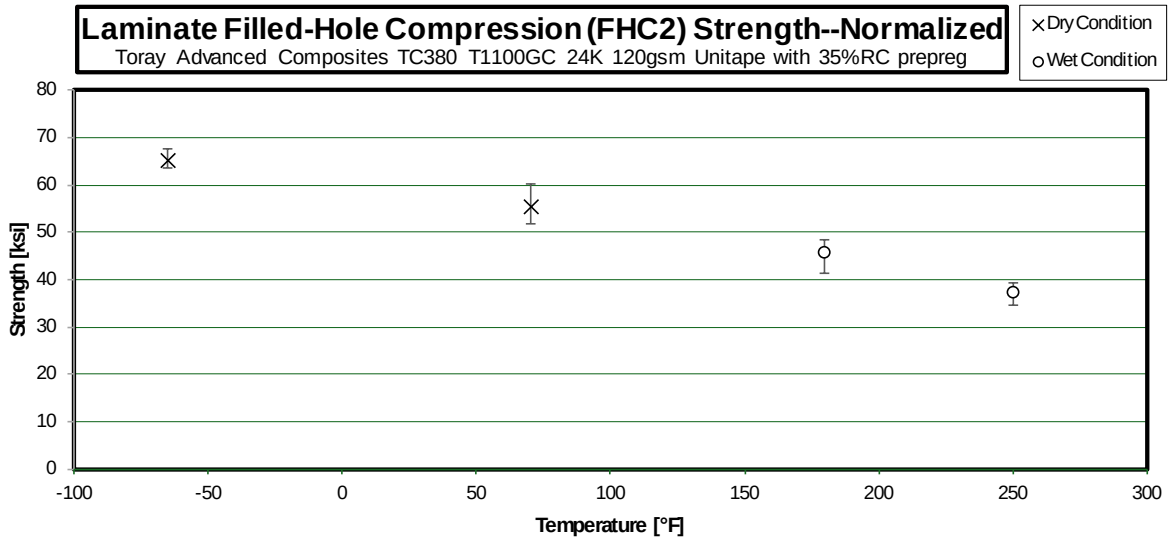
3.23 "50/40/10" Open-Hole Compression 3 Properties (OHC3)



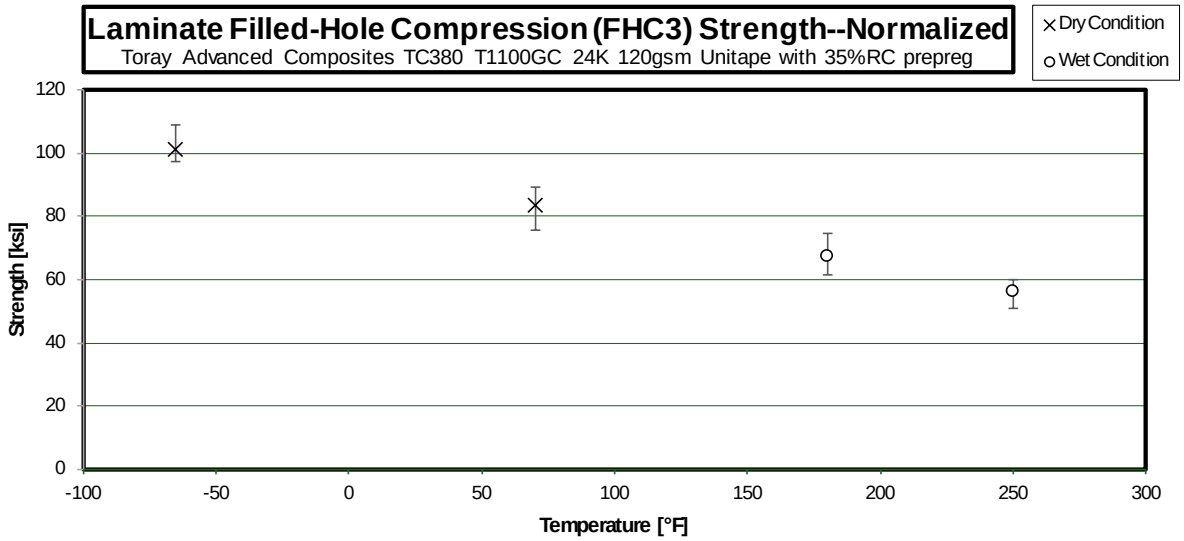
3.24 "25/50/25" Filled-Hole Compression 1 Properties (FHC1)



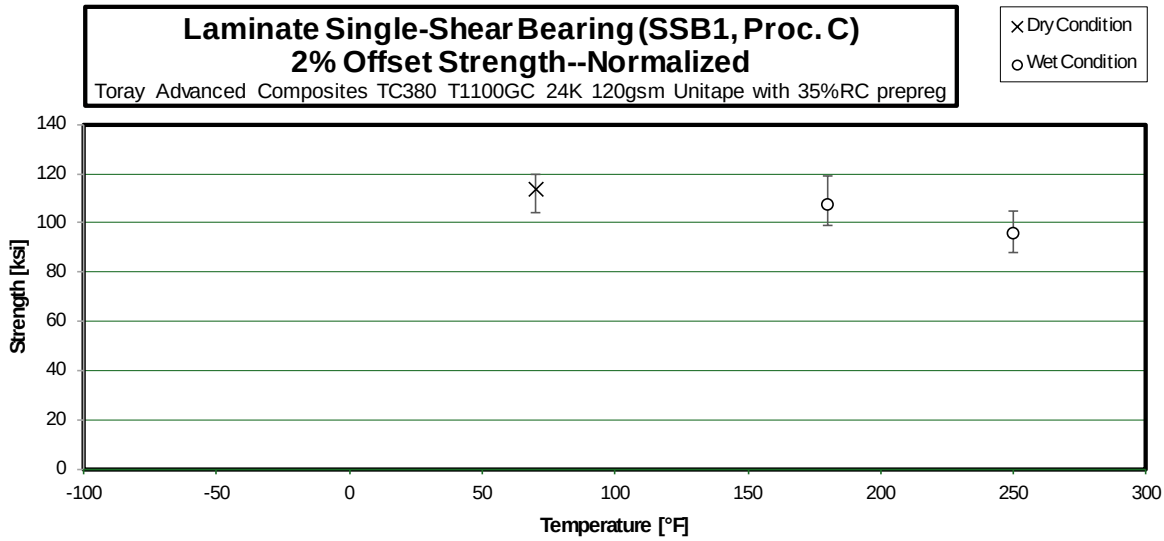
3.25 "10/80/10" Filled-Hole Compression 2 Properties (FHC2)

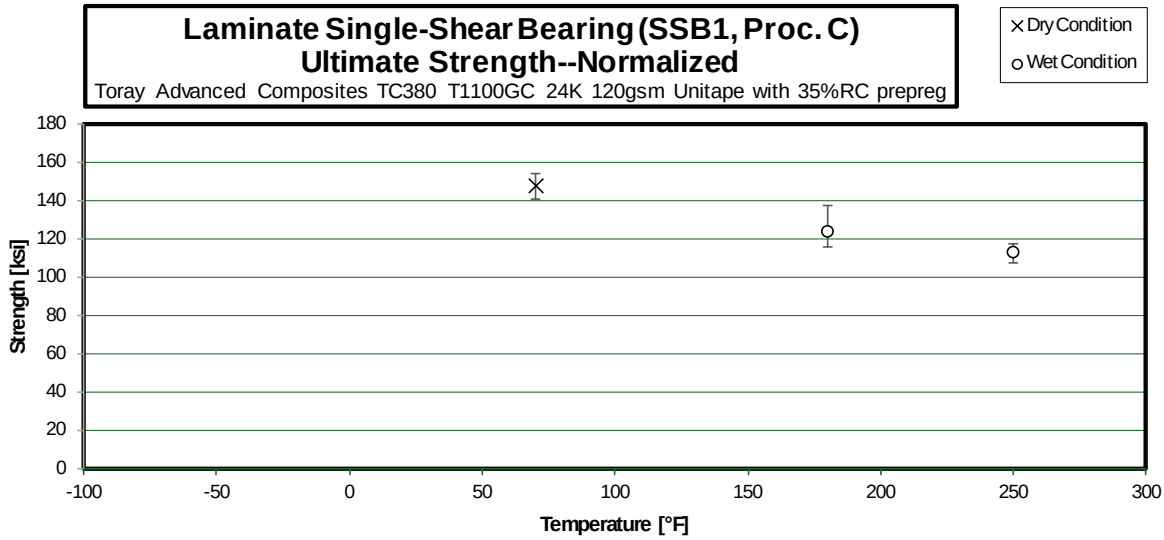


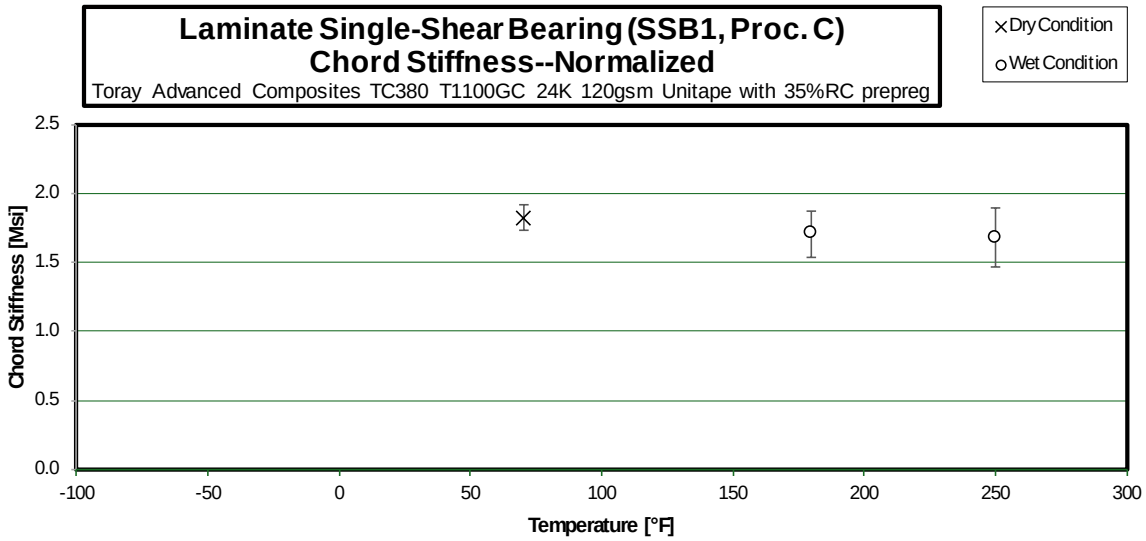
3.26 "50/40/10" Filled-Hole Compression 3 Properties (FHC3)



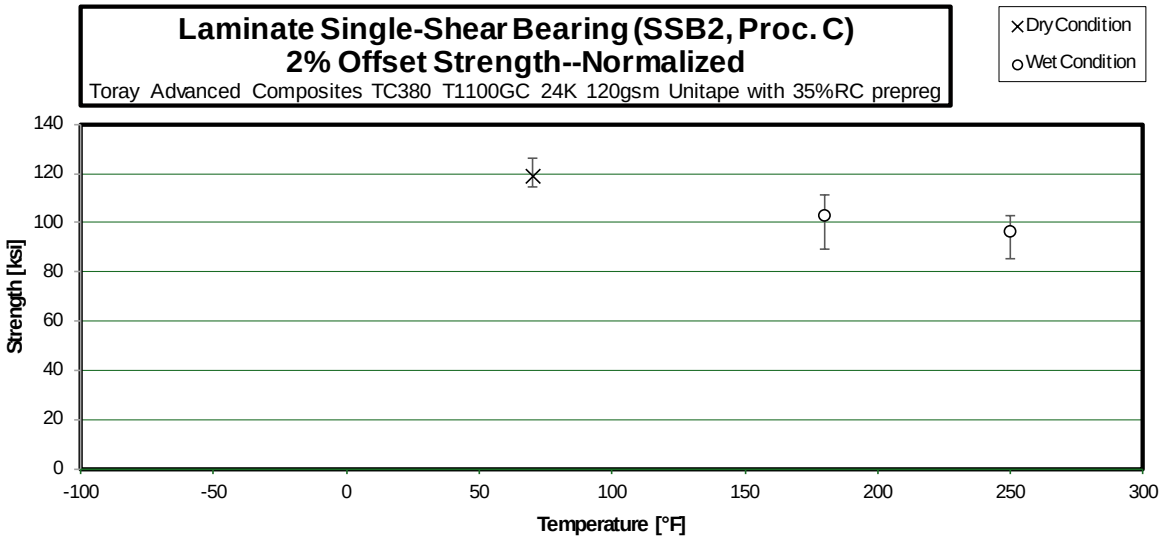
3.27 "25/50/25" Single-Shear Bearing 1 Properties (SSB1, Proc. C)

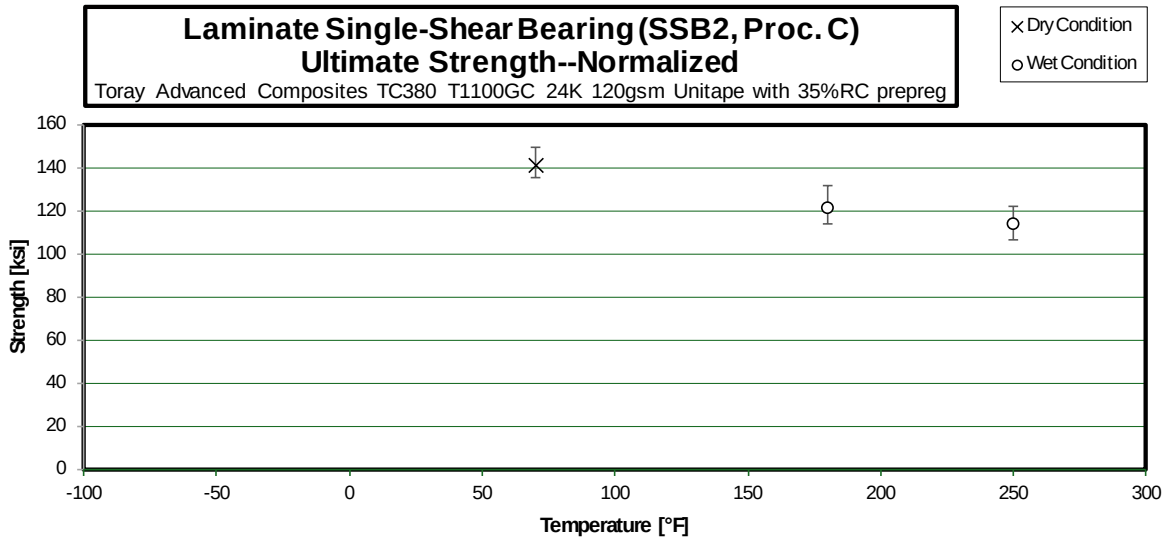


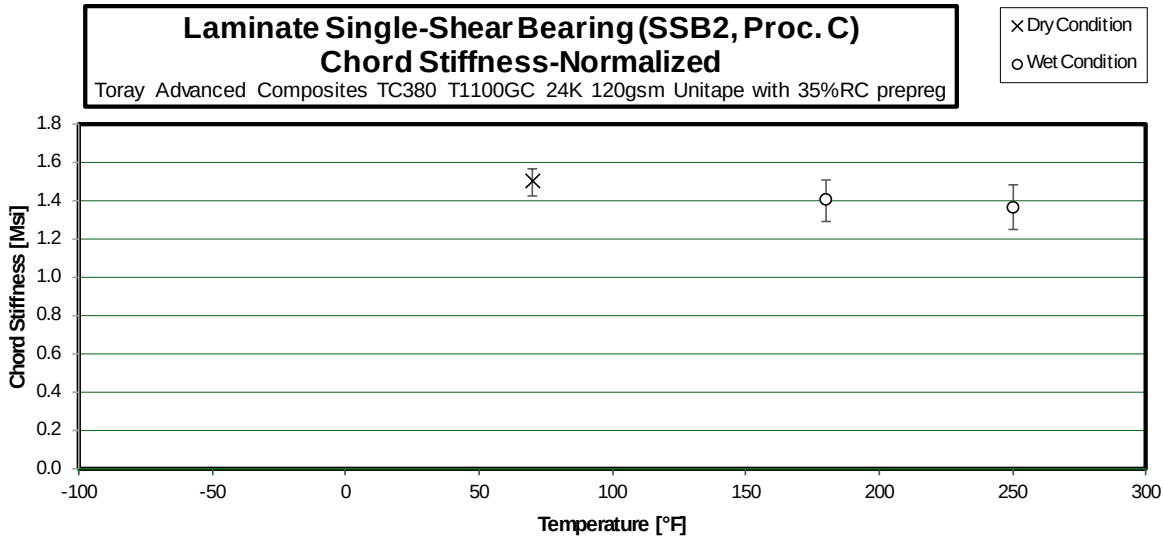




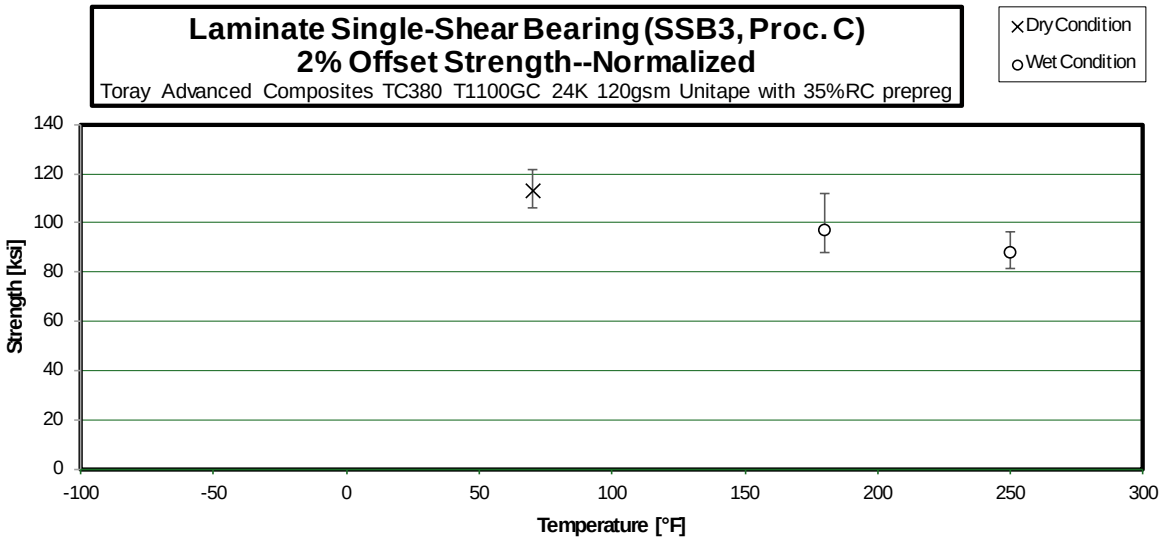
3.28 "10/80/10" Single-Shear Bearing 2 Properties (SSB2, Proc. C)

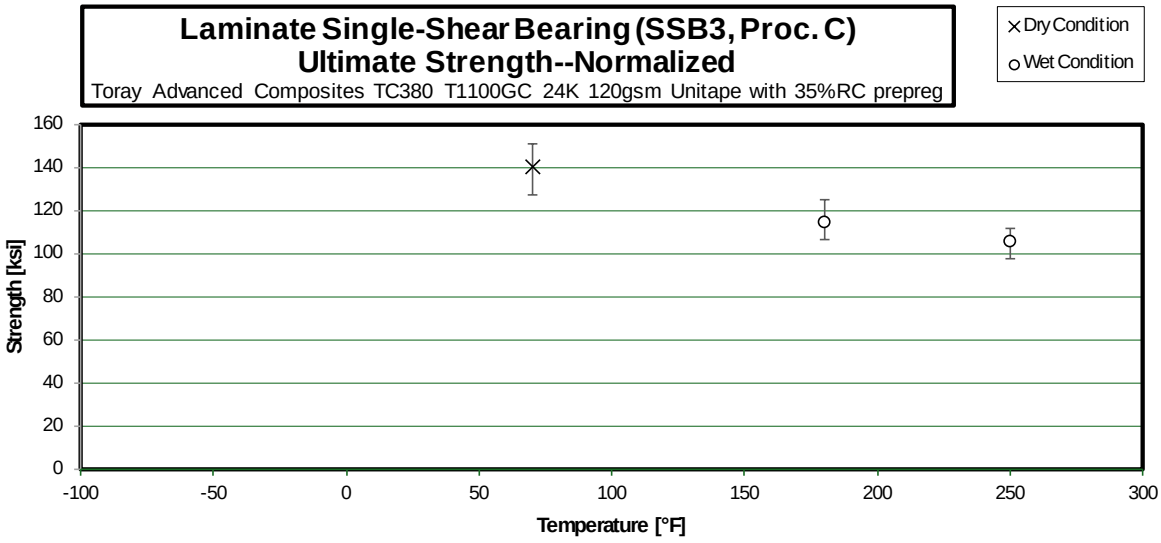


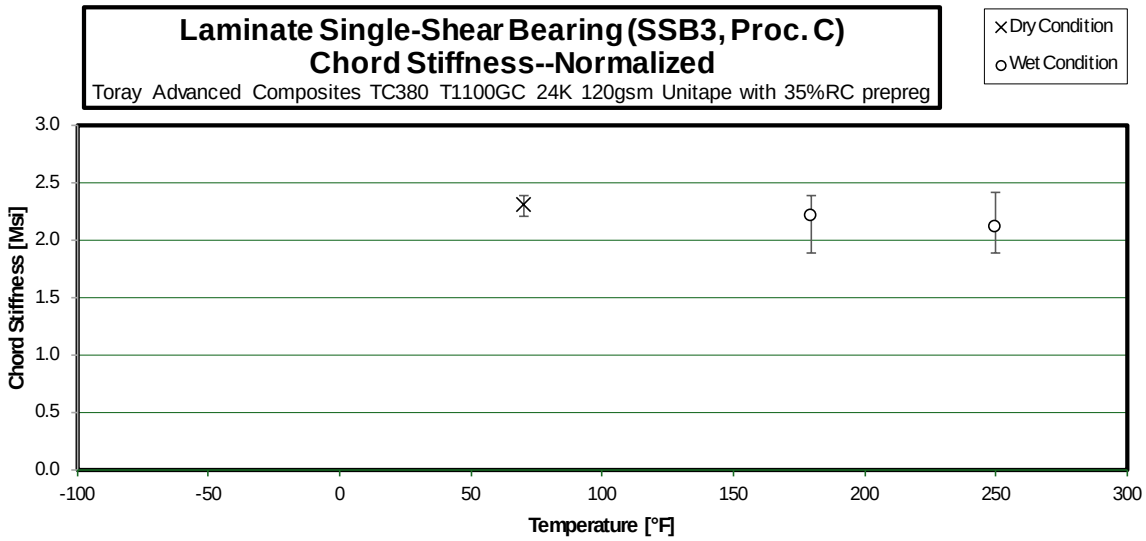

Laminate Single-Shear Bearing (SSB2, Proc. C)
Ultimate Strength--Normalized
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Dry Condition
Wet Condition
Strength [ksi]
160
140
120
100
80
60
40
20
0
-100
-50
0
50
100
150
200
250
300
Temperature [°F]


Laminate Single-Shear Bearing (SSB2, Proc. C)
Chord Stiffness-Normalized
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Dry Condition
Wet Condition
Chord Stiffness [Msi]
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-100
-50
0
50
100
150
200
250
300
Temperature [°F]

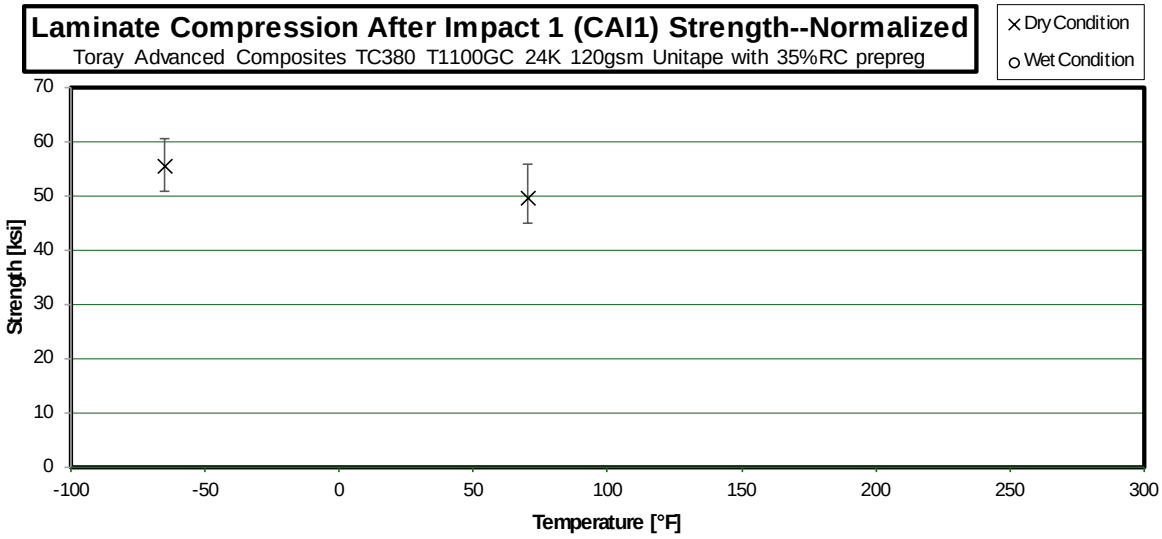
3.29 "50/40/10" Single-Shear Bearing 3 Properties (SSB3, Proc. C)



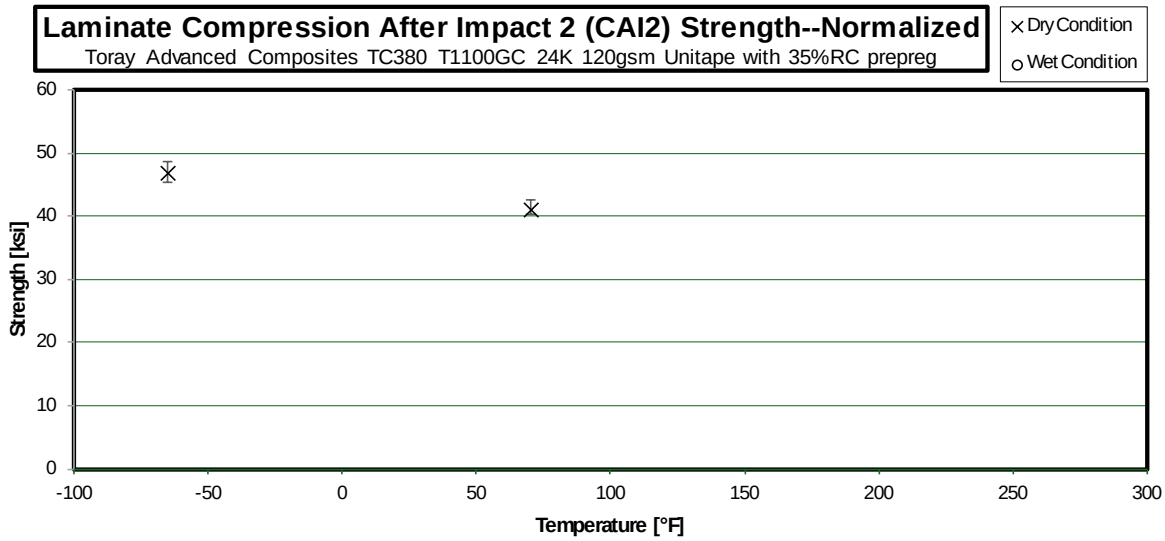




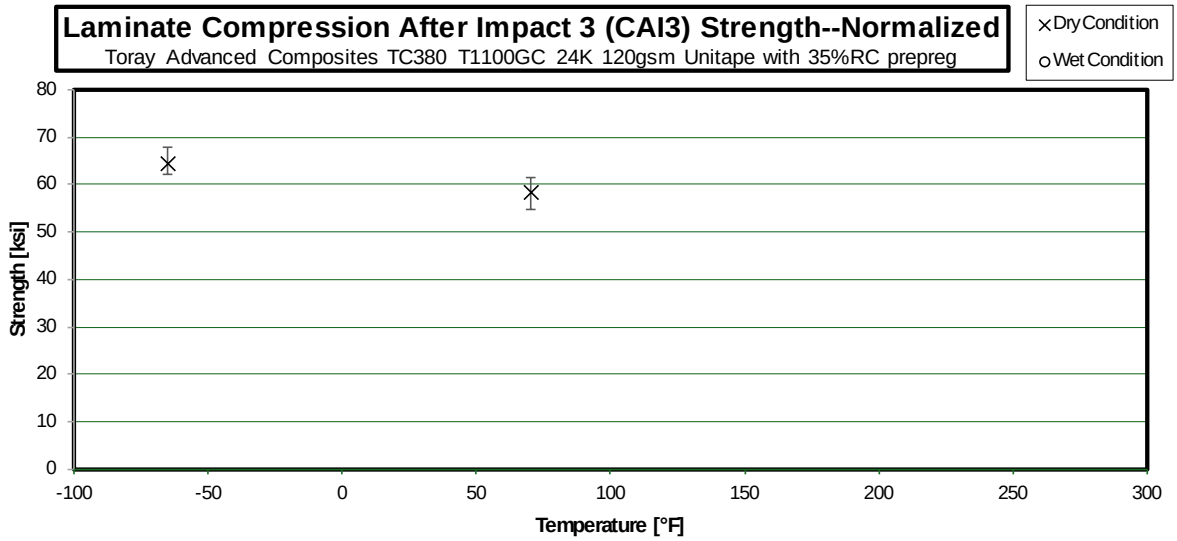
3.30 "25/50/25" Compression After Impact 1 Properties (CAI1)



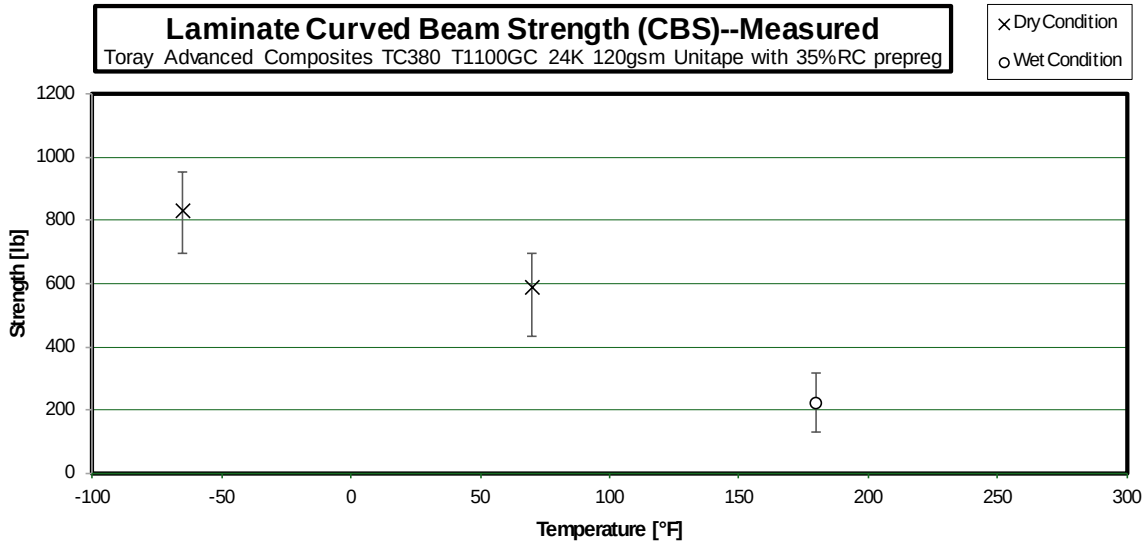
3.31 “10/80/10” Compression After Impact 2 Properties (CAI2)

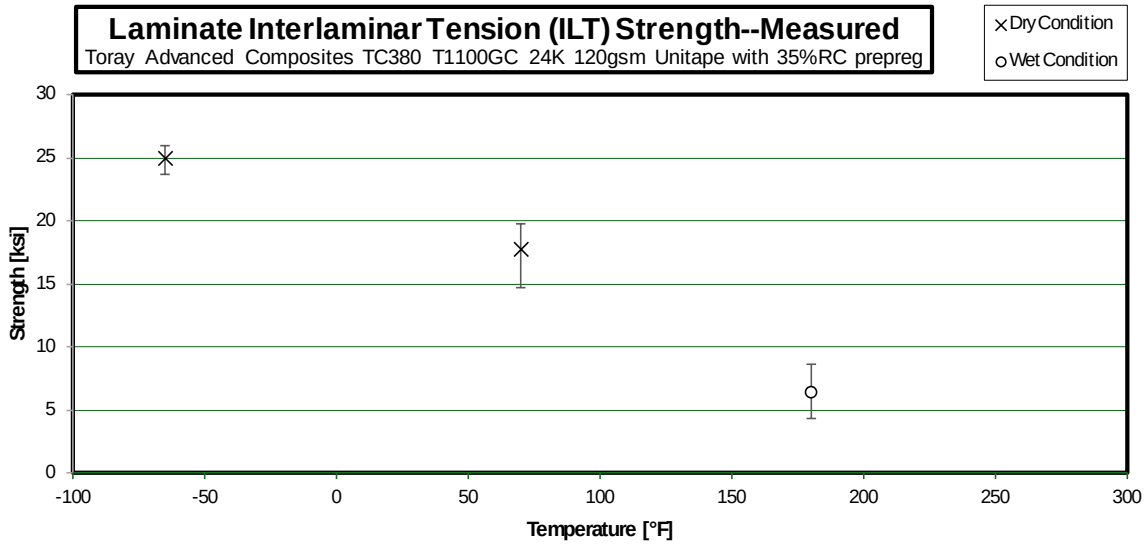


3.32 “50/40/10” Compression After Impact 3 Properties (CAI3)



3.33 "100/0/0" Interlaminar Tension Properties (ILT)





4. Raw Data

4.1 Longitudinal Tension Properties (LT)

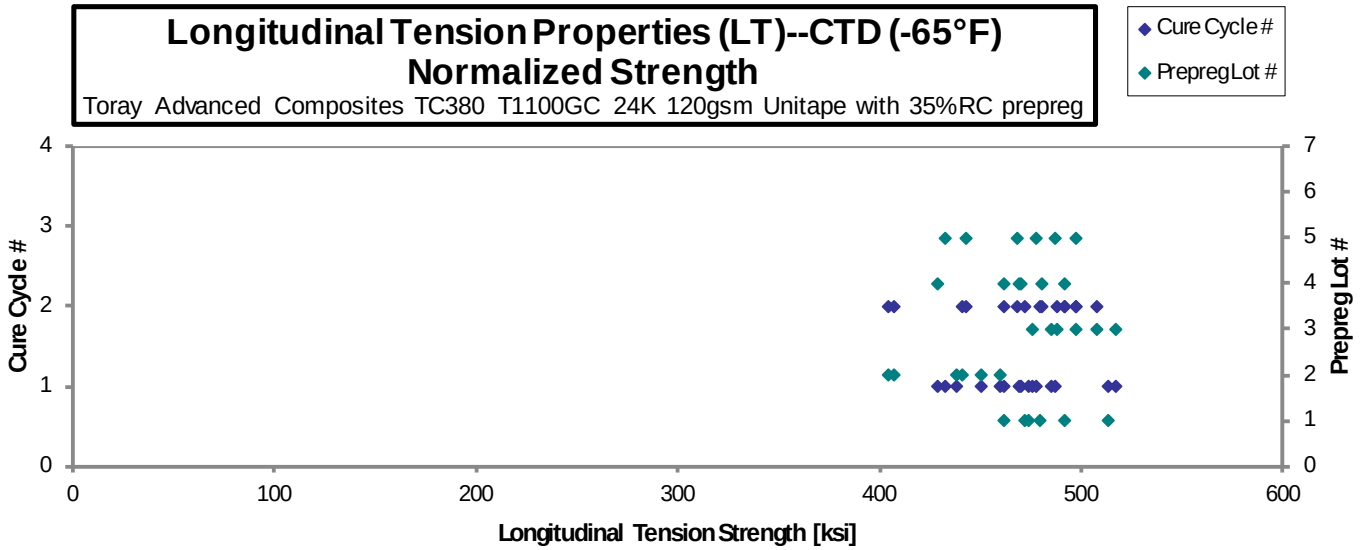
Longitudinal Tension Properties (LT)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

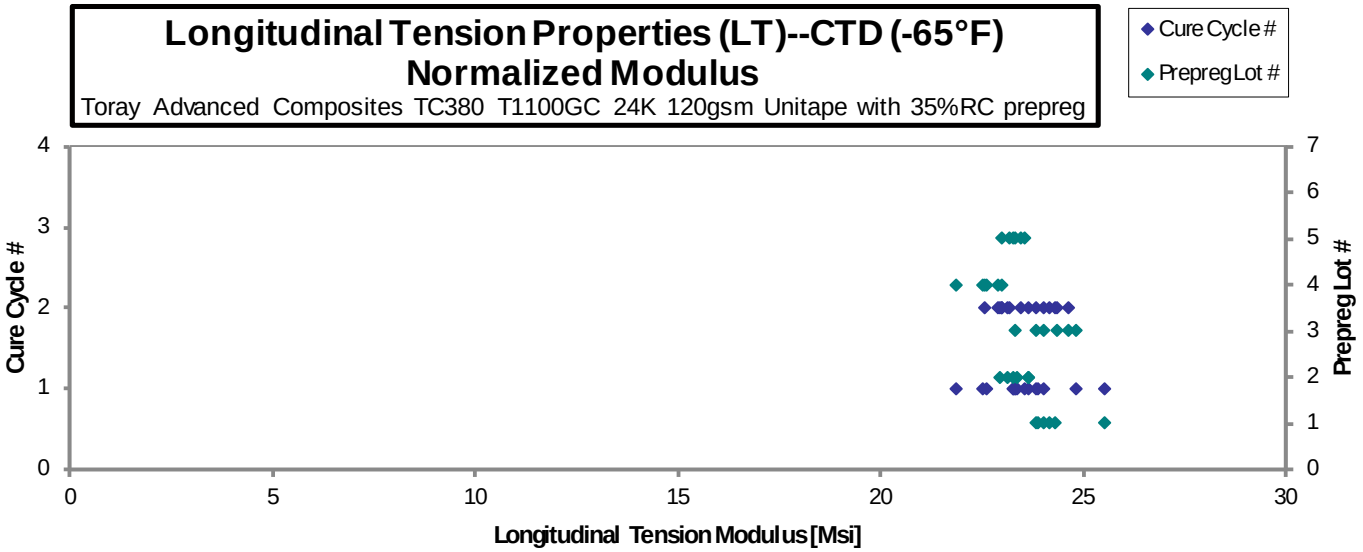
normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDJA111B	A	C1	1	1	461.7	23.35	0.2734	0.04932	10	XGM	0.004932	474.4	23.99
TCDJA112B	A	C1	1	1	503.4	24.99	0.3813	0.04898	10	XGM	0.004898	513.7	25.51
TCDJA113B	A	C1	1	1	456.3	23.58	0.3383	0.04855	10	XGM	0.004855	461.6	23.85
TCDJA211B	A	C2	1	2	460.0	23.27	0.3327	0.05012	10	XGM	0.005012	480.3	24.29
TCDJA212B	A	C2	1	2	479.1	23.52	0.3188	0.04932	10	XGM	0.004932	492.2	24.17
TCDJA213B	A	C2	1	2	465.9	23.51	0.2689	0.04862	10	XGM	0.004862	471.9	23.81
TCDJB111B	B	C1	2	1	452.7	22.86	0.3277	0.04880	10	XGM	0.004880	460.2	23.24
TCDJB112B	B	C1	2	1	423.1	22.53	0.3245	0.04972	10	XGM	0.004972	438.2	23.33
TCDJB113B	B	C1	2	1	427.6	22.42	0.3334	0.05063	10	XGM	0.005063	451.0	23.65
TCDJB211B	B	C2	2	2	390.7	22.65	0.3343	0.05008	10	XGM	0.005008	407.6	23.63
TCDJB212B	B	C2	2	2	389.2	22.02	0.3008	0.04995	10	XGM	0.004995	405.0	22.92
TCDJB213B	B	C2	2	2	430.8	22.57	0.3204	0.04918	10	XGM	0.004918	441.4	23.13
TCDJC111B	C	C1	3	1	483.3	23.14	0.3223	0.05142	10	XGM	0.005142	517.7	24.79
TCDJC112B	C	C1	3	1	445.4	21.79	0.3577	0.05133	10	XGM	0.005133	476.3	23.30
TCDJC113B	C	C1	3	1	451.0	22.14	0.3432	0.05168	10	XGM	0.005168	485.6	23.84
TCDJC211B	C	C2	3	2	485.1	23.53	0.3455	0.05027	10	XGM	0.005027	508.0	24.64
TCDJC212B	C	C2	3	2	466.1	22.94	0.3283	0.05025	10	XGM	0.005025	488.0	24.02
TCDJC213B	C	C2	3	2	480.4	23.47	0.3006	0.04975	10	XGM	0.004975	497.9	24.33
TCDJD111B	D	C1	4	1	426.8	21.73	0.3458	0.04828	10	SGM, LAB/LIB	0.004828	429.3	21.86
TCDJD112B	D	C1	4	1	473.4	22.76	0.3296	0.04762	10	SGM, LAB/LIB	0.004762	469.6	22.58
TCDJD113B	D	C1	4	1	484.6	23.19	0.3386	0.04658	10	M(S,L)GM	0.004658	470.3	22.50
TCDJD211B	D	C2	4	2	511.2	24.42	0.3133	0.04513	10	SGM, LWT, LAB/LIB	0.004513	480.7	22.96
TCDJD212B	D	C2	4	2	480.5	23.80	0.3222	0.04618	10	SGM, LAT/LIT, LAB/LIB	0.004618	462.3	22.90
TCDJD213B	D	C2	4	2	504.3	23.13	0.3468	0.04680	10	SGM, LAT/LIT	0.004680	491.6	22.55
TCDJE111B	E	C1	5	1	468.3	25.23	0.3339	0.04435	10	SGM, LAB/LIB	0.004435	432.7	23.31
TCDJE112B	E	C1	5	1	504.1	24.33	0.3244	0.04643	10	SGM, LWT, LAB/LIB	0.004643	487.7	23.54
TCDJE113B	E	C1	5	1	478.5	23.30	0.3392	0.04792	10	SGM, LWT, LAB/LIB	0.004792	477.7	23.26
TCDJE211B	E	C2	5	2	517.3	24.37	0.3052	0.04620	10	SGM, LWT, LAB/LIB	0.004620	497.9	23.46
TCDJE212B	E	C2	5	2	471.6	23.31	0.3210	0.04773	10	SGM, LWB, LAB/LIB	0.004773	469.0	23.18
TCDJE213B	E	C2	5	2	440.3	22.79	0.3503	0.04835	10	SGM, LWB, LAT/;LIT	0.004835	443.5	22.95

Average	**463.7**	**23.22**	**0.3274**
Standard Dev.	**32.16**	**0.8578**	**0.02265**
Coeff. of Var. [%]	**6.935**	**3.694**	**6.919**
Min.	**389.2**	**21.73**	**0.2689**
Max.	**517.3**	**25.23**	**0.3813**
Number of Spec.	**30**	**30**	**30**

$Average_{norm}$	**0.004865**	**469.4**	**23.52**
Standard $Dev._{norm}$		**28.55**	**0.7617**
Coeff. of Var. $[\%]_{norm}$		**6.082**	**3.239**
Min.	**0.004435**	**405.0**	**21.86**
Max.	**0.005168**	**517.7**	**25.51**
Number of Spec.	**30**	**30**	**30**


Longitudinal Tension Properties (LT)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
100
200
300
400
500
600
Longitudinal Tension Strength [ksi]

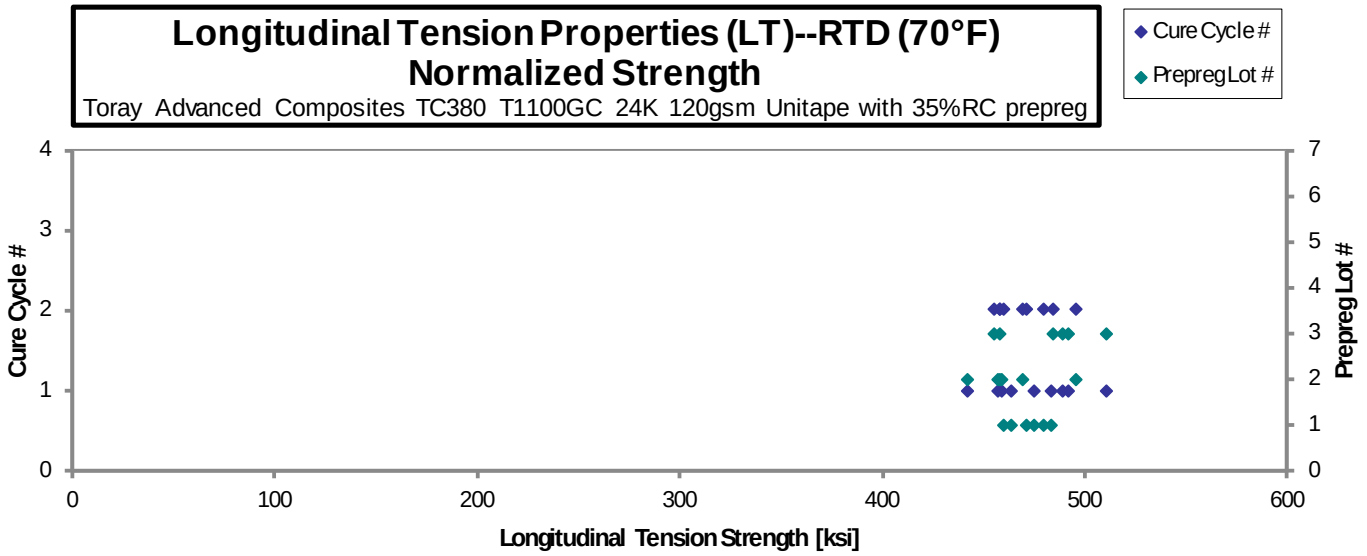

Longitudinal Tension Properties (LT)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
5
10
15
20
25
30
Longitudinal Tension Modulus [Msi]

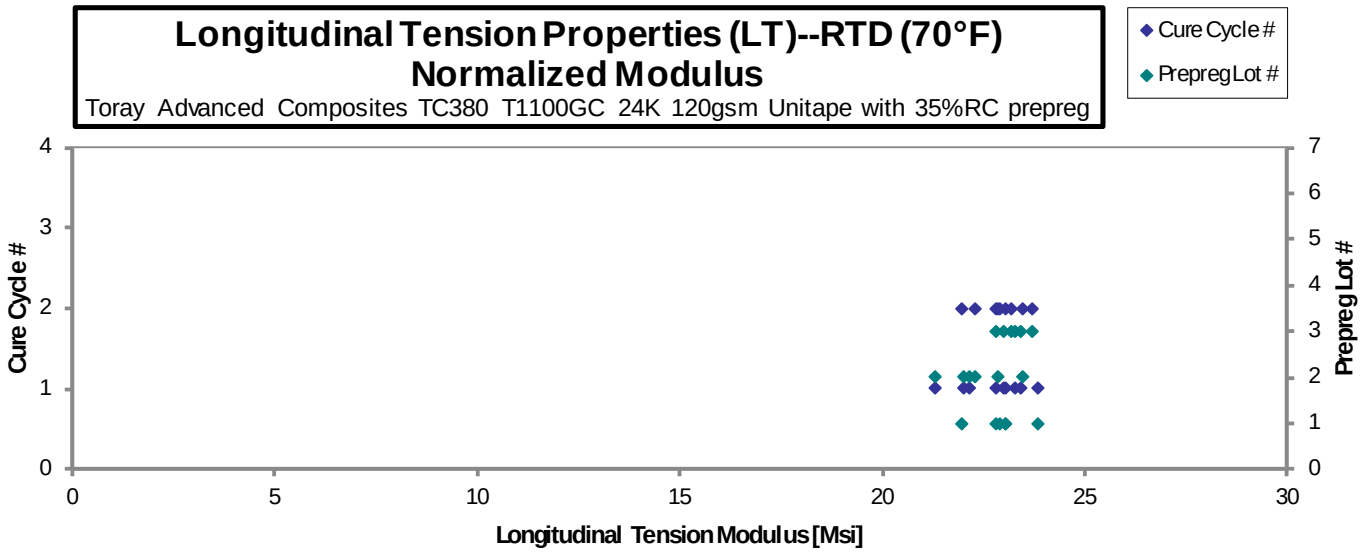
Longitudinal Tension Properties (LT)--RTD (70°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDJA111A	A	C1	1	1	489.7	23.48	0.3531	0.04660	10	XGM	0.004660	475.4	22.80
TCDJA112A	A	C1	1	1	465.2	23.92	0.3324	0.04783	10	XGM	0.004783	463.6	23.84
TCDJA113A	A	C1	1	1	478.7	22.81	0.3202	0.04852	10	XGM	0.004852	483.8	23.05
TCDJA211A	A	C2	1	2	485.5	23.17	0.3252	0.04550	10	XGM	0.004550	460.2	21.97
TCDJA212A	A	C2	1	2	474.7	23.23	0.3143	0.04763	10	XGM	0.004763	471.1	23.05
TCDJA213A	A	C2	1	2	469.5	22.41	0.3406	0.04902	10	XGM	0.004902	479.4	22.89
TCDJB111A	B	C1	2	1	467.1	23.22	0.3012	0.04547	10	XGM	0.004547	442.4	22.00
TCDJB112A	B	C1	2	1	473.0	22.01	0.3117	0.04645	10	XGM	0.004645	457.7	21.30
TCDJB113A	B	C1	2	1	467.1	22.54	0.3062	0.04715	10	XGM	0.004715	458.8	22.14
TCDJB211A	B	C2	2	2	453.1	21.53	0.3004	0.04975	10	XGM	0.004975	469.6	22.31
TCDJB212A	B	C2	2	2	475.4	22.52	0.3061	0.05005	10	XGM	0.005005	495.7	23.48
TCDJB213A	B	C2	2	2	440.4	21.98	0.2960	0.04997	10	XGM	0.004997	458.4	22.88
TCDJC111A	C	C1	3	1	514.6	24.02	0.3052	0.04593	10	XGM	0.004593	492.5	22.99
TCDJC112A	C	C1	3	1	485.3	23.08	0.2998	0.04840	10	XGM	0.004840	489.3	23.27
TCDJC113A	C	C1	3	1	492.7	22.63	0.3068	0.04975	10	XGM	0.004975	510.7	23.45
TCDJC211A	C	C2	3	2	510.1	24.42	0.2896	0.04555	10	XGM	0.004555	484.1	23.18
TCDJC212A	C	C2	3	2	463.0	23.07	0.3094	0.04748	10	XGM	0.004748	458.0	22.82
TCDJC213A	C	C2	3	2	450.7	23.46	0.3193	0.04853	10	XGM	0.004853	455.7	23.72

Average	**475.3**	**22.97**	**0.3132**	**$Average_{norm}$**	**0.004775**	**472.6**	**22.84**
Standard Dev.	**19.15**	**0.7536**	**0.01628**	**$Standard\ Dev._{norm}$**		**17.56**	**0.6679**
Coeff. of Var. [%]	**4.028**	**3.280**	**5.196**	**Coeff. of Var. $[\%]_{norm}$**		**3.715**	**2.924**
Min.	**440.4**	**21.53**	**0.2896**	**Min.**	**0.004547**	**442.4**	**21.30**
Max.	**514.6**	**24.42**	**0.3531**	**Max.**	**0.005005**	**510.7**	**23.84**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Longitudinal Tension Properties (LT)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Tension Strength [ksi]
0
100
200
300
400
500
600
0
1
2
3
4
0
1
2
3
4
5
6
7

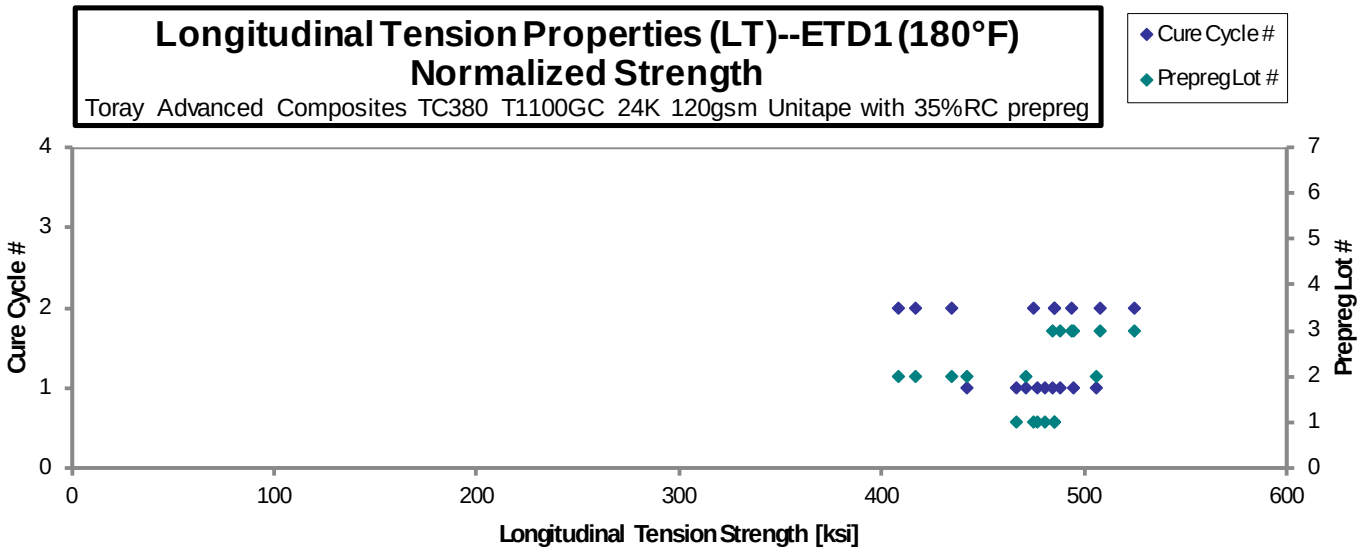

Longitudinal Tension Properties (LT)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Tension Modulus [Msi]
0
5
10
15
20
25
30
0
1
2
3
4
0
1
2
3
4
5
6
7

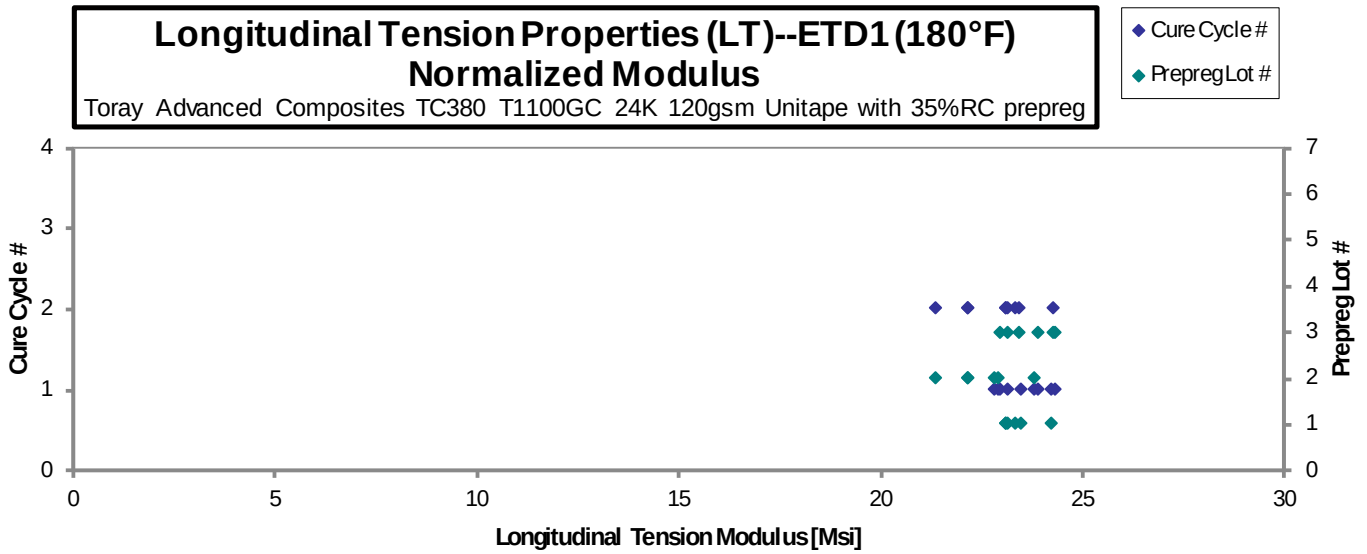
Longitudinal Tension Properties (LT)--ETD1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDJA111C	A	C1	1	1	466.3	22.62	0.3278	0.04908	10	XGM	0.004908	476.8	23.13
TCDJA112C	A	C1	1	1	467.2	23.52	0.2939	0.04945	10	XGM	0.004945	481.3	24.23
TCDJA113C	A	C1	1	1	449.9	22.61	0.3077	0.04985	10	XGM	0.004985	467.2	23.48
TCDJA211C	A	C2	1	2	475.4	22.61	0.2949	0.04908	10	XGM	0.004908	486.1	23.12
TCDJA212C	A	C2	1	2	474.2	22.52	0.3250	0.04918	10	XGM	0.004918	485.9	23.08
TCDJA213C	A	C2	1	2	461.7	22.68	0.3219	0.04938	10	XGM	0.004938	475.0	23.34
TCDJB111C	B	C1	2	1	480.7	21.78	0.3118	0.05053	10	XGM	0.005053	506.1	22.92
TCDJB112C	B	C1	2	1	447.5	22.58	0.3286	0.05063	10	XGM	0.005063	472.1	23.82
TCDJB113C	B	C1	2	1	424.0	21.87	0.3142	0.05007	10	XGM	0.005007	442.3	22.81
TCDJB211C	B	C2	2	2	423.6	22.49	0.3175	0.04727	10	XGM	0.004727	417.1	22.15
TCDJB212C	B	C2	2	2	421.6	22.01	0.3308	0.04653	10	XGM	0.004653	408.7	21.34
TCDJB213C	B	C2	2	2	466.7	23.74	0.3308	0.04477	10	XGM	0.004477	435.3	22.14
TCDJC111C	C	C1	3	1	461.6	21.86	0.3148	0.05038	10	XGM	0.005038	484.5	22.95
TCDJC112C	C	C1	3	1	473.6	23.24	0.3055	0.05018	10	XGM	0.005018	495.2	24.30
TCDJC113C	C	C1	3	1	469.6	22.98	0.2988	0.04993	10	XGM	0.004993	488.5	23.91
TCDJC211C	C	C2	3	2	477.3	22.35	0.3168	0.04967	10	XGM	0.004967	493.8	23.13
TCDJC212C	C	C2	3	2	490.0	22.58	0.3041	0.04982	10	XGM	0.004982	508.5	23.43
TCDJC213C	C	C2	3	2	506.6	23.40	0.3111	0.04975	10	XGM	0.004975	525.1	24.25

Average	**463.2**	**22.64**	**0.3142**	**$Average_{norm}$**	**0.004920**	**475.0**	**23.20**
Standard Dev.	**22.79**	**0.5695**	**0.01187**	**$Standard\ Dev._{norm}$**		**31.04**	**0.7829**
Coeff. of Var. [%]	**4.921**	**2.516**	**3.779**	**Coeff. of Var. $[\%]_{norm}$**		**6.536**	**3.375**
Min.	**421.6**	**21.78**	**0.2939**	**Min.**	**0.004477**	**408.7**	**21.34**
Max.	**506.6**	**23.74**	**0.3308**	**Max.**	**0.005063**	**525.1**	**24.30**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Longitudinal Tension Properties (LT)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Tension Strength [ksi]
0
100
200
300
400
500
600
0
1
2
3
4
0
1
2
3
4
5
6
7

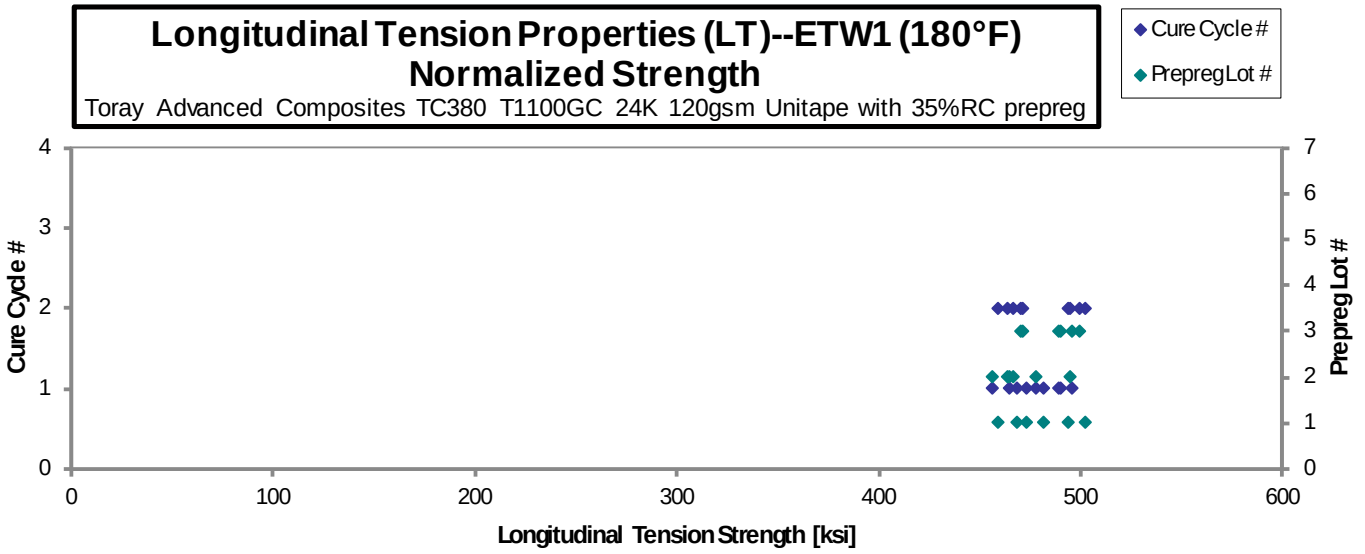

Longitudinal Tension Properties (LT)--ETD1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Tension Modulus [Msi]
0
5
10
15
20
25
30
0
1
2
3
4
0
1
2
3
4
5
6
7

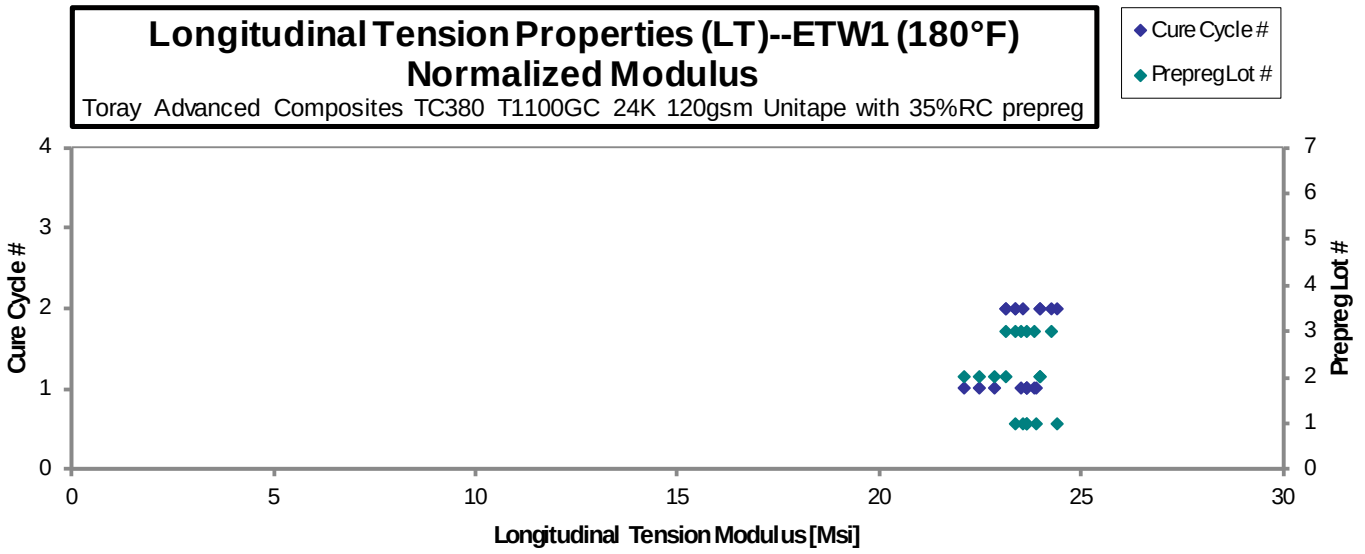
Longitudinal Tension Properties (LT)--ETW1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDJA111D	A	C1	1	1	472.4	23.84	0.3071	0.04762	10	XGM	0.004762	468.6	23.65
TCDJA112D	A	C1	1	1	468.1	23.36	0.3033	0.04855	10	XGM	0.004855	473.4	23.63
TCDJA113D	A	C1	1	1	467.2	23.18	0.3196	0.04943	10	XGM	0.004943	481.2	23.87
TCDJA211D	A	C2	1	2	455.6	23.34	0.2934	0.04842	10	XGM	0.004842	459.5	23.54
TCDJA212D	A	C2	1	2	482.9	22.84	0.3174	0.04913	10	XGM	0.004913	494.3	23.38
TCDJA213D	A	C2	1	2	474.0	23.01	0.3073	0.05087	10	XGM	0.005087	502.3	24.38
TCDJB111D	B	C1	2	1	481.7	22.89	0.3074	0.04632	10	XGM	0.004632	464.8	22.09
TCDJB112D	B	C1	2	1	460.7	23.06	0.3068	0.04757	10	XGM	0.004757	456.6	22.85
TCDJB113D	B	C1	2	1	475.0	22.34	0.3045	0.04825	10	XGM	0.004825	477.5	22.46
TCDJB211D	B	C2	2	2	448.2	23.05	0.2913	0.04993	10	XGM	0.004993	466.3	23.98
TCDJB212D	B	C2	2	2	444.0	22.15	0.3103	0.05010	10	XGM	0.005010	463.5	23.12
TCDJB213D	B	C2	2	2	475.4	23.04	0.3055	0.05000	10	XGM	0.005000	495.2	24.00
TCDJC111D	C	C1	3	1	493.5	23.79	0.3130	0.04770	10	XGM	0.004770	490.4	23.64
TCDJC112D	C	C1	3	1	480.8	22.78	0.3106	0.04950	10	XGM	0.004950	495.8	23.49
TCDJC113D	C	C1	3	1	466.7	22.72	0.2978	0.05032	10	XGM	0.005032	489.2	23.82
TCDJC211D	C	C2	3	2	471.1	23.13	0.3133	0.04802	10	XGM	0.004802	471.3	23.14
TCDJC212D	C	C2	3	2	459.5	22.84	0.3093	0.04915	10	XGM	0.004915	470.5	23.39
TCDJC213D	C	C2	3	2	479.7	23.30	0.3192	0.04995	10	XGM	0.004995	499.2	24.24

Average	**469.8**	**23.04**	**0.3076**	**$Average_{norm}$**	**0.004893**	**478.9**	**23.48**
Standard Dev.	**12.64**	**0.4231**	**0.007871**	**$Standard\ Dev._{norm}$**		**14.81**	**0.5901**
Coeff. of Var. [%]	**2.691**	**1.837**	**2.559**	**Coeff. of Var. $[\%]_{norm}$**		**3.093**	**2.513**
Min.	**444.0**	**22.15**	**0.2913**	**Min.**	**0.004632**	**456.6**	**22.09**
Max.	**493.5**	**23.84**	**0.3196**	**Max.**	**0.005087**	**502.3**	**24.38**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Longitudinal Tension Properties (LT)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
100
200
300
400
500
600
Longitudinal Tension Strength [ksi]

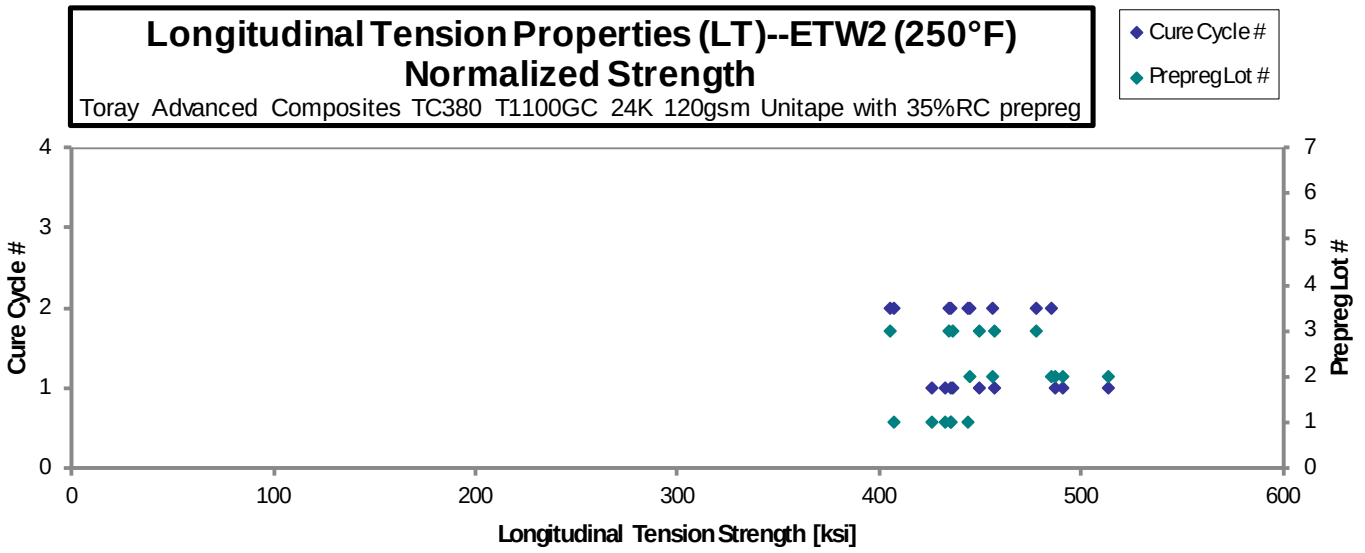

Longitudinal Tension Properties (LT)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
5
10
15
20
25
30
Longitudinal Tension Modulus [Msi]

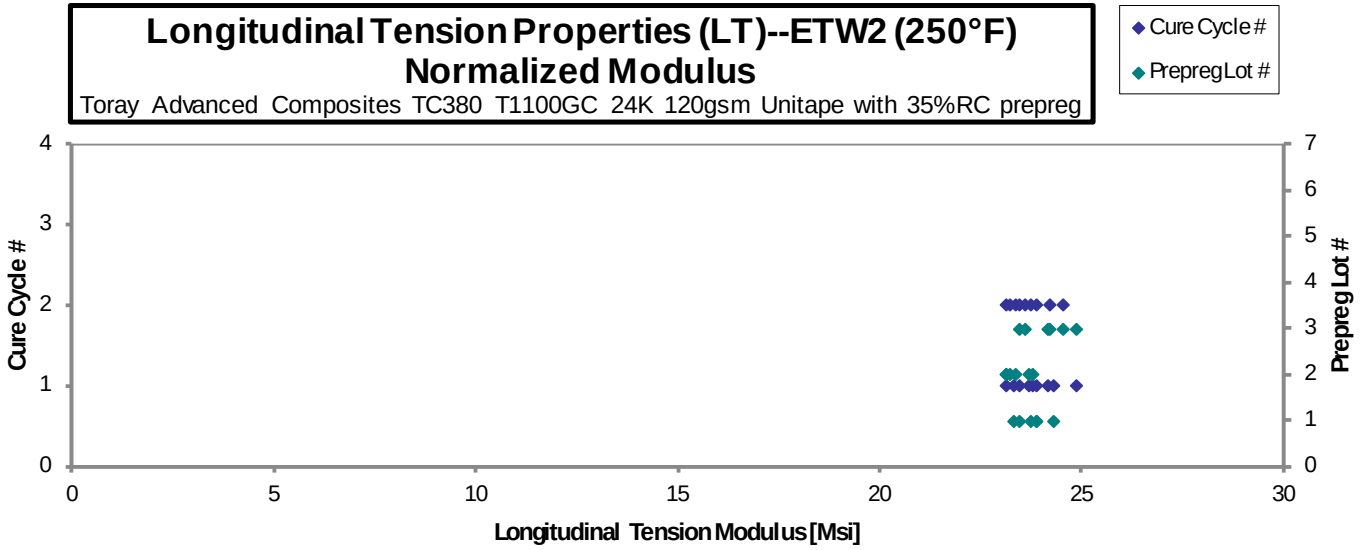
Longitudinal Tension Properties (LT)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDJA111E	A	C1	1	1	426.0	23.39	0.3272	0.04903	10	XGM	0.004903	435.2	23.90
TCDJA112E	A	C1	1	1	422.1	24.08	0.2971	0.04843	10	XGM	0.004843	425.9	24.30
TCDJA113E	A	C1	1	1	425.9	22.97	0.3200	0.04872	10	XGM	0.004872	432.2	23.31
TCDJA211E	A	C2	1	2	424.4	23.28	0.3097	0.04923	10	XGM	0.004923	435.3	23.88
TCDJA212E	A	C2	1	2	430.0	22.70	0.2654	0.04958	10	XGM	0.004958	444.2	23.45
TCDJA213E	A	C2	1	2	392.6	22.88	0.3077	0.04978	10	XGM	0.004978	407.2	23.73
TCDJB111E	B	C1	2	1	470.3	22.35	0.2742	0.04970	10	XGM	0.004970	486.9	23.14
TCDJB112E	B	C1	2	1	472.5	22.88	0.2913	0.04987	10	XGM	0.004987	490.9	23.77
TCDJB113E	B	C1	2	1	492.0	22.71	0.2950	0.05008	10	XGM	0.005008	513.3	23.69
TCDJB211E	B	C2	2	2	471.5	22.74	0.2929	0.04935	10	XGM	0.004935	484.8	23.37
TCDJB212E	B	C2	2	2	441.0	23.02	0.2849	0.04837	10	XGM	0.004837	444.4	23.19
TCDJB213E	B	C2	2	2	461.8	23.43	0.2760	0.04737	10	XGM	0.004737	455.7	23.12
TCDJC111E	C	C1	3	1	414.3	22.91	0.2822	0.05057	10	XGM	0.005057	436.5	24.13
TCDJC112E	C	C1	3	1	437.1	23.75	0.2995	0.05023	10	XGM	0.005023	457.4	24.85
TCDJC113E	C	C1	3	1	428.3	22.36	0.3001	0.05033	10	XGM	0.005033	449.2	23.45
TCDJC211E	C	C2	3	2	461.3	23.70	0.2906	0.04972	10	XGM	0.004972	477.8	24.55
TCDJC212E	C	C2	3	2	390.4	22.73	0.2976	0.04982	10	XGM	0.004982	405.2	23.59
TCDJC213E	C	C2	3	2	408.4	22.74	0.3027	0.05103	10	XGM	0.005103	434.2	24.18

Average	**437.2**	**23.03**	**0.2952**	**Average$_{norm}$**	**0.004951**	**450.9**	**23.76**
Standard Dev.	**28.73**	**0.4763**	**0.01559**	**Standard Dev.$_{norm}$**		**29.48**	**0.4933**
Coeff. of Var. [%]	**6.571**	**2.068**	**5.281**	**Coeff. of Var. [%]$_{norm}$**		**6.538**	**2.076**
Min.	**390.4**	**22.35**	**0.2654**	**Min.**	**0.004737**	**405.2**	**23.12**
Max.	**492.0**	**24.08**	**0.3272**	**Max.**	**0.005103**	**513.3**	**24.85**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Longitudinal Tension Properties (LT)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
100
200
300
400
500
600
Longitudinal Tension Strength [ksi]


Longitudinal Tension Properties (LT)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
5
10
15
20
25
30
Longitudinal Tension Modulus [Msi]

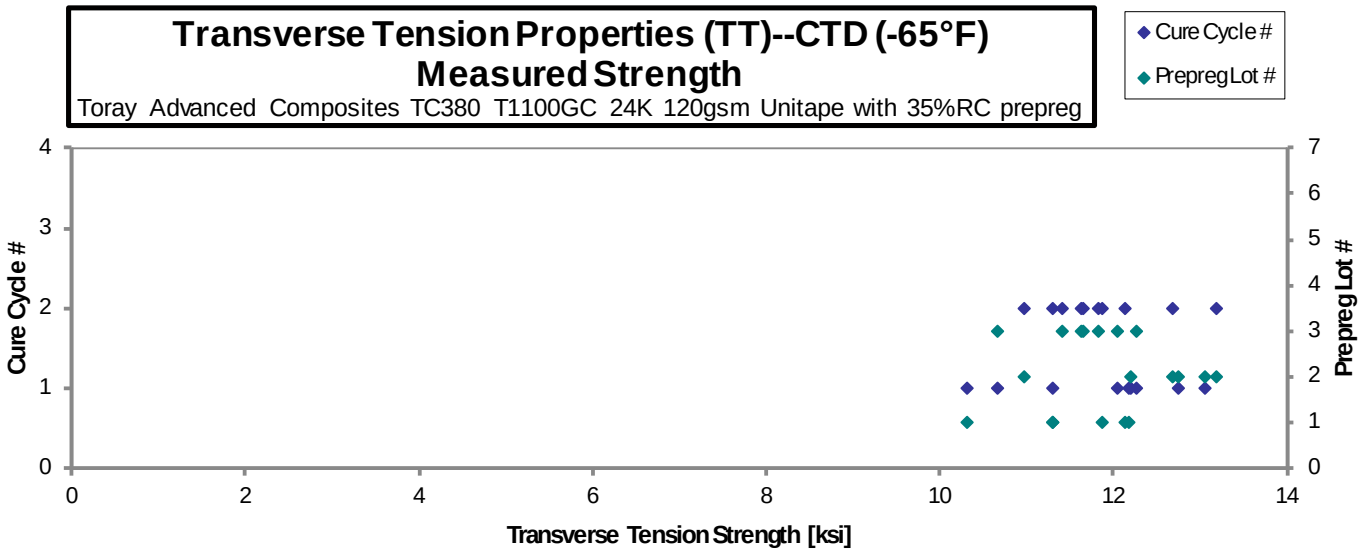
4.2 Transverse Tension Properties (TT)

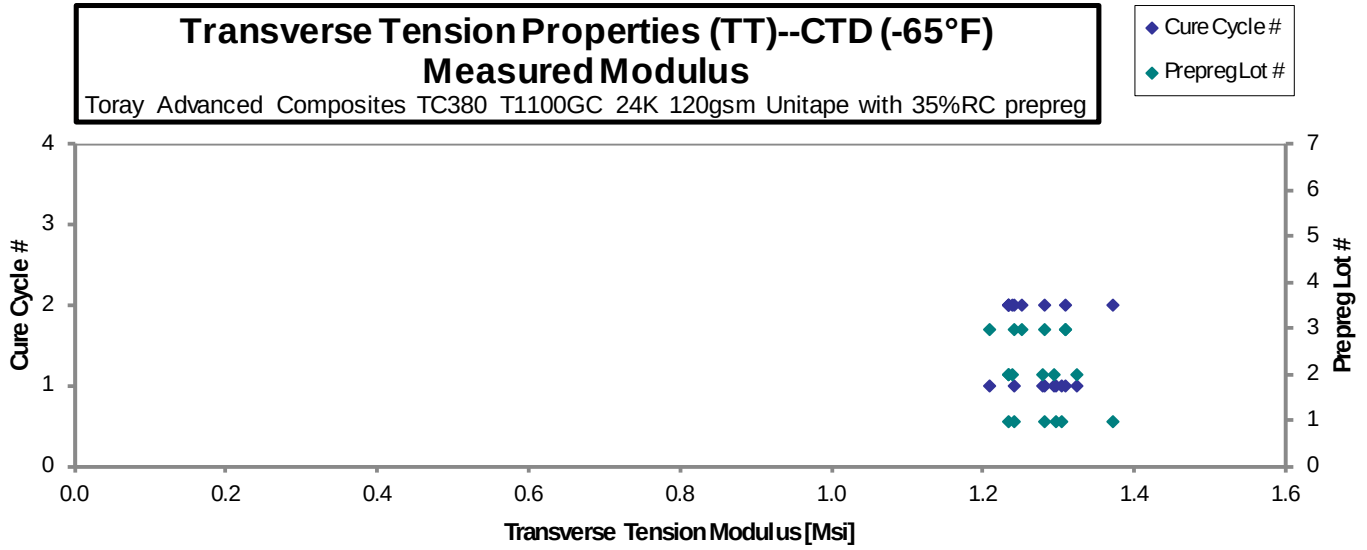
Transverse Tension Properties (TT)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

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

* Specimen was not gaged, only strength is tested.

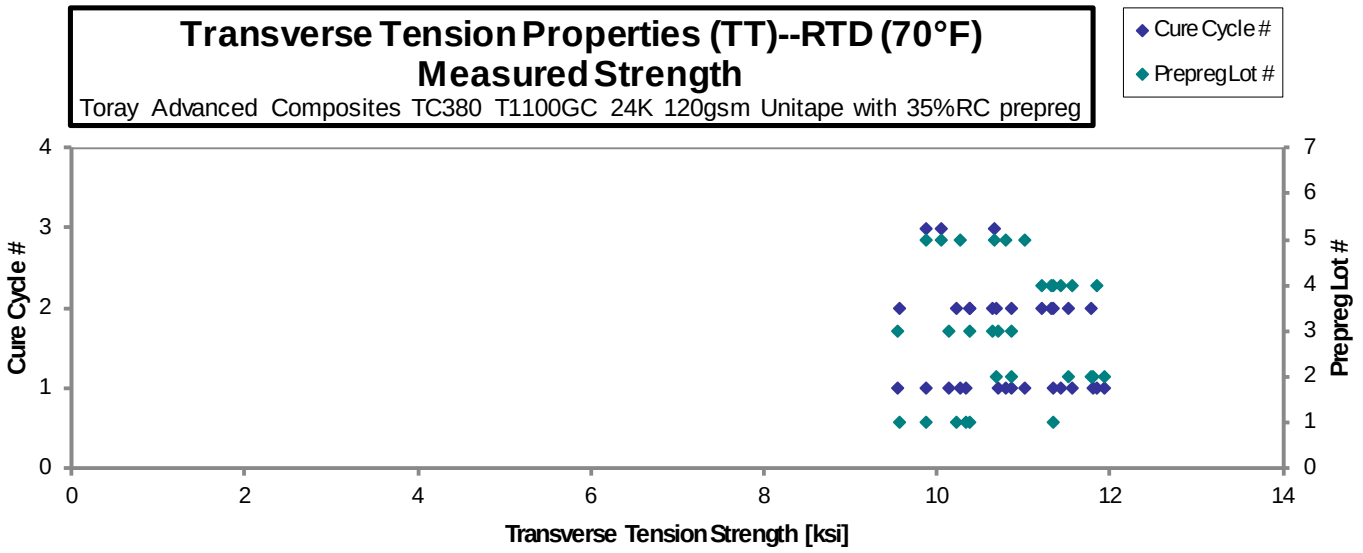
Average	**11.86**	**1.273**	**0.004919**
Standard Dev.	**0.7669**	**0.04156**	
Coeff. of Var. [%]	**6.464**	**3.264**	
Min.	**10.32**	**1.207**	**0.004868**
Max.	**13.18**	**1.371**	**0.005077**
Number of Spec.	**19**	**18**	**19**

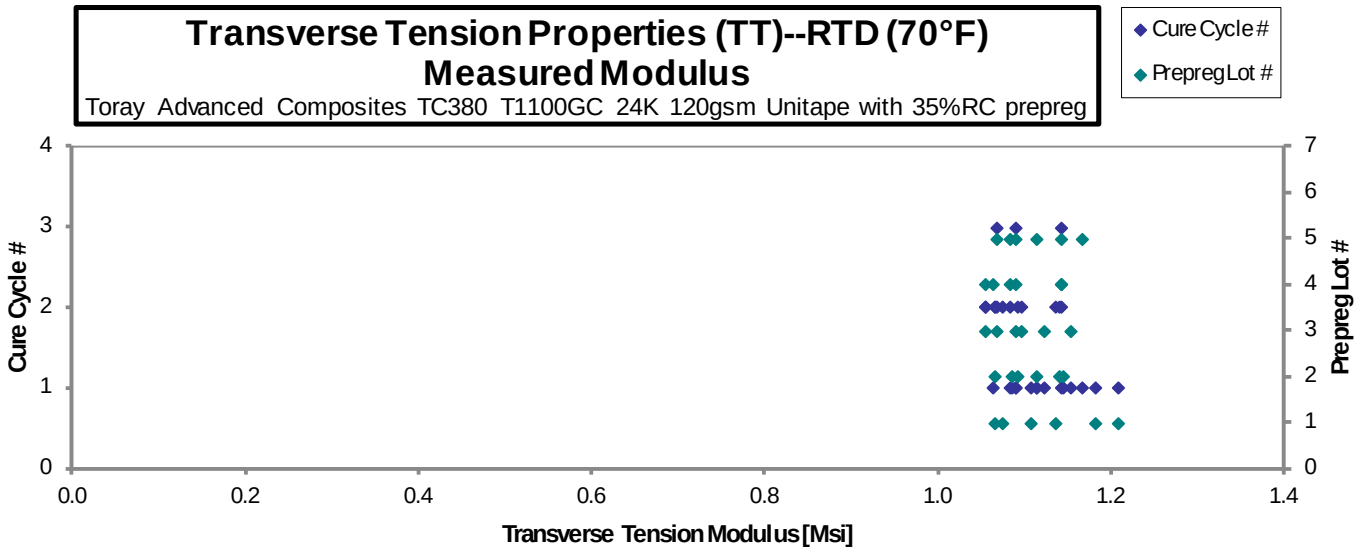

Transverse Tension Properties (TT)--CTD (-65°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Strength [ksi]
0
2
4
6
8
10
12
14


Transverse Tension Properties (TT)--CTD (-65°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6

Transverse Tension Properties (TT)--RTD (70°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111A	A	C1	1	1	9.866	1.209	0.08198	18	0.004555	LGB
TCDUA112A	A	C1	1	1	10.34	1.183	0.08562	18	0.004756	LGT
TCDUA113A	A	C1	1	1	11.34	1.108	0.08752	18	0.004862	LAT
TCDUA211A	A	C2	1	2	10.22	1.137	0.08290	18	0.004606	LGT
TCDUA212A	A	C2	1	2	9.559	1.066	0.08755	18	0.004864	LGT
TCDUA213A	A	C2	1	2	10.39	1.073	0.08918	18	0.004955	LWB
TCDUB111A	B	C1	2	1	11.94	1.145	0.08133	18	0.004519	LAT
TCDUB112A	B	C1	2	1	10.87	1.114	0.08487	18	0.004715	LAT
TCDUB113A	B	C1	2	1	11.80	1.086	0.08747	18	0.004859	LWB
TCDUB211A	B	C2	2	2	10.69	1.141	0.07953	18	0.004419	LWB
TCDUB212A	B	C2	2	2	11.53	1.093	0.08425	18	0.004681	LAB
TCDUB213A	B	C2	2	2	11.78	1.065	0.08748	18	0.004860	LWT
TCDUC111A	C	C1	3	1	10.13	1.153	0.08175	18	0.004542	LAB
TCDUC112A	C	C1	3	1	9.548	1.122	0.08505	18	0.004725	LWB
TCDUC113A	C	C1	3	1	10.72	1.090	0.08723	18	0.004846	LAB
TCDUC211A	C	C2	3	2	10.65	1.096	0.08515	18	0.004731	LWT
TCDUC212A	C	C2	3	2	10.87	1.055	0.08917	18	0.004954	LAT
TCDUC213A	C	C2	3	2	10.37	1.067	0.08902	18	0.004945	LAT
TCDUD111A	D	C1	4	1	11.43	1.142	0.07867	18	0.004370	LAT
TCDUD112A	D	C1	4	1	11.56	1.089	0.08323	18	0.004624	LAB
TCDUD113A	D	C1	4	1	11.85	1.065	0.08525	18	0.004736	LWB
TCDUD211A	D	C2	4	2	11.35	1.143	0.07785	18	0.004325	LAB
TCDUD212A	D	C2	4	2	11.21	1.082	0.08248	18	0.004582	LAB
TCDUD213A	D	C2	4	2	11.32	1.054	0.08557	18	0.004754	LAT
TCDUE111A	E	C1	5	1	10.27	1.166	0.07993	18	0.004441	LWB
TCDUE112A	E	C1	5	1	10.81	1.115	0.08445	18	0.004692	LWT
TCDUE113A	E	C1	5	1	11.03	1.084	0.08693	18	0.004830	LGT
TCDUE311A	E	C3	5	3	9.884	1.142	0.08098	18	0.004499	LAB
TCDUE312A	E	C3	5	3	10.04	1.091	0.08542	18	0.004745	LGT
TCDUE313A	E	C3	5	3	10.67	1.067	0.08833	18	0.004907	LWT
				Average	**10.80**	**1.108**			**0.004697**	
				Standard Dev.	**0.6959**	**0.04036**				
				Coeff. of Var. [%]	**6.443**	**3.642**				
				Min.	**9.548**	**1.054**			**0.004325**	
				Max.	**11.94**	**1.209**			**0.004955**	
				Number of Spec.	**30**	**30**			**30**	

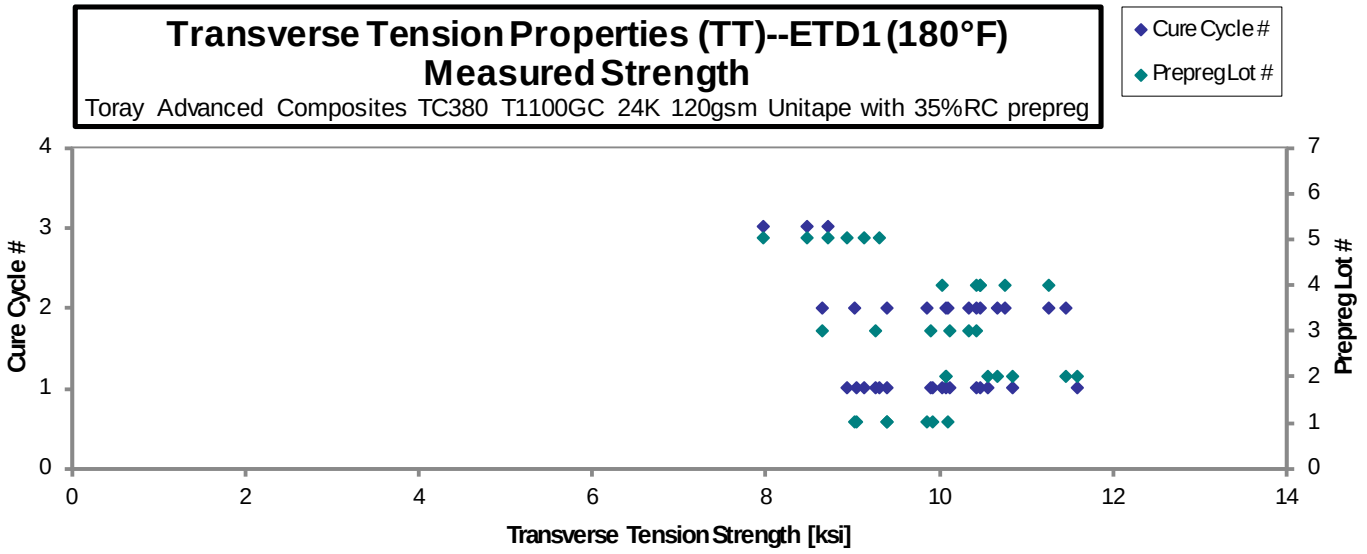

Transverse Tension Properties (TT)--RTD (70°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Strength [ksi]
0
2
4
6
8
10
12
14
0
1
2
3
4
0
1
2
3
4
5
6
7

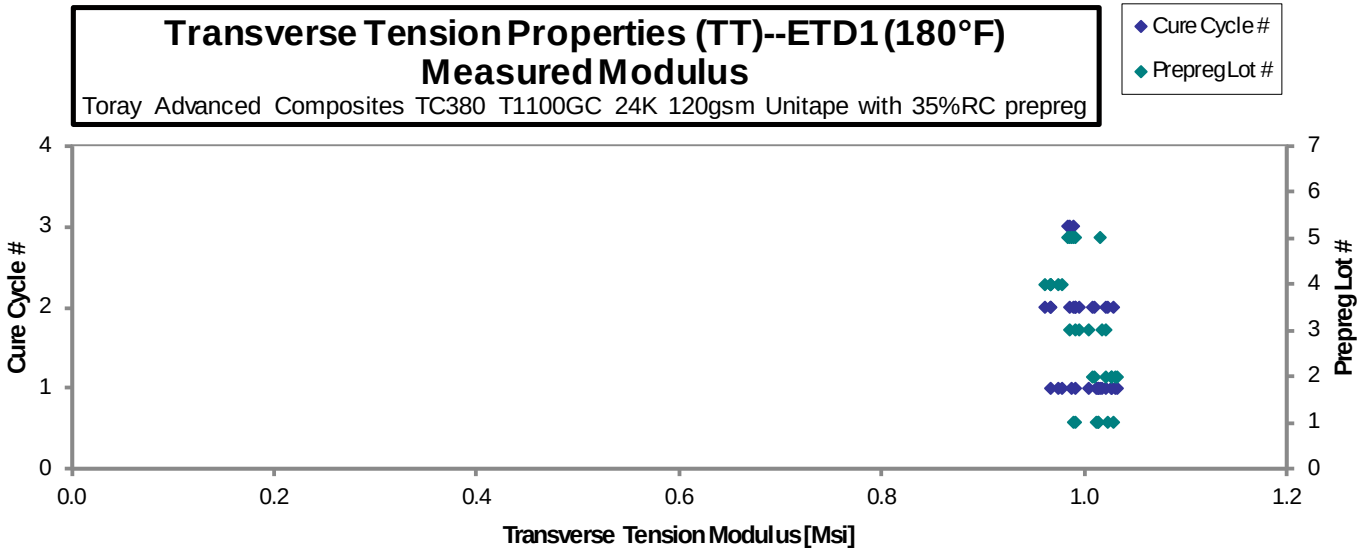

Transverse Tension Properties (TT)--RTD (70°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
1
2
3
4
0
1
2
3
4
5
6
7

Transverse Tension Properties (TT)--ETD1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111C	A	C1	1	1	9.930	1.014	0.08798	18	0.004888	LWB
TCDUA112C	A	C1	1	1	9.045	1.015	0.08778	18	0.004877	LGB, LWB
TCDUA113C	A	C1	1	1	9.401	1.015	0.08802	18	0.004890	LGB
TCDUA211C	A	C2	1	2	10.09	1.029	0.08765	18	0.004869	LAT
TCDUA212C	A	C2	1	2	9.394	1.024	0.08777	18	0.004876	LAT
TCDUA213C	A	C2	1	2	9.041	0.9908	0.08890	18	0.004939	LAB
TCDUA214C	A	C2	1	2	9.866	0.9925	0.08823	18	0.004902	LAB
TCDUB111C	B	C1	2	1	10.08	1.028	0.08758	18	0.004866	LAB
TCDUB112C	B	C1	2	1	10.56	1.032	0.08667	18	0.004815	LWT
TCDUB113C	B	C1	2	1	11.61	1.027	0.08717	18	0.004843	LAT
TCDUB114C	B	C1	2	1	10.85	1.033	0.08698	18	0.004832	LWT
TCDUB211C	B	C2	2	2	10.67	1.009	0.08673	18	0.004819	LGB
TCDUB212C	B	C2	2	2	10.09	1.022	0.08677	18	0.004820	LGB
TCDUB213C	B	C2	2	2	11.46	1.010	0.08658	18	0.004810	LGB
TCDUC111C	C	C1	3	1	10.13	1.006	0.08790	18	0.004883	LGM
TCDUC112C	C	C1	3	1	9.904	1.018	0.08837	18	0.004909	LGT
TCDUC113C	C	C1	3	1	9.268	1.022	0.08787	18	0.004881	LGM
TCDUC211C	C	C2	3	2	10.36	0.9859	0.08955	18	0.004975	LWT
TCDUC212C	C	C2	3	2	8.654	0.9921	0.08843	18	0.004913	LGT
TCDUC213C	C	C2	3	2	10.43	0.9965	0.08865	18	0.004925	LAT
TCDUD111C	D	C1	4	1	10.04	0.9677	0.08818	18	0.004899	LAB
TCDUD112C	D	C1	4	1	10.44	0.9761	0.08718	18	0.004844	LWB
TCDUD113C	D	C1	4	1	10.49	0.9798	0.08705	18	0.004836	LWB
TCDUD211C	D	C2	4	2	11.26	0.9680	0.08657	18	0.004809	LAB
TCDUD212C	D	C2	4	2	10.77	0.9622	0.08647	18	0.004804	LAT
TCDUD213C	D	C2	4	2	10.47	0.9668	0.08603	18	0.004780	LWT
TCDUE111C	E	C1	5	1	9.326	0.9891	0.08887	18	0.004937	LGT
TCDUE112C	E	C1	5	1	8.933	0.9923	0.08825	18	0.004903	LWT
TCDUE113C	E	C1	5	1	9.143	1.016	0.08740	18	0.004856	LWT
TCDUE311C	E	C3	5	3	8.491	0.9908	0.08900	18	0.004944	LWT
TCDUE312C	E	C3	5	3	7.972	0.9872	0.08908	18	0.004949	LGB
TCDUE313C	E	C3	5	3	8.726	0.9854	0.08860	18	0.004922	LGT

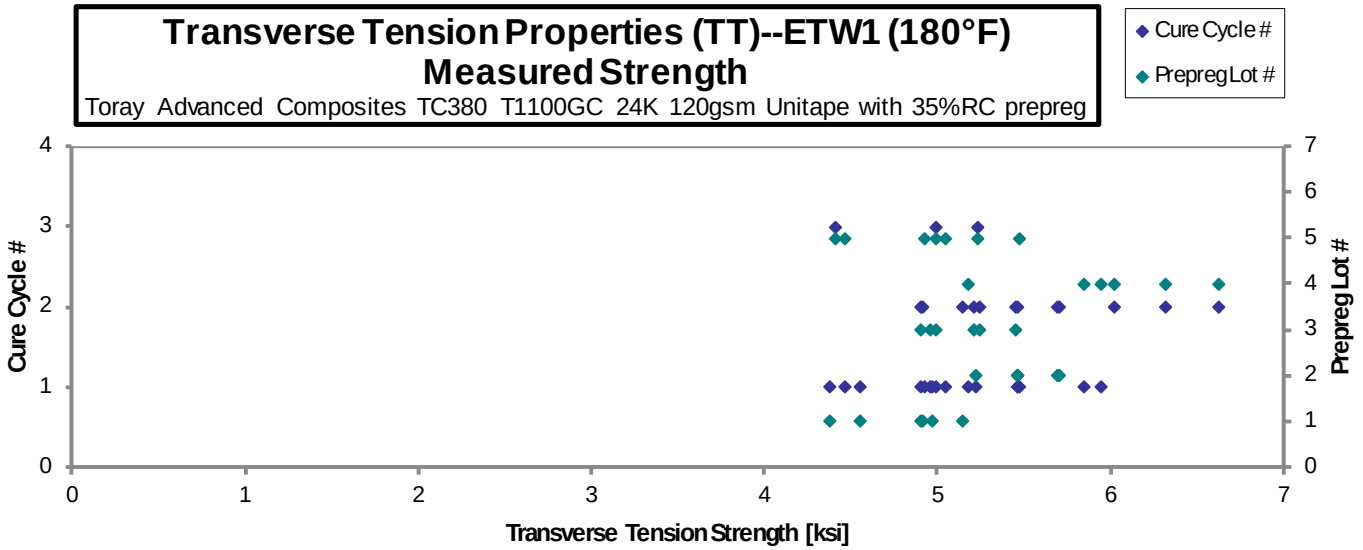
Average	**9.903**	**1.001**	**0.004875**
Standard Dev.	**0.8863**	**0.02128**	
Coeff. of Var. [%]	**8.950**	**2.125**	
Min.	**7.972**	**0.9622**	**0.004780**
Max.	**11.61**	**1.033**	**0.004975**
Number of Spec.	**32**	**32**	**32**

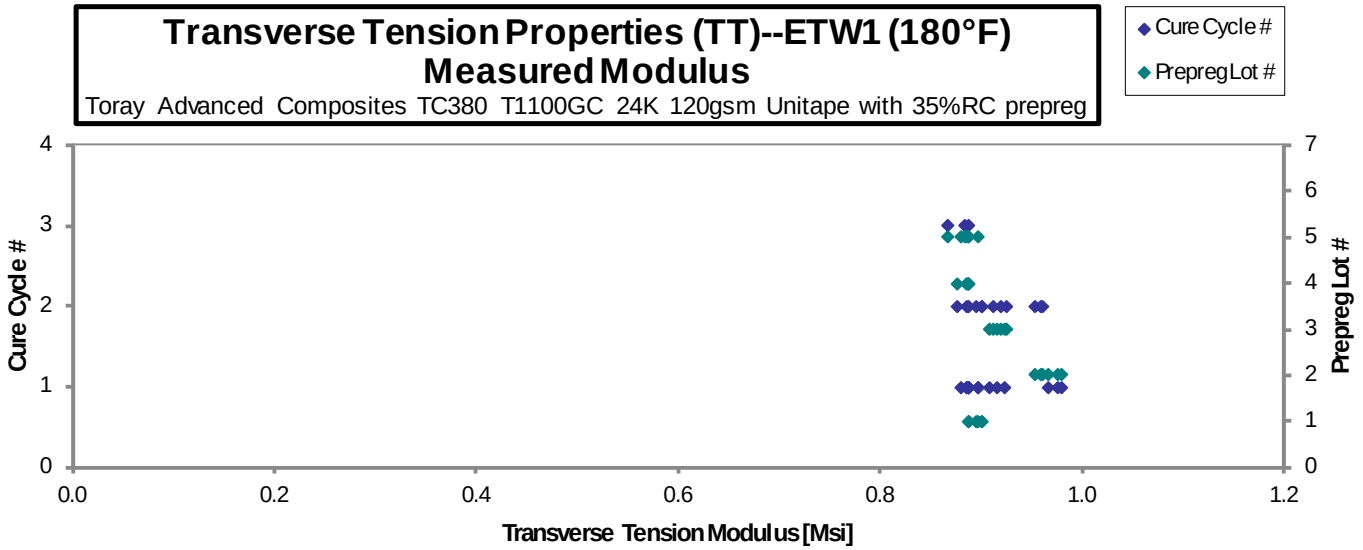

Transverse Tension Properties (TT)--ETD1 (180°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Strength [ksi]
0
2
4
6
8
10
12
14
0
1
2
3
4
0
1
2
3
4
5
6
7


Transverse Tension Properties (TT)--ETD1 (180°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
1
2
3
4
0
1
2
3
4
5
6
7

Transverse Tension Properties (TT)--ETW1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

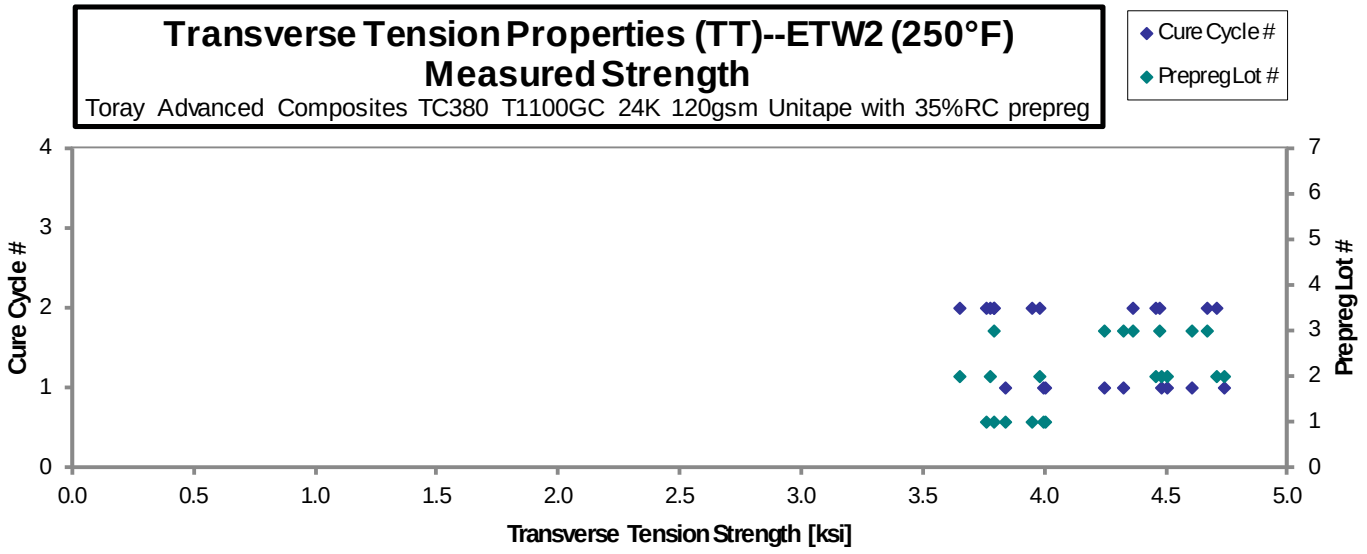
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111D	A	C1	1	1	4.548	0.8874	0.08795	18	0.004886	LAB
TCDUA112D	A	C1	1	1	4.964	0.8971	0.08832	18	0.004906	LGT
TCDUA113D	A	C1	1	1	4.380	0.8870	0.08815	18	0.004897	LAB
TCDUA211D	A	C2	1	2	5.139	0.8943	0.08808	18	0.004894	LGT
TCDUA212D	A	C2	1	2	4.912	0.8999	0.08763	18	0.004869	LGM
TCDUA213D	A	C2	1	2	4.907	0.9001	0.08760	18	0.004867	LWT
TCDUB111D	B	C1	2	1	5.215	0.9660	0.08712	18	0.004840	LWT
TCDUB112D	B	C1	2	1	5.461	0.9795	0.08697	18	0.004831	LWT
TCDUB113D	B	C1	2	1	5.465	0.9758	0.08682	18	0.004823	LWT
TCDUB211D	B	C2	2	2	5.696	0.9598	0.08725	18	0.004847	LWB
TCDUB212D	B	C2	2	2	5.699	0.9585	0.08698	18	0.004832	LWT
TCDUB213D	B	C2	2	2	5.466	0.9518	0.08712	18	0.004840	LGT
TCDUC111D	C	C1	3	1	4.905	0.9218	0.08817	18	0.004898	LGT
TCDUC112D	C	C1	3	1	4.993	0.9155	0.08897	18	0.004943	LGT
TCDUC113D	C	C1	3	1	4.959	0.9078	0.08943	18	0.004969	LWT
TCDUC211D	C	C2	3	2	5.214	0.9246	0.08868	18	0.004927	LGT
TCDUC212D	C	C2	3	2	5.446	0.9110	0.08852	18	0.004918	LGM
TCDUC213D	C	C2	3	2	5.239	0.9194	0.08808	18	0.004894	LWT
TCDUD111D	D	C1	4	1	5.171	0.8868	0.08770	18	0.004872	LWT
TCDUD112D	D	C1	4	1	5.843	0.8876	0.08800	18	0.004889	LGT
TCDUD113D	D	C1	4	1	5.948	0.8843	0.08782	18	0.004879	LGM
TCDUD211D	D	C2	4	2	6.320	0.8749	0.08608	18	0.004782	LGM
TCDUD212D	D	C2	4	2	6.619	0.8863	0.08623	18	0.004791	LGM
TCDUD213D	D	C2	4	2	6.021	0.8843	0.08653	18	0.004807	LGT
TCDUE111D	E	C1	5	1	5.468	0.8792	0.08815	18	0.004897	LGM
TCDUE112D	E	C1	5	1	4.468	0.8868	0.08818	18	0.004899	LWB
TCDUE113D	E	C1	5	1	4.919	0.8842	0.08933	18	0.004963	LAB
TCDUE114D	E	C1	5	1	5.043	0.8971	0.08775	18	0.004875	LGB
TCDUE311D	E	C3	5	3	5.229	0.8869	0.08837	18	0.004909	LGB
TCDUE312D	E	C3	5	3	4.413	0.8657	0.08925	18	0.004958	LWB
TCDUE313D	E	C3	5	3	4.990	0.8837	0.08815	18	0.004897	LGB
				Average	**5.260**	**0.9079**			**0.004881**	
				Standard Dev.	**0.5311**	**0.03190**				
				Coeff. of Var. [%]	**10.10**	**3.514**				
				Min.	**4.380**	**0.8657**			**0.004782**	
				Max.	**6.619**	**0.9795**			**0.004969**	
				Number of Spec.	**31**	**31**			**31**	

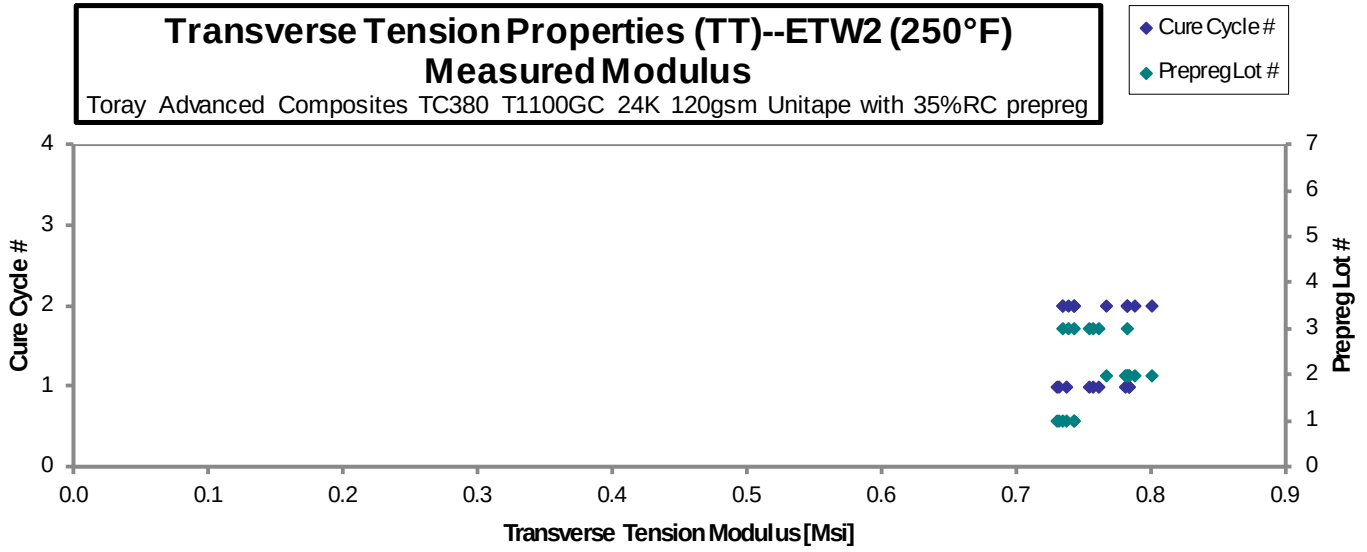

Transverse Tension Properties (TT)--ETW1 (180°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Strength [ksi]
0
1
2
3
4
5
6
7


Transverse Tension Properties (TT)--ETW1 (180°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2

Transverse Tension Properties (TT)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDUA111E	A	C1	1	1	3.997	0.7302	0.08858	18	0.004921	LGM
TCDUA112E	A	C1	1	1	4.006	0.7323	0.08905	18	0.004947	LWT
TCDUA113E	A	C1	1	1	3.844	0.7379	0.08928	18	0.004960	LGB
TCDUA211E	A	C2	1	2	3.766	0.7441	0.08815	18	0.004897	LGT
TCDUA212E	A	C2	1	2	3.948	0.7357	0.08843	18	0.004913	LGM
TCDUA213E	A	C2	1	2	3.792	0.7434	0.08853	18	0.004919	LGT
TCDUB111E	B	C1	2	1	4.744	0.7822	0.08778	18	0.004877	LGB
TCDUB112E	B	C1	2	1	4.510	0.7849	0.08885	18	0.004936	LGT
TCDUB113E	B	C1	2	1	4.480	0.7849	0.08868	18	0.004927	LGT
TCDUB211E	B	C2	2	2	3.781	0.7836	0.08733	18	0.004852	LGM
TCDUB212E	B	C2	2	2	4.711	0.7676	0.08833	18	0.004907	LWT
TCDUB213E	B	C2	2	2	4.462	0.7822	0.08777	18	0.004876	LWT
TCDUB214E	B	C2	2	2	3.654	0.7881	0.08697	18	0.004831	LGM
TCDUB215E	B	C2	2	2	3.982	0.8008	0.08447	18	0.004693	LGM
TCDUC111E	C	C1	3	1	4.245	0.7612	0.08850	18	0.004917	LGB
TCDUC112E	C	C1	3	1	4.610	0.7549	0.08925	18	0.004958	LGM
TCDUC113E	C	C1	3	1	4.327	0.7573	0.08895	18	0.004942	LGT
TCDUC211E	C	C2	3	2	4.676	0.7432	0.08947	18	0.004970	LGB
TCDUC212E	C	C2	3	2	4.480	0.7392	0.08907	18	0.004948	LGT
TCDUC213E	C	C2	3	2	3.797	0.7343	0.09020	18	0.005011	LGT
TCDUC214E	C	C2	3	2	4.366	0.7828	0.08583	18	0.004769	LWT
				Average	**4.199**	**0.7605**			**0.004903**	
				Standard Dev.	**0.3623**	**0.02290**				
				Coeff. of Var. [%]	**8.629**	**3.011**				
				Min.	**3.654**	**0.7302**			**0.004693**	
				Max.	**4.744**	**0.8008**			**0.005011**	
				Number of Spec.	**21**	**21**			**21**	


Transverse Tension Properties (TT)--ETW2 (250°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Strength [ksi]
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
0 1 2 3 4
0 1 2 3 4 5 6 7


Transverse Tension Properties (TT)--ETW2 (250°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Tension Modulus [Msi]
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9
0 1 2 3 4
0 1 2 3 4 5 6 7

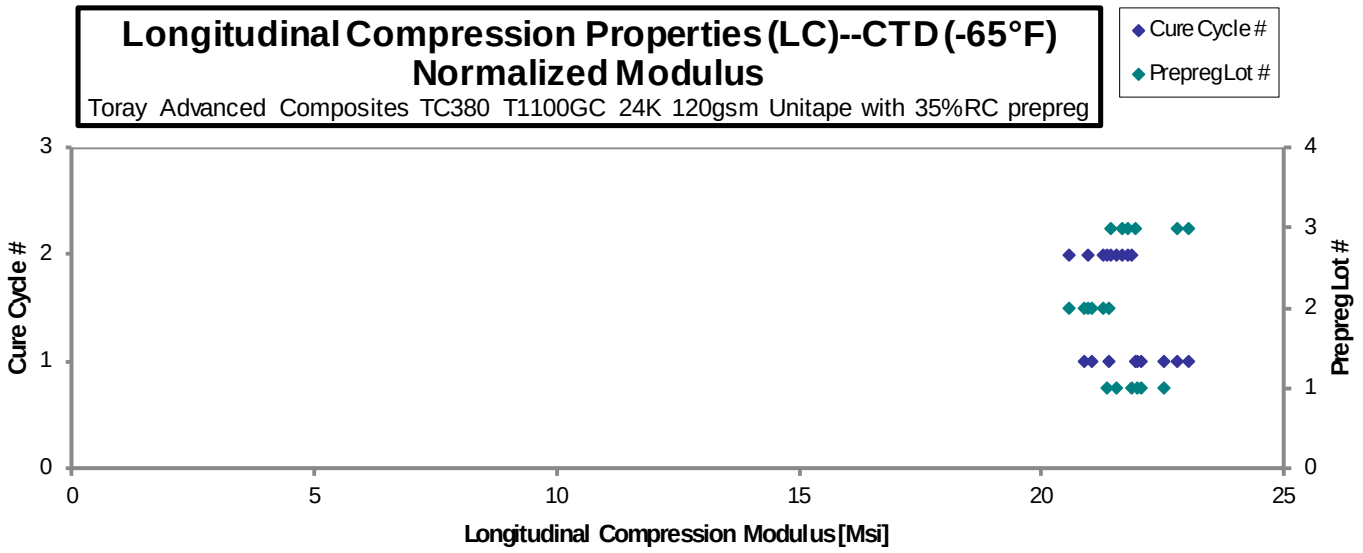
4.3 Longitudinal Compression Properties (LC)

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

normalizing t_{ply} [in]
0.004800

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

Average	**21.13**	**0.3880**	**$Average_{norm}$**	**0.004921**	**21.66**
Standard Dev.	**0.6563**	**0.03115**	**$Standard\ Dev._{norm}$**		**0.6616**
Coeff. of Var. [%]	**3.105**	**8.029**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.054**
Min.	**20.05**	**0.3420**	**Min.**	**0.004705**	**20.58**
Max.	**22.20**	**0.4603**	**Max.**	**0.005026**	**23.04**
Number of Spec.	**18**	**18**	**Number of Spec.**	**18**	**18**


Longitudinal Compression Properties (LC)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Modulus [Msi]
0
1
2
3
4
0
5
10
15
20
25

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

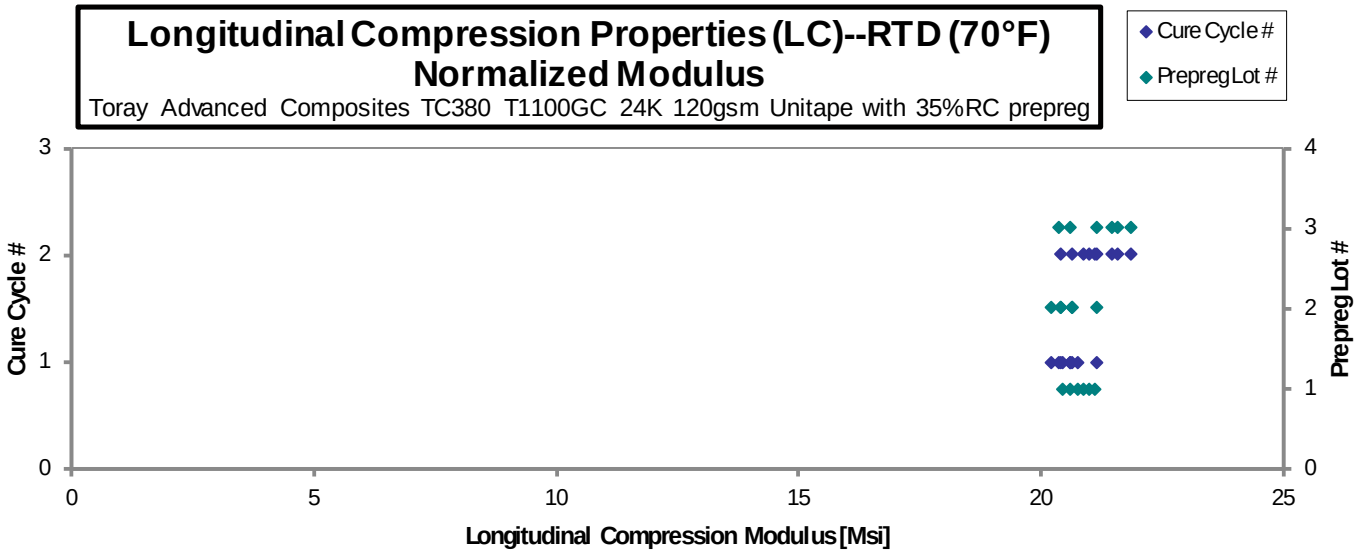
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Longitudinal Compression Properties (LC)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Modulus [Msi]
0
1
2
3
4
0
5
10
15
20
25

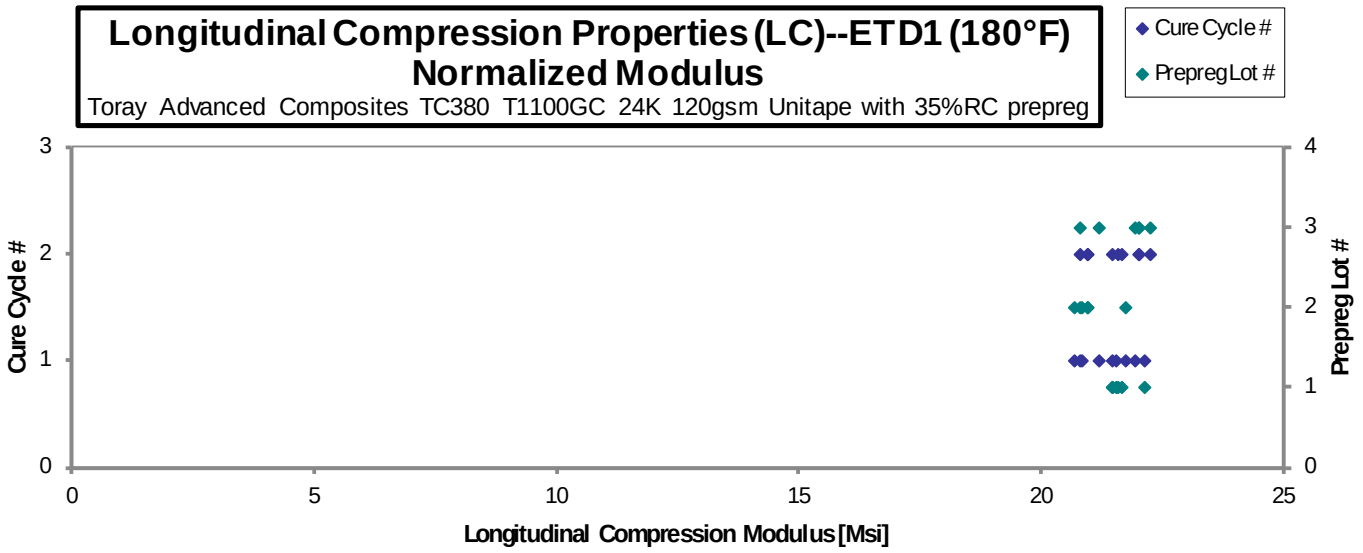
Longitudinal Compression Properties (LC)--ETD1 (180°F)
Modulus

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

normalizing t_{ply} [in]
0.004800

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

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


Longitudinal Compression Properties (LC)--ETD1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Modulus [Msi]
0
1
2
3
4
0
5
10
15
20
25

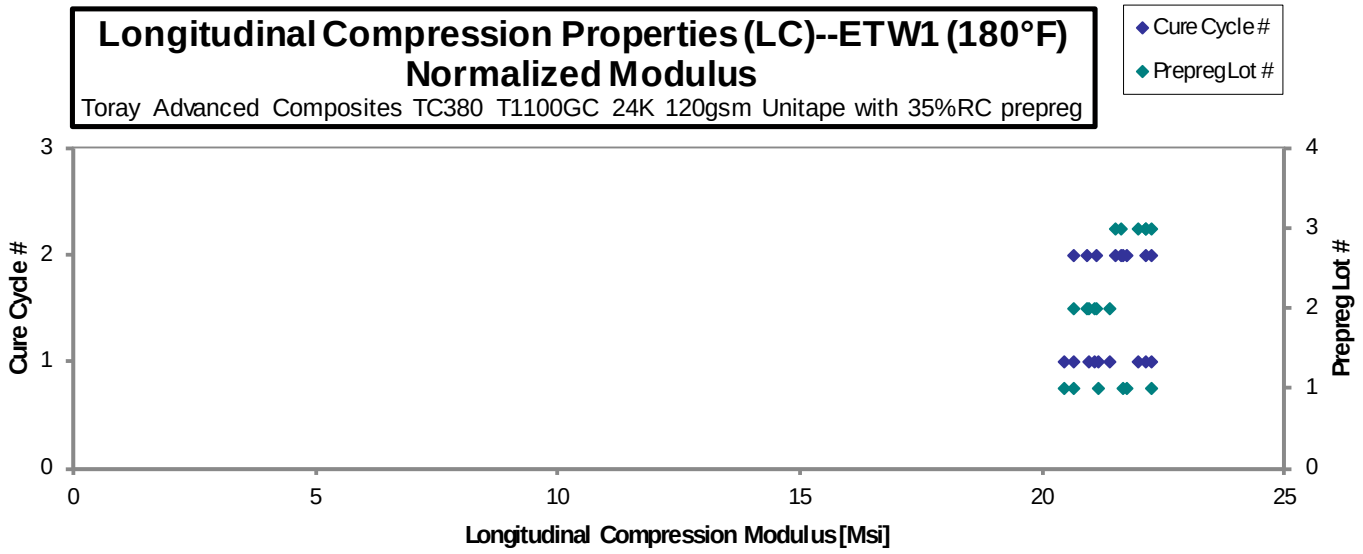
Longitudinal Compression Properties (LC)--ETW1 (180°F)
Modulus

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

normalizing t_{ply} [in]
0.004800

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

Average	**20.96**	**0.3847**	**Average$_{norm}$**	**0.004911**	**21.44**
Standard Dev.	**0.4674**	**0.02974**	**Standard Dev.$_{norm}$**		**0.5826**
Coeff. of Var. [%]	**2.230**	**7.731**	**Coeff. of Var. [%]$_{norm}$**		**2.717**
Min.	**20.24**	**0.3445**	**Min.**	**0.004725**	**20.48**
Max.	**21.81**	**0.4599**	**Max.**	**0.005001**	**22.27**
Number of Spec.	**18**	**18**	**Number of Spec.**	**18**	**18**


Longitudinal Compression Properties (LC)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Modulus [Msi]
0
1
2
3
4
0
5
10
15
20
25

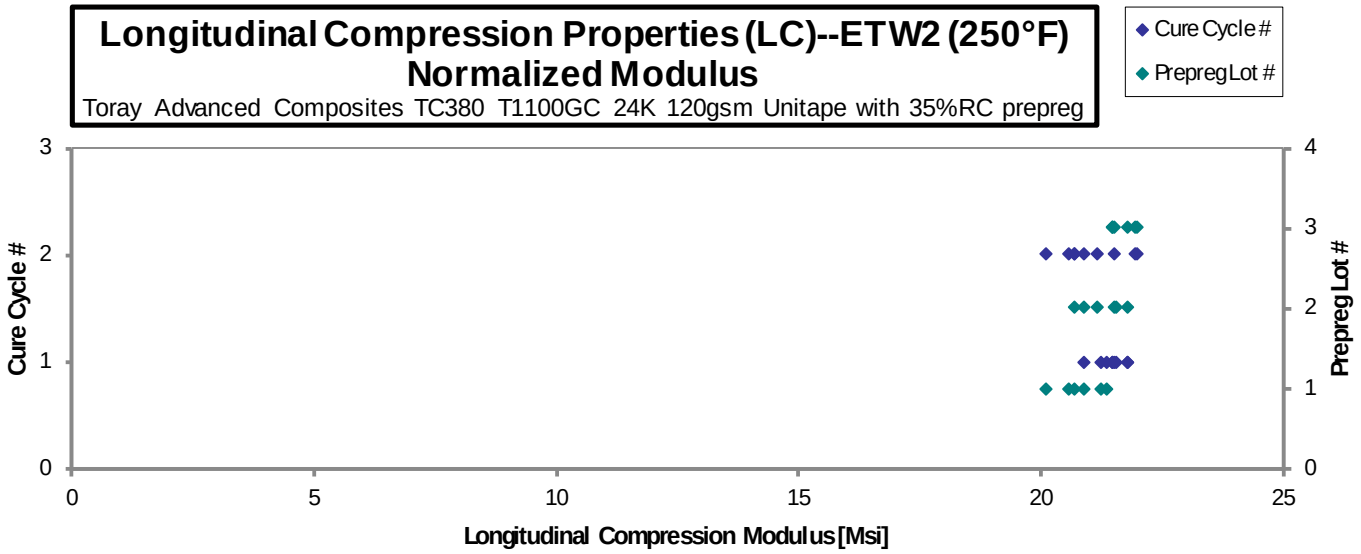
Longitudinal Compression Properties (LC)--ETW2 (250°F)
Modulus

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

normalizing t_{ply} [in]
0.004800

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

Average	**21.23**	**0.4063**	**Average$_{norm}$**	**0.004807**	**21.25**
Standard Dev.	**0.8264**	**0.02438**	**Standard Dev.$_{norm}$**		**0.5194**
Coeff. of Var. [%]	**3.892**	**6.001**	**Coeff. of Var. [%]$_{norm}$**		**2.445**
Min.	**19.63**	**0.3610**	**Min.**	**0.004559**	**20.10**
Max.	**22.88**	**0.4680**	**Max.**	**0.005053**	**21.97**
Number of Spec.	**18**	**18**	**Number of Spec.**	**18**	**18**


Longitudinal Compression Properties (LC)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Modulus [Msi]
0
1
2
3
4
0
5
10
15
20
25

4.4 Longitudinal Compression (LC) Back-out Factor Properties

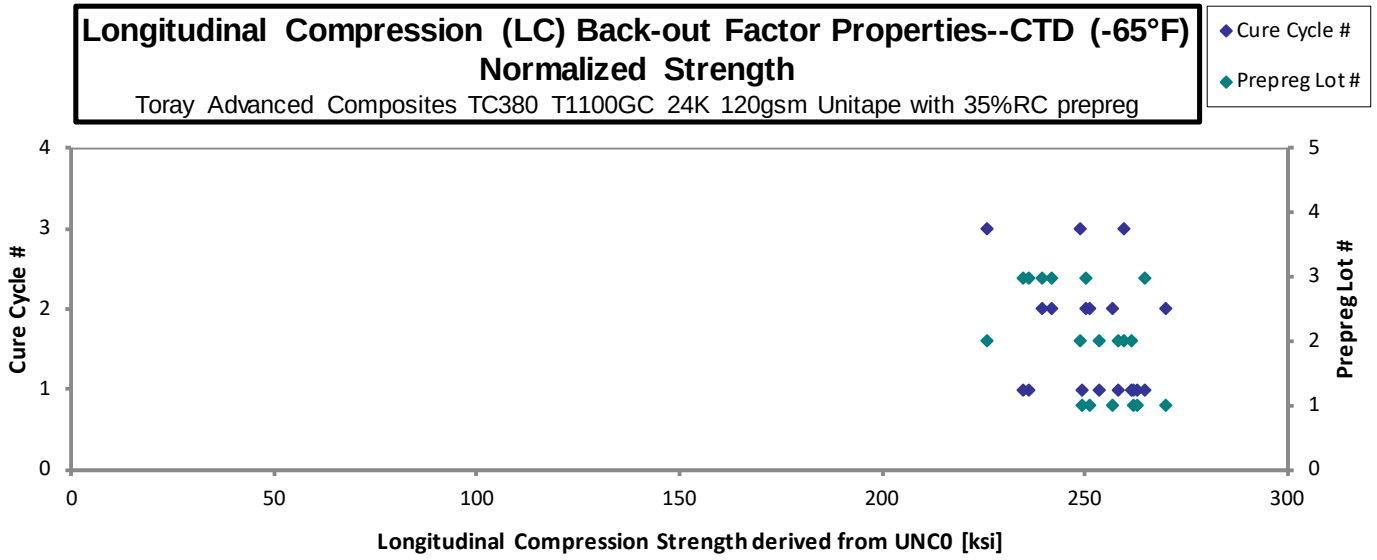
Note: For each test condition, F_1^{cu} [ksi] derived from cross-ply compression (UNC0) was calculated using back-out factor values. The back-out factor values were calculated using E_1^c, v_{12}^c and E_2^c values from each corresponding test condition, as shown in Table 1-2. For example, CTD F_1^{cu}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

Longitudinal Compression (LC) Back-out Factor Properties--CTD (-65°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

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

* CTD Back-out $factor_{meas}$ = 2.672
** CTD Back-out $factor_{norm}$ = 2.679

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

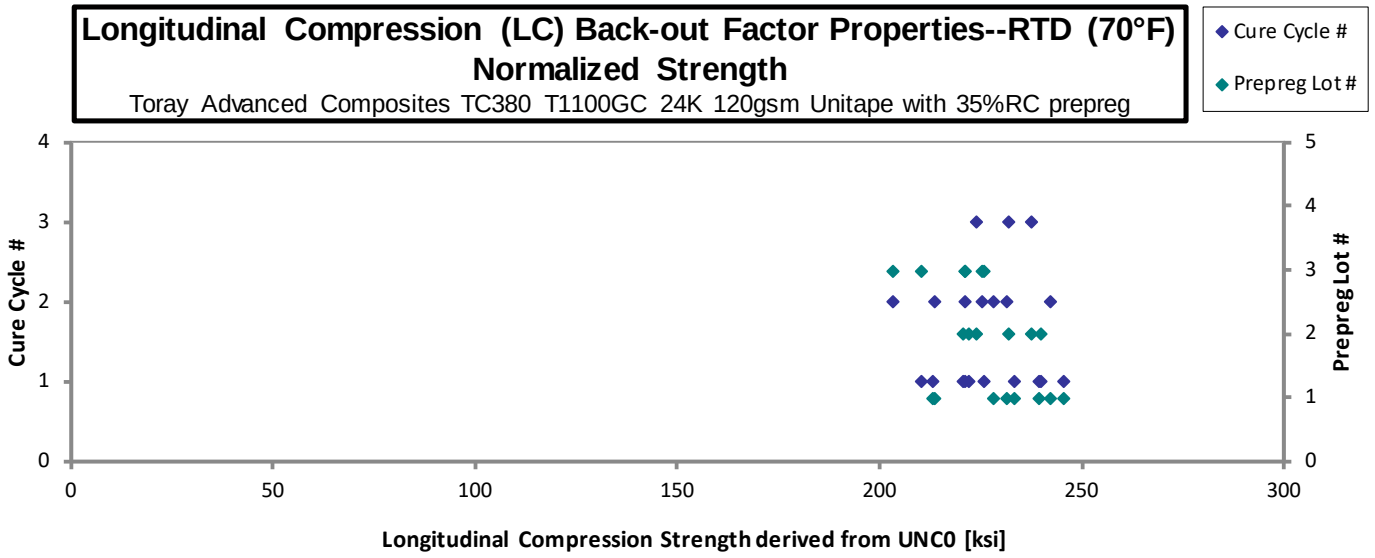

Longitudinal Compression (LC) Back-out Factor Properties--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Strength derived from UNC0 [ksi]
0
50
100
150
200
250
300
0
1
2
3
4
5

Longitudinal Compression (LC) Back-out Factor Properties--RTD (70°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	$F_1^{cu}{}_{meas}$ [ksi] from UNC0*	$F_1^{cu}{}_{norm}$ [ksi] from UNC0**
TCDRA111A	A	C1	1	1	225.9	213.4
TCDRA112A	A	C1	1	1	255.2	245.5
TCDRA113A	A	C1	1	1	238.7	233.5
TCDRA114A	A	C1	1	1	241.2	239.8
TCDRA211A	A	C2	1	2	227.7	213.8
TCDRA212A	A	C2	1	2	238.8	228.3
TCDRA213A	A	C2	1	2	250.3	242.5
TCDRA214A	A	C2	1	2	236.0	231.6
TCDRB111A	B	C1	2	1	241.5	220.7
TCDRB112A	B	C1	2	1	238.8	222.1
TCDRB113A	B	C1	2	1	249.1	240.2
TCDRB311A	B	C3	2	3	251.1	232.1
TCDRB312A	B	C3	2	3	249.9	237.6
TCDRB313A	B	C3	2	3	231.1	224.1
TCDRC111A	C	C1	3	1	231.0	221.2
TCDRC112A	C	C1	3	1	214.3	210.6
TCDRC113A	C	C1	3	1	225.2	225.8
TCDRC211A	C	C2	3	2	237.5	221.6
TCDRC212A	C	C2	3	2	211.1	203.5
TCDRC213A	C	C2	3	2	229.0	225.7

* RTD Back-out $factor_{meas}$ = 2.693
** RTD Back-out $factor_{norm}$ = 2.694

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


Longitudinal Compression (LC) Back-out Factor Properties--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
50
100
150
200
250
300
Longitudinal Compression Strength derived from UNC0 [ksi]

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

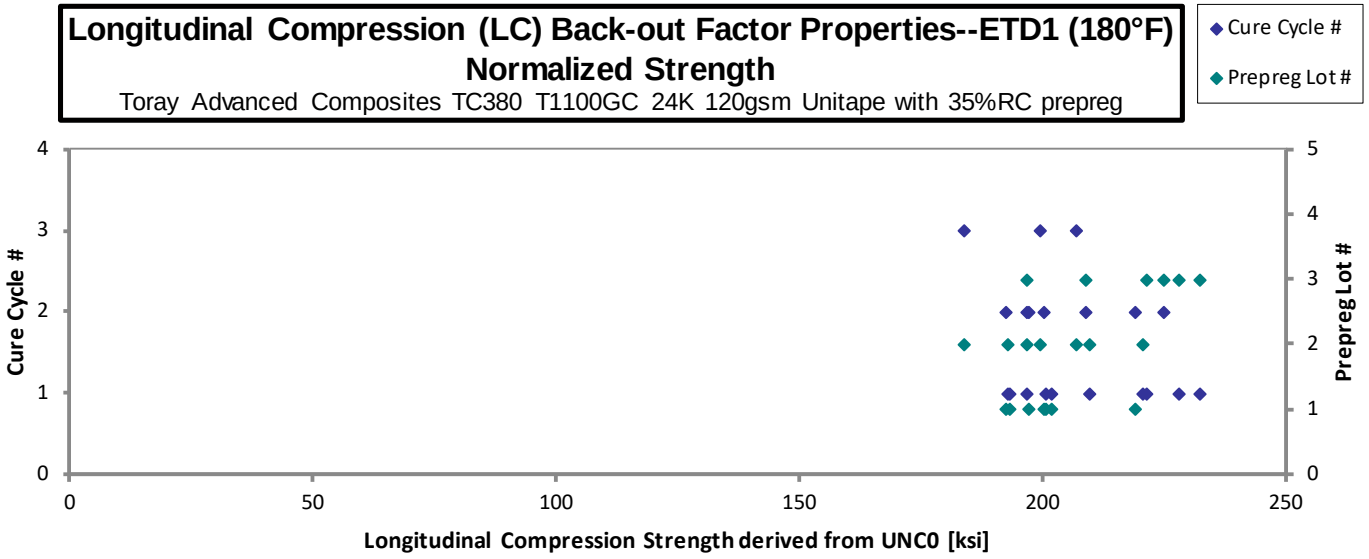
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	$F_1^{cu}{}_{meas}$ [ksi] from UNC0*	$F_1^{cu}{}_{norm}$ [ksi] from UNC0**
TCDRA111C	A	C1	1	1	198.2	200.4
TCDRA112C	A	C1	1	1	199.4	201.6
TCDRA113C	A	C1	1	1	192.1	193.3
TCDRA211C	A	C2	1	2	217.5	218.8
TCDRA212C	A	C2	1	2	199.0	200.3
TCDRA213C	A	C2	1	2	191.8	192.3
TCDRA214C	A	C2	1	2	197.5	197.1
TCDRB111C	B	C1	2	1	188.9	196.5
TCDRB112C	B	C1	2	1	212.0	220.5
TCDRB113C	B	C1	2	1	187.0	192.9
TCDRB114C	B	C1	2	1	232.5	209.6
TCDRB311C	B	C3	2	3	176.6	183.9
TCDRB312C	B	C3	2	3	191.8	199.5
TCDRB313C	B	C3	2	3	199.2	207.0
TCDRC111C	C	C1	3	1	208.5	221.4
TCDRC112C	C	C1	3	1	220.3	232.2
TCDRC113C	C	C1	3	1	217.2	227.7
TCDRC211C	C	C2	3	2	185.9	196.6
TCDRC212C	C	C2	3	2	213.7	224.9
TCDRC213C	C	C2	3	2	197.7	208.6

* ETD1 Back-out $factor_{meas}$ = 2.716

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

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


Longitudinal Compression (LC) Back-out Factor Properties--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Strength derived from UNC0 [ksi]
0
1
2
3
4
5
0
50
100
150
200
250

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

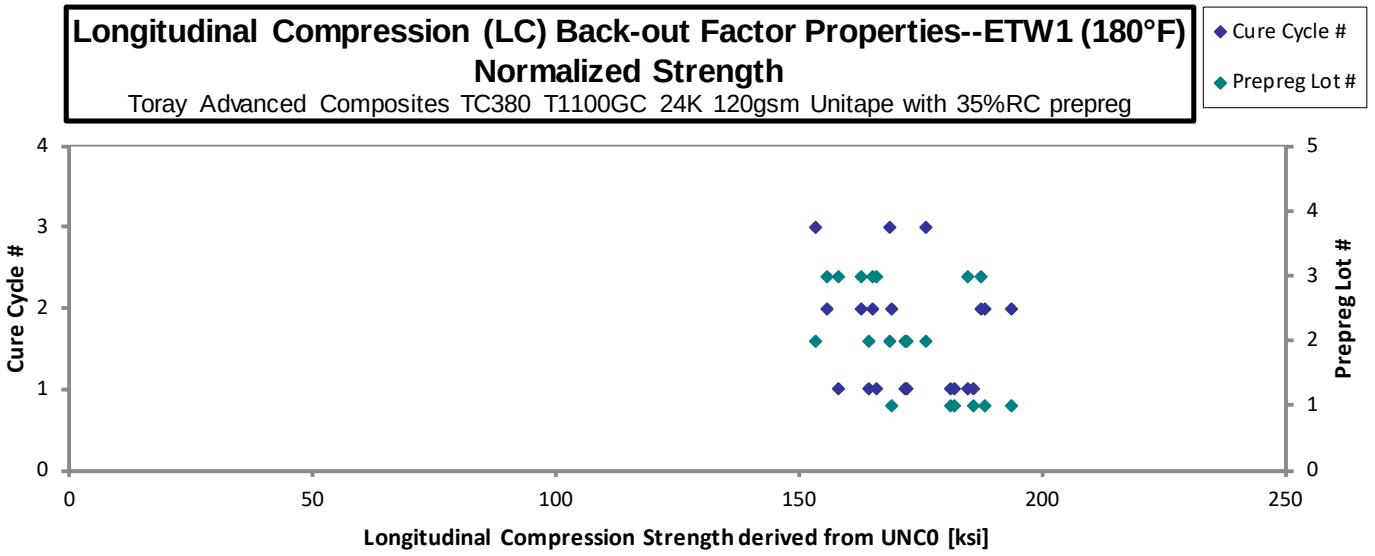
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

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

* ETW1 Back-out $factor_{meas}$ = 2.734

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

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


Longitudinal Compression (LC) Back-out Factor Properties--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Strength derived from UNC0 [ksi]
0
50
100
150
200
250
0
1
2
3
4
5

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

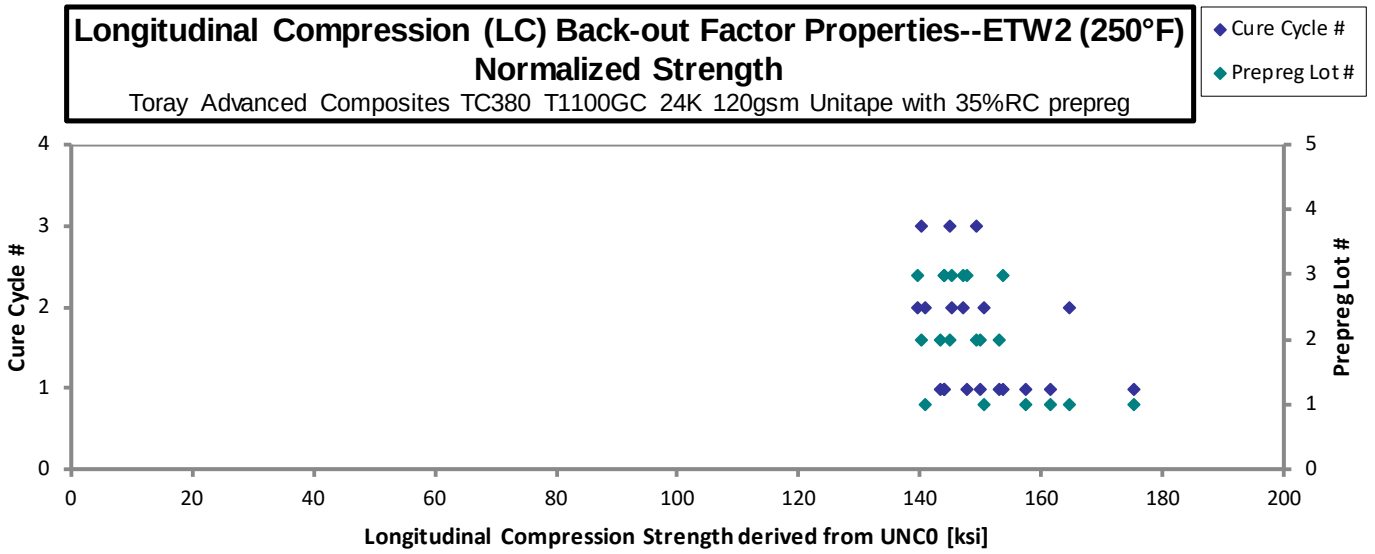
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

UNC0 Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	$F_1^{cu}{}_{meas}$ [ksi] from UNC0*	$F_1^{cu}{}_{norm}$ [ksi] from UNC0**
TCDRA111E	A	C1	1	1	154.8	157.5
TCDRA112E	A	C1	1	1	172.6	175.3
TCDRA113E	A	C1	1	1	158.8	161.7
TCDRA211E	A	C2	1	2	149.3	140.8
TCDRA212E	A	C2	1	2	157.3	150.7
TCDRA213E	A	C2	1	2	168.0	164.6
TCDRB111E	B	C1	2	1	140.5	150.0
TCDRB112E	B	C1	2	1	144.4	153.2
TCDRB113E	B	C1	2	1	134.5	143.5
TCDRB311E	B	C3	2	3	150.7	140.4
TCDRB312E	B	C3	2	3	152.2	145.2
TCDRB313E	B	C3	2	3	153.5	149.3
TCDRC111E	C	C1	3	1	145.7	147.8
TCDRC112E	C	C1	3	1	144.8	144.2
TCDRC113E	C	C1	3	1	158.3	153.8
TCDRC114E	C	C1	3	1	152.5	144.0
TCDRC211E	C	C2	3	2	150.5	139.8
TCDRC212E	C	C2	3	2	149.4	145.4
TCDRC213E	C	C2	3	2	147.7	147.2

* ETW2 Back-out $factor_{meas}$ = 2.777

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

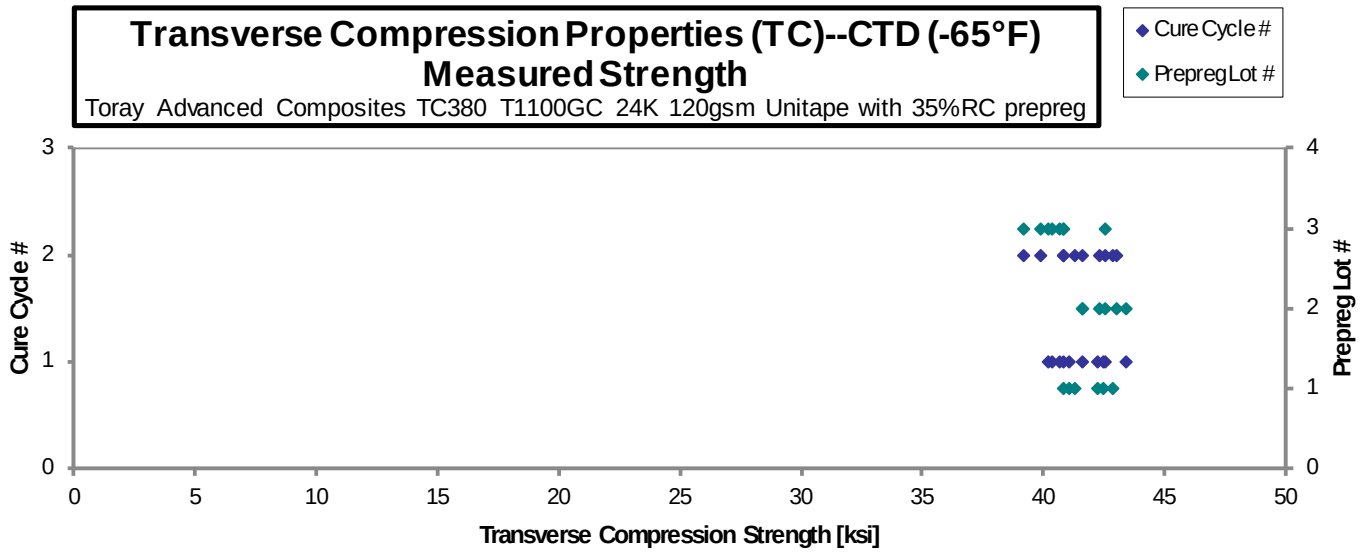
Average	**151.9**	**150.2**
Standard Dev.	**8.914**	**9.198**
Coeff. of Var. [%]	**5.869**	**6.123**
Min.	**134.5**	**139.8**
Max.	**172.6**	**175.3**
Number of Spec.	**19**	**19**

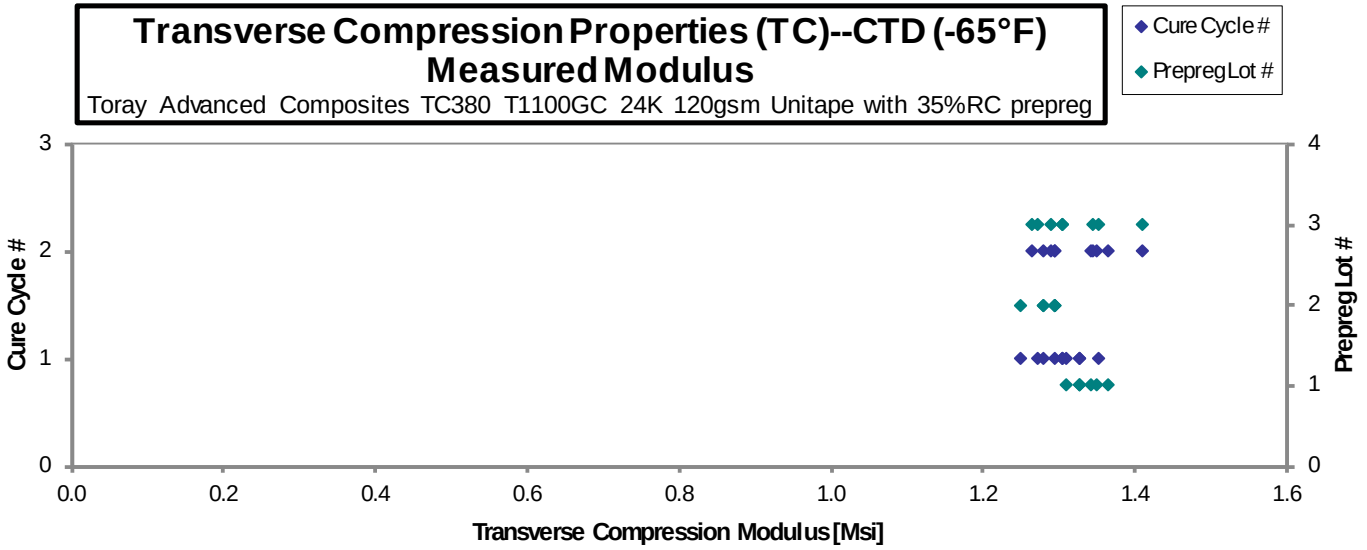

Longitudinal Compression (LC) Back-out Factor Properties--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Longitudinal Compression Strength derived from UNC0 [ksi]
0
1
2
3
4
5
0
20
40
60
80
100
120
140
160
180
200

4.5 Transverse Compression Properties (TC)

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

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDZA111B	A	C1	1	1	42.41	1.328	0.09810	20	0.004905	BGM
TCDZA112B	A	C1	1	1	41.04	1.310	0.09827	20	0.004913	BGM
TCDZA113B	A	C1	1	1	42.24	1.328	0.09823	20	0.004912	BGM
TCDZA211B	A	C2	1	2	41.30	1.349	0.09682	20	0.004841	BGM
TCDZA212B	A	C2	1	2	40.80	1.342	0.09733	20	0.004867	BGM
TCDZA213B	A	C2	1	2	42.88	1.366	0.09698	20	0.004849	BGM
TCDZB111B	B	C1	2	1	42.54	1.250	0.09937	20	0.004968	BGM
TCDZB112B	B	C1	2	1	41.55	1.281	0.09882	20	0.004941	BGM
TCDZB113B	B	C1	2	1	43.42	1.295	0.09910	20	0.004955	BGM
TCDZB211B	B	C2	2	2	42.26	1.281	0.09797	20	0.004898	BGM
TCDZB212B	B	C2	2	2	41.63	1.294	0.09805	20	0.004903	BGM
TCDZB213B	B	C2	2	2	42.98	1.296	0.09788	20	0.004894	BGM
TCDZC111B	C	C1	3	1	40.17	1.272	0.1001	20	0.005006	HAB, HAT
TCDZC112B	C	C1	3	1	40.36	1.305	0.1000	20	0.005000	HAT
TCDZC113B	C	C1	3	1	40.79	1.353	0.1002	20	0.005009	HGM, HAT
TCDZC114B	C	C1	3	1	40.62	1.305	0.1004	20	0.005018	HGM, HAB
TCDZC211B	C	C2	3	2	39.14	1.346	0.09843	20	0.004922	HAB, HAT
TCDZC212B	C	C2	3	2	40.81	1.290	0.09877	20	0.004938	HGM, HAB
TCDZC213B	C	C2	3	2	39.83	1.265	0.09865	20	0.004933	HAB, HAT
TCDZC214B	C	C2	3	2	42.55	1.411	0.09862	20	0.004931	HGM, HAB
				Average	**41.47**	**1.313**			**0.004930**	
				Standard Dev.	**1.165**	**0.03937**				
				Coeff. of Var. [%]	**2.809**	**2.997**				
				Min.	**39.14**	**1.250**			**0.004841**	
				Max.	**43.42**	**1.411**			**0.005018**	
				Number of Spec.	**20**	**20**			**20**	


Transverse Compression Properties (TC)--CTD (-65°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Strength [ksi]
0
5
10
15
20
25
30
35
40
45
50
0
1
2
3
4

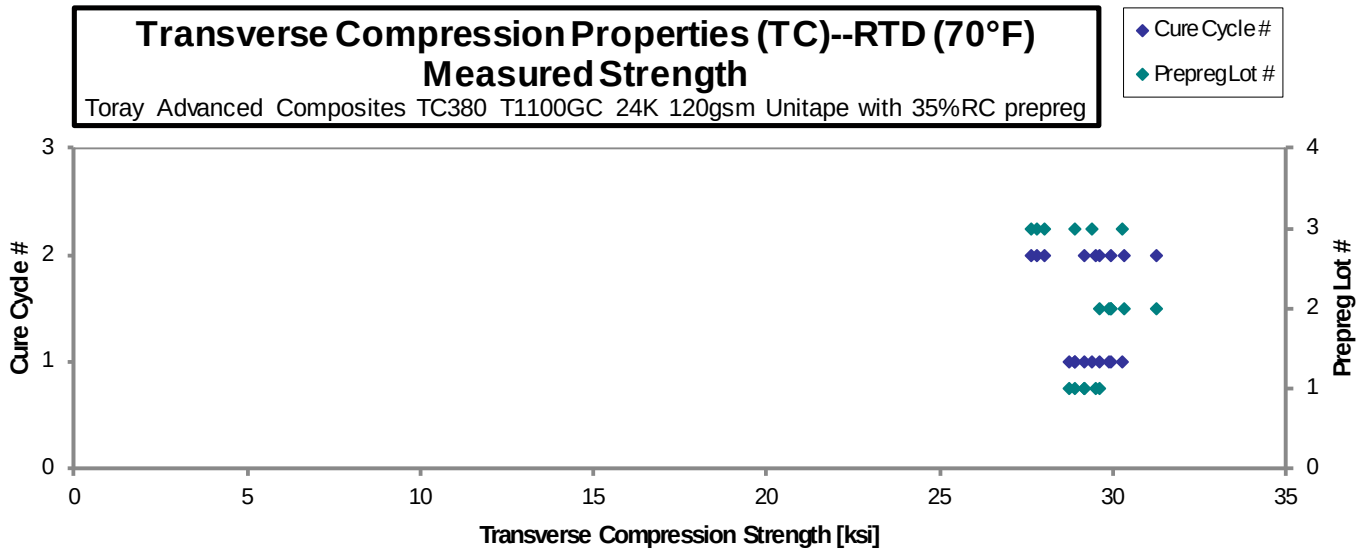

Transverse Compression Properties (TC)--CTD (-65°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
0
1
2
3
4

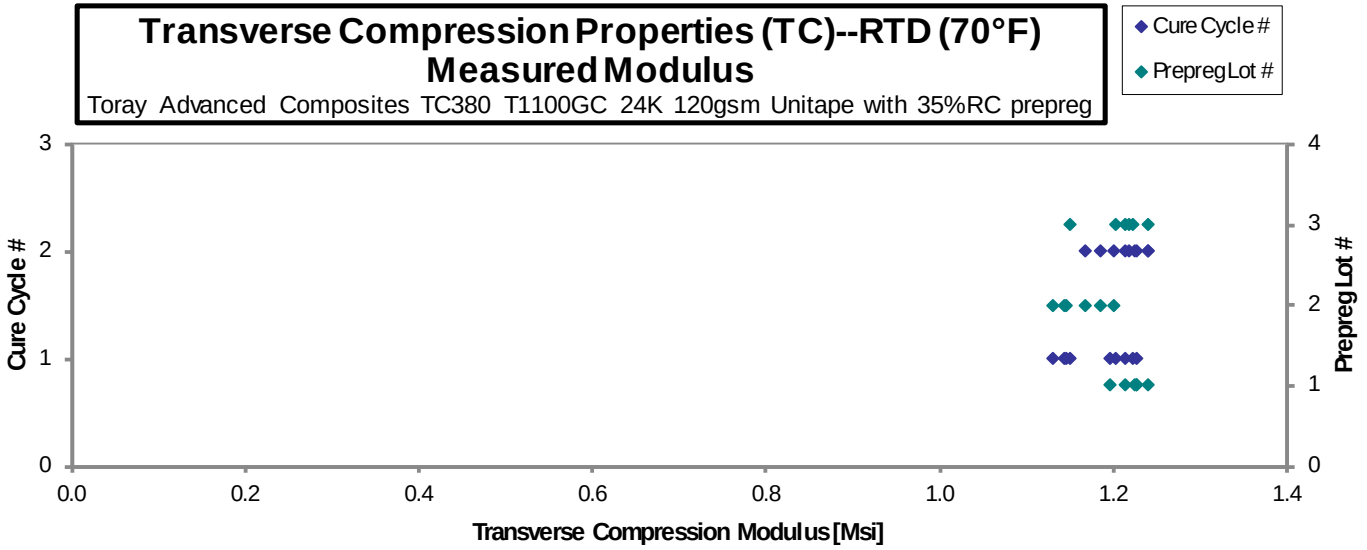
Transverse Compression Properties (TC)--RTD (70°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

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

* Modulus are averaged values of 2 strain gages.

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

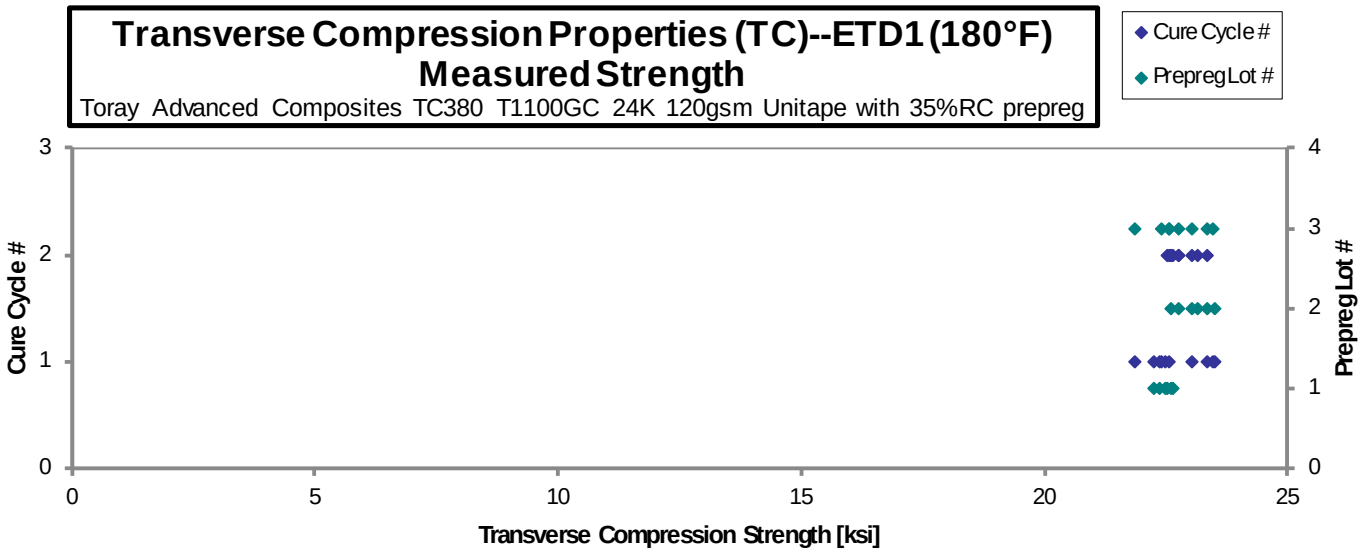

Transverse Compression Properties (TC)--RTD (70°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Strength [ksi]
0
5
10
15
20
25
30
35
0
1
2
3
4

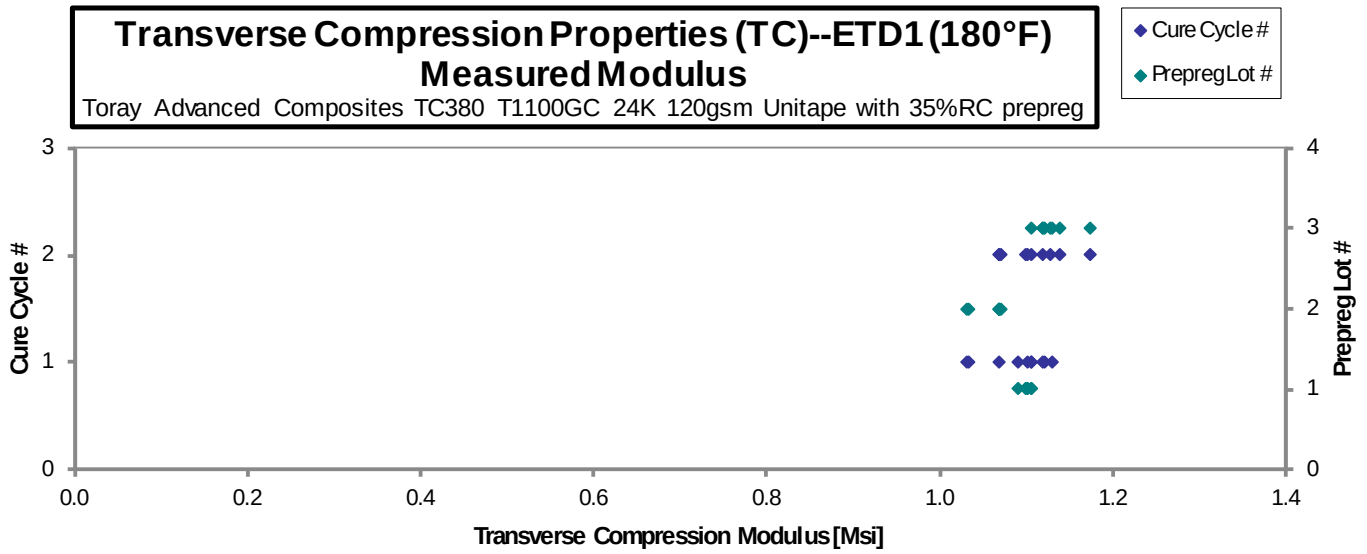

Transverse Compression Properties (TC)--RTD (70°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
1
2
3
4

Transverse Compression Properties (TC)--ETD1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

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

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

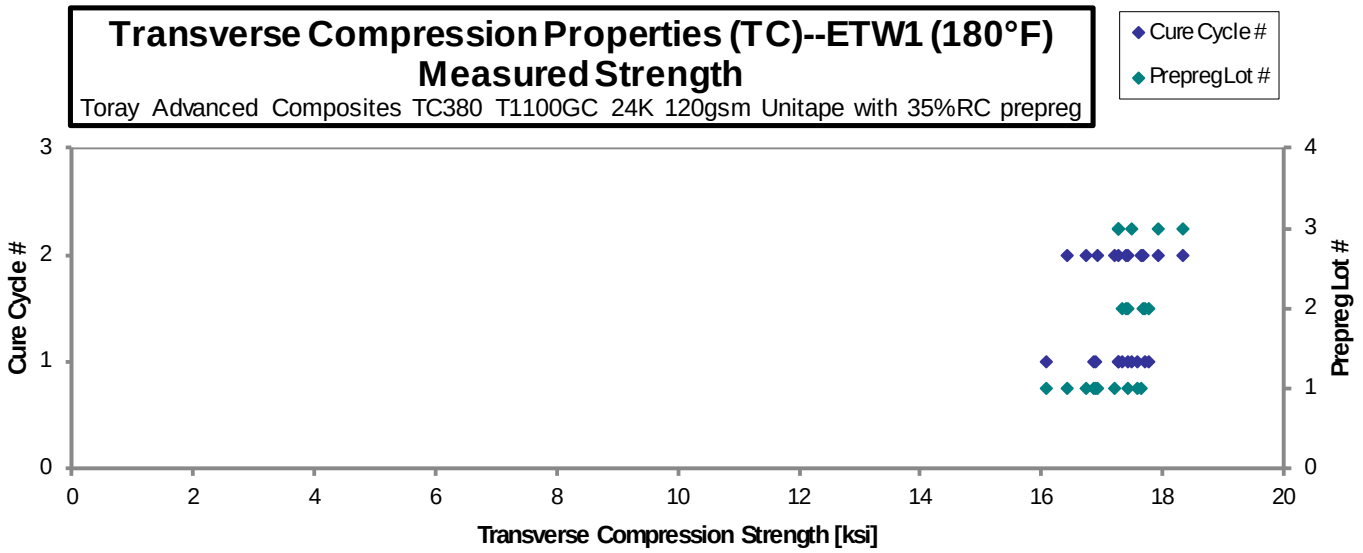

Transverse Compression Properties (TC)--ETD1 (180°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Strength [ksi]
0
5
10
15
20
25
0
1
2
3
4

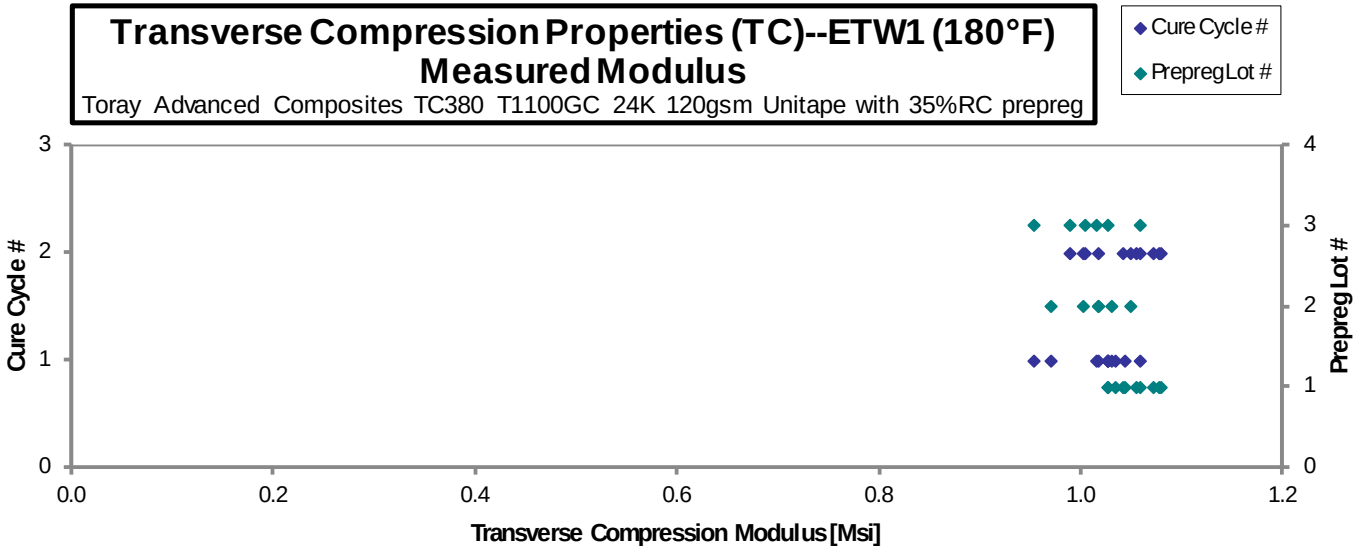

Transverse Compression Properties (TC)--ETD1 (180°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
1
2
3
4

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

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

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDZA111D	A	C1	1	1	17.41	1.045	0.09767	20	0.004883	HAT
TCDZA112D	A	C1	1	1	17.58	1.035	0.09803	20	0.004902	HAT
TCDZA113D	A	C1	1	1	16.86	1.058	0.09847	20	0.004923	HAT
TCDZA114D	A	C1	1	1	16.06	1.027	0.09860	20	0.004930	BGM
TCDZA115D	A	C1	1	1	16.88	1.028	0.09853	20	0.004927	BGM
TCDZA211D	A	C2	1	2	17.64	1.072	0.09715	20	0.004858	HAT, HAB
TCDZA212D	A	C2	1	2	16.74	1.043	0.09730	20	0.004865	HAT
TCDZA213D	A	C2	1	2	16.93	1.080	0.09677	20	0.004838	HAT
TCDZA214D	A	C2	1	2	17.18	1.078	0.09707	20	0.004853	HGM
TCDZA215D	A	C2	1	2	16.40	1.056	0.09670	20	0.004835	BAT
TCDZB111D	B	C1	2	1	17.70	0.9716	0.09900	20	0.004950	HGM, HAT
TCDZB112D	B	C1	2	1	17.32	1.019	0.09937	20	0.004968	HGM, HAB
TCDZB113D	B	C1	2	1	17.75	1.031	0.09925	20	0.004963	HGM, HAB
TCDZB211D	B	C2	2	2	17.43	1.018	0.09818	20	0.004909	BGM, HAT
TCDZB212D	B	C2	2	2	17.66	1.051	0.09793	20	0.004897	BGM, HAT
TCDZB213D	B	C2	2	2	17.39	1.003	0.09778	20	0.004889	BGM, HAT
TCDZC111D	C	C1	3	1	17.25	1.027	0.1003	20	0.005015	HGM
TCDZC112D	C	C1	3	1	17.48	0.9537	0.1008	20	0.005039	BGM, HAB
TCDZC113D	C	C1	3	1	17.27	1.016	0.1006	20	0.005029	BGM, HAT
TCDZC211D	C	C2	3	2	17.26	1.059	0.09927	20	0.004963	HGM
TCDZC212D	C	C2	3	2	18.32	1.005	0.09953	20	0.004977	HGM
TCDZC213D	C	C2	3	2	17.92	0.9893	0.09898	20	0.004949	HGM
				Average	**17.29**	**1.030**			**0.004926**	
				Standard Dev.	**0.5055**	**0.03275**				
				Coeff. of Var. [%]	**2.923**	**3.179**				
				Min.	**16.06**	**0.9537**			**0.004835**	
				Max.	**18.32**	**1.080**			**0.005039**	
				Number of Spec.	**22**	**22**			**22**	

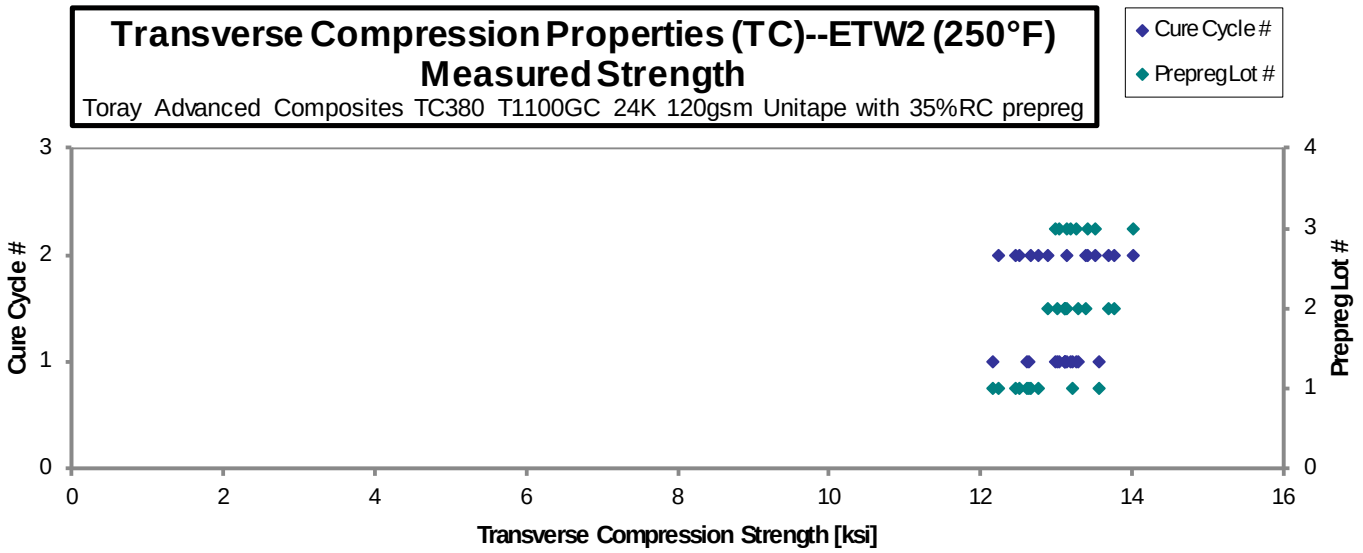

Transverse Compression Properties (TC)--ETW1 (180°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Strength [ksi]
0
2
4
6
8
10
12
14
16
18
20
0
1
2
3
4

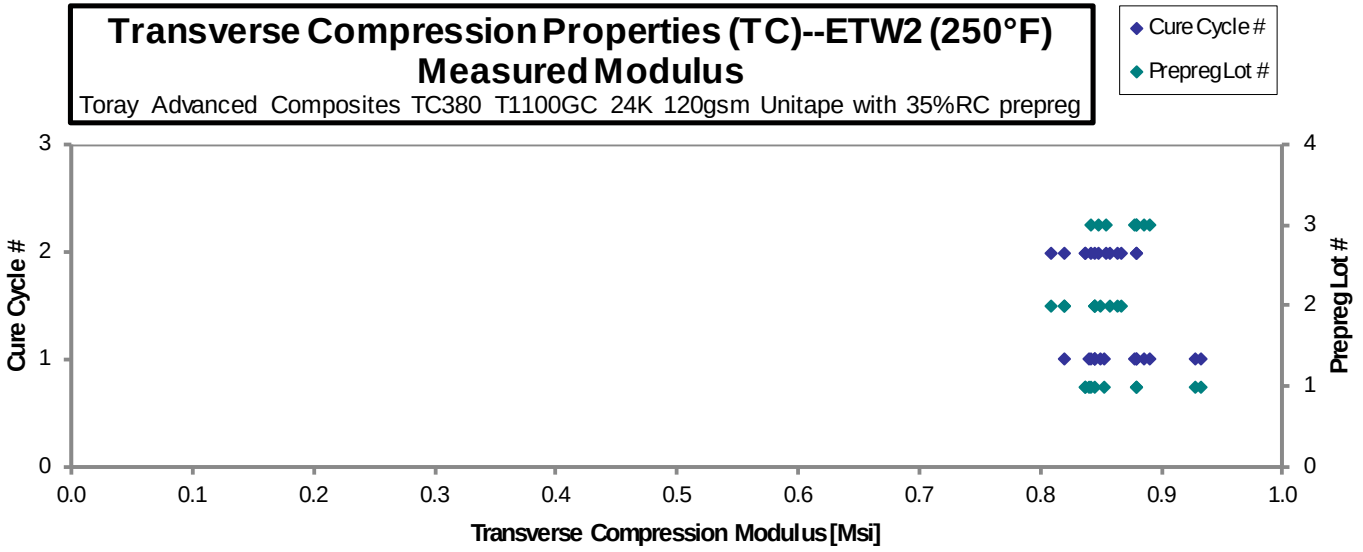

Transverse Compression Properties (TC)--ETW1 (180°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Modulus [Msi]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
1
2
3
4

Transverse Compression Properties (TC)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

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

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


Transverse Compression Properties (TC)--ETW2 (250°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Strength [ksi]
0
2
4
6
8
10
12
14
16


Transverse Compression Properties (TC)--ETW2 (250°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Transverse Compression Modulus [Msi]
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

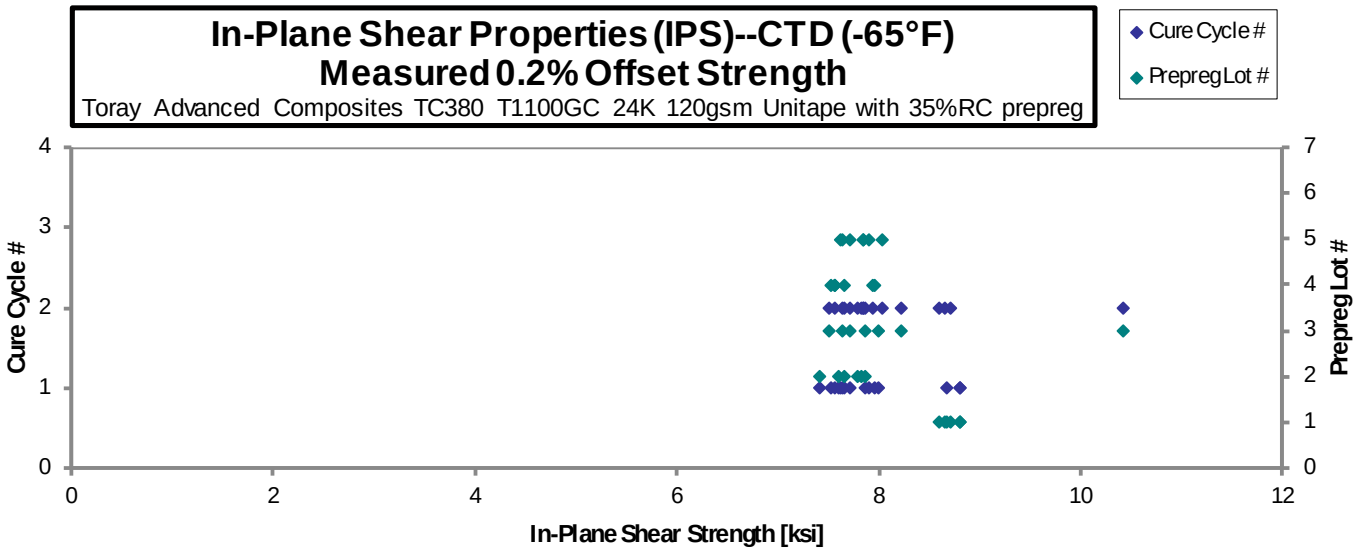
4.6 In-Plane Shear Properties (IPS)

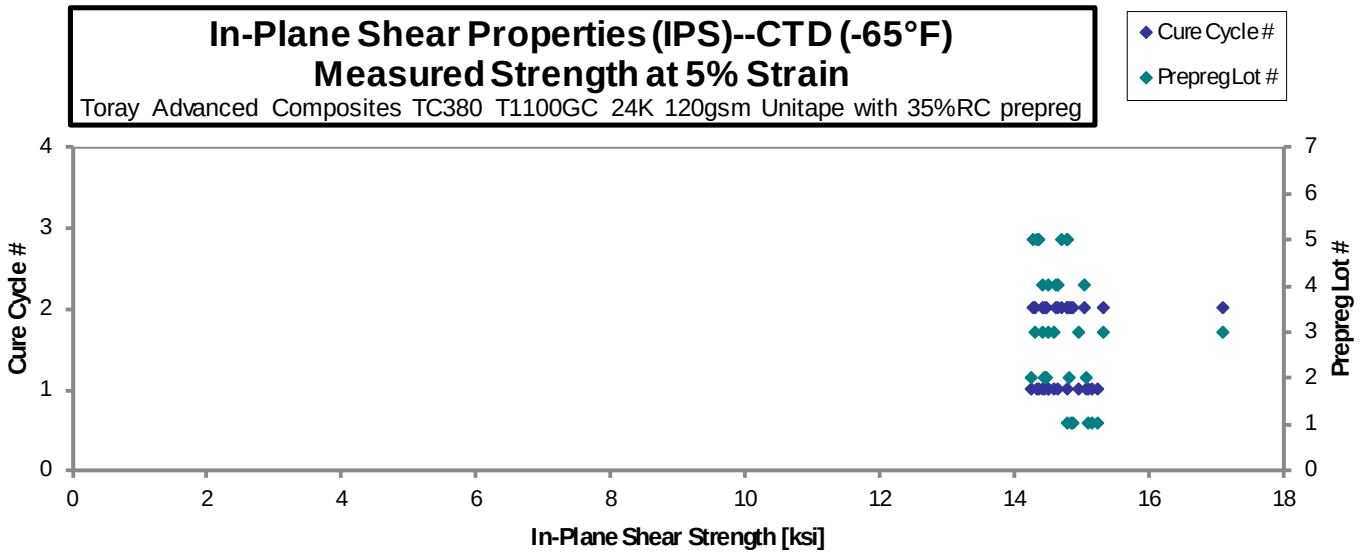
In-Plane Shear Properties (IPS)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

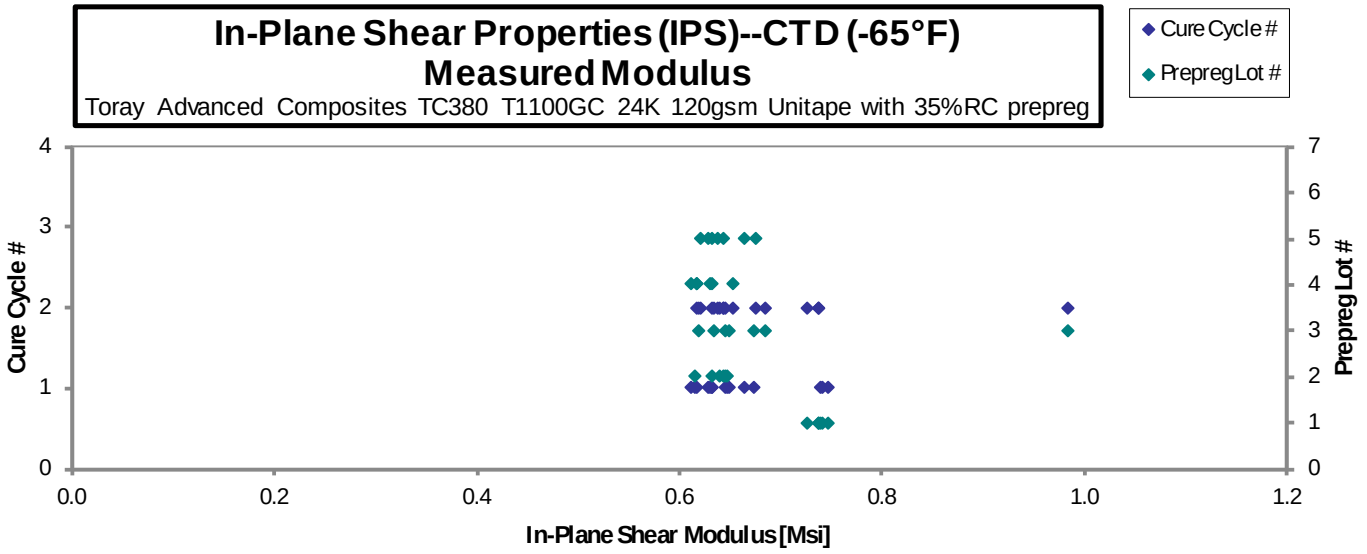
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCDNA111B	A	C1	1	1	8.678	15.23	0.7406	0.07398	16	0.004624
TCDNA112B	A	C1	1	1	8.813	15.07	0.7420	0.07365	16	0.004603
TCDNA113B	A	C1	1	1	8.800	15.14	0.7474	0.07380	16	0.004613
TCDNA211B	A	C2	1	2	8.654	14.85	0.7378	0.07423	16	0.004640
TCDNA212B	A	C2	1	2	8.710	14.76	0.7379	0.07378	16	0.004611
TCDNA213B	A	C2	1	2	8.598	14.84	0.7269	0.07393	16	0.004621
TCDNB111B	B	C1	2	1	7.603	14.43	0.6329	0.07917	16	0.004948
TCDNB112B	B	C1	2	1	7.419	14.23	0.6154	0.07920	16	0.004950
TCDNB113B	B	C1	2	1	7.667	15.04	0.6481	0.07853	16	0.004908
TCDNB211B	B	C2	2	2	7.858	14.81	0.6461	0.07700	16	0.004813
TCDNB212B	B	C2	2	2	7.795	14.42	0.6399	0.07693	16	0.004808
TCDNB213B	B	C2	2	2	7.831	14.46	0.6434	0.07675	16	0.004797
TCDNC111B	C	C1	3	1	7.718	14.49	0.6469	0.08063	16	0.005040
TCDNC112B	C	C1	3	1	7.866	14.57	0.6493	0.08060	16	0.005038
TCDNC113B	C	C1	3	1	8.001	14.94	0.6752	0.07970	16	0.004981
TCDNC211B	C	C2	3	2	7.514	14.29	0.6202	0.07817	16	0.004885
TCDNC212B	C	C2	3	2	7.648	14.39	0.6344	0.07807	16	0.004879
TCDNC213B	C	C2	3	2	10.42	17.08	0.9841	0.07787	16	0.004867
TCDNC214B	C	C2	3	2	8.221	15.30	0.6849	0.07562	16	0.004726
TCDND111B	D	C1	4	1	7.523	14.41	0.6129	0.07667	16	0.004792
TCDND112B	D	C1	4	1	7.563	14.48	0.6174	0.07628	16	0.004768
TCDND113B	D	C1	4	1	7.965	14.63	0.6307	0.07665	16	0.004791
TCDND211B	D	C2	4	2	7.664	14.62	0.6331	0.07697	16	0.004810
TCDND212B	D	C2	4	2	7.557	14.60	0.6186	0.07668	16	0.004793
TCDND213B	D	C2	4	2	7.939	15.01	0.6530	0.07628	16	0.004768
TCDNE111B	E	C1	5	1	7.629	14.36	0.6299	0.07850	16	0.004906
TCDNE112B	E	C1	5	1	7.645	14.31	0.6329	0.07905	16	0.004941
TCDNE113B	E	C1	5	1	7.903	14.76	0.6643	0.07805	16	0.004878
TCDNE211B	E	C2	5	2	7.848	14.27	0.6218	0.07837	16	0.004898
TCDNE212B*	E	C2	5	2	7.708		0.6376	0.07847	16	0.004904
TCDNE213B	E	C2	5	2	8.044	14.76	0.6755	0.07713	16	0.004821
TCDNE214B	E	C2	5	2	7.856	14.69	0.6446	0.07535	16	0.004709

* Strength at 5% strain data is not reported due to erroneous strain.

Average	**8.021**	**14.75**	**0.6695**	**0.004817**
Standard Dev.	**0.6019**	**0.5256**	**0.07143**	
Coeff. of Var. [%]	**7.504**	**3.563**	**10.67**	
Min.	**7.419**	**14.23**	**0.6129**	**0.004603**
Max.	**10.42**	**17.08**	**0.9841**	**0.005040**
Number of Spec.	**32**	**31**	**32**	**32**

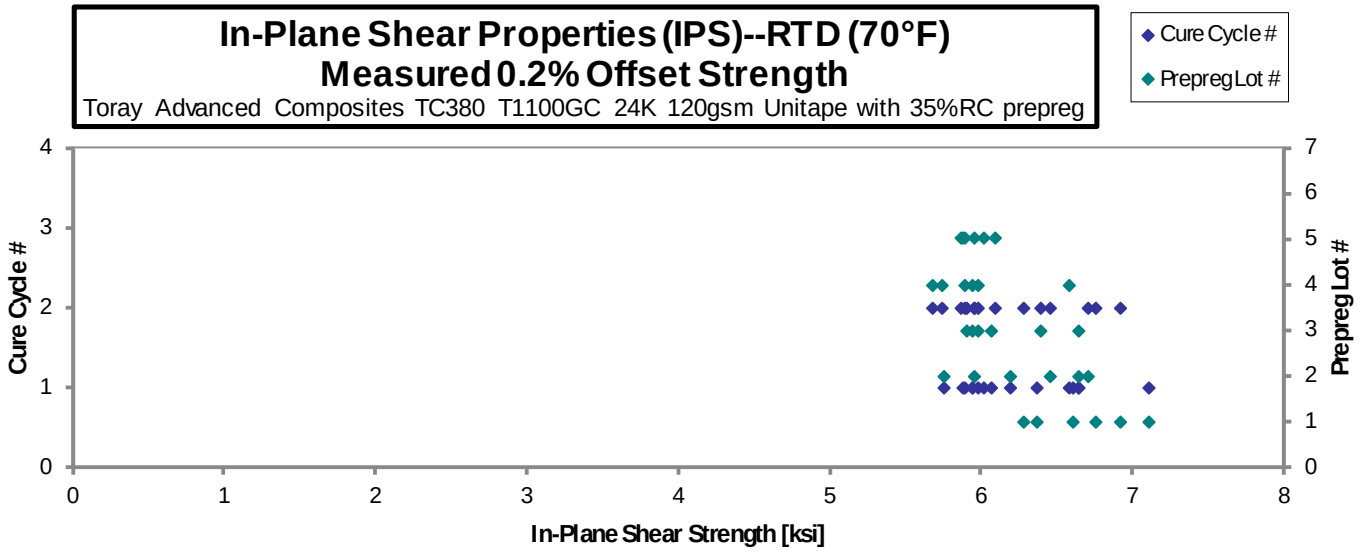

In-Plane Shear Properties (IPS)--CTD (-65°F)
Measured 0.2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12

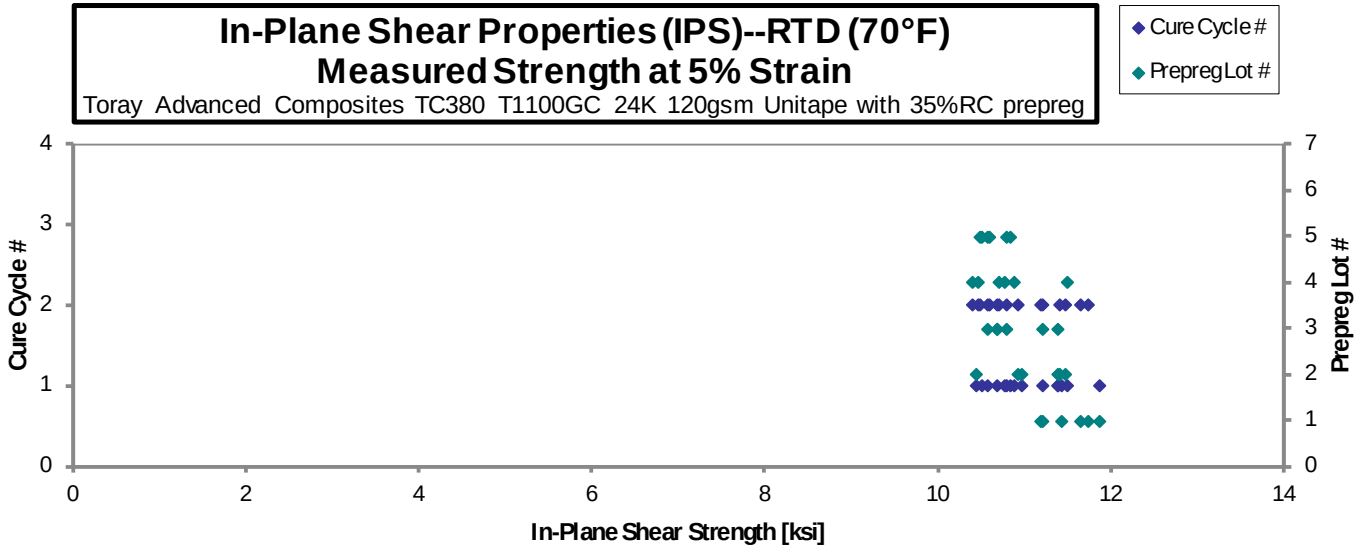

In-Plane Shear Properties (IPS)--CTD (-65°F)
Measured Strength at 5% Strain
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12
14
16
18

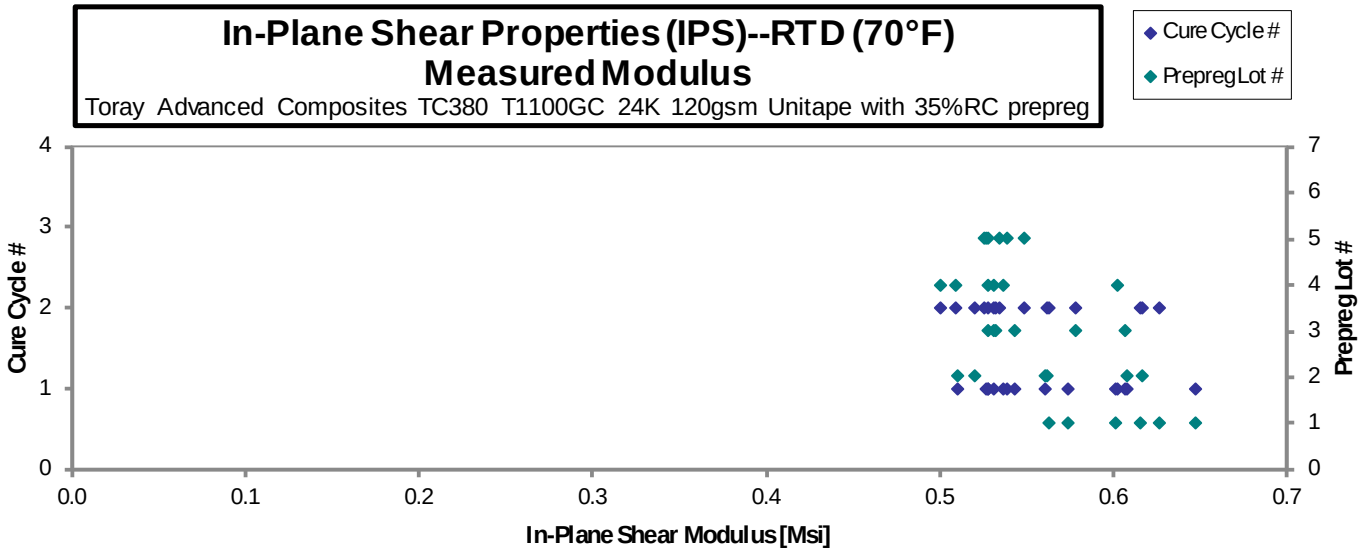

In-Plane Shear Properties (IPS)--CTD (-65°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus [Msi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0.0
0.2
0.4
0.6
0.8
1.0
1.2

In-Plane Shear Properties (IPS)--RTD (70°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCDNA111A	A	C1	1	1	7.109	11.87	0.6475	0.07153	16	0.004471
TCDNA112A	A	C1	1	1	6.605	11.43	0.6019	0.07385	16	0.004616
TCDNA113A	A	C1	1	1	6.362	11.20	0.5746	0.07495	16	0.004684
TCDNA211A	A	C2	1	2	6.920	11.73	0.6274	0.07222	16	0.004514
TCDNA212A	A	C2	1	2	6.758	11.65	0.6156	0.07418	16	0.004636
TCDNA213A	A	C2	1	2	6.273	11.17	0.5629	0.07503	16	0.004690
TCDNB111A	B	C1	2	1	6.635	11.37	0.6078	0.07040	16	0.004400
TCDNB112A	B	C1	2	1	6.186	10.96	0.5615	0.07487	16	0.004679
TCDNB113A	B	C1	2	1	5.754	10.44	0.5112	0.07900	16	0.004938
TCDNB211A	B	C2	2	2	6.702	11.39	0.6173	0.06942	16	0.004339
TCDNB212A	B	C2	2	2	6.450	11.46	0.5624	0.07315	16	0.004572
TCDNB213A	B	C2	2	2	5.956	10.91	0.5203	0.07540	16	0.004713
TCDNC111A	C	C1	3	1	6.642	11.37	0.6072	0.07300	16	0.004563
TCDNC112A	C	C1	3	1	6.064	10.78	0.5441	0.07733	16	0.004833
TCDNC113A	C	C1	3	1	5.945	10.67	0.5280	0.07965	16	0.004978
TCDNC211A	C	C2	3	2	6.389	11.21	0.5785	0.07370	16	0.004606
TCDNC212A	C	C2	3	2	5.980	10.67	0.5330	0.07675	16	0.004797
TCDNC213A	C	C2	3	2	5.905	10.56	0.5316	0.07850	16	0.004906
TCDND111A	D	C1	4	1	6.573	11.50	0.6023	0.07037	16	0.004398
TCDND112A	D	C1	4	1	5.979	10.88	0.5365	0.07343	16	0.004590
TCDND113A	D	C1	4	1	5.941	10.77	0.5318	0.07600	16	0.004750
TCDND211A	D	C2	4	2	5.892	10.70	0.5279	0.07578	16	0.004736
TCDND212A	D	C2	4	2	5.670	10.38	0.5003	0.07735	16	0.004834
TCDND213A	D	C2	4	2	5.732	10.45	0.5092	0.07713	16	0.004821
TCDNE111A	E	C1	5	1	6.020	10.83	0.5390	0.07667	16	0.004792
TCDNE112A	E	C1	5	1	5.885	10.51	0.5273	0.07843	16	0.004902
TCDNE113A	E	C1	5	1	5.879	10.56	0.5287	0.07802	16	0.004876
TCDNE211A	E	C2	5	2	5.951	10.60	0.5344	0.07763	16	0.004852
TCDNE212A	E	C2	5	2	6.087	10.79	0.5491	0.07845	16	0.004903
TCDNE213A	E	C2	5	2	5.860	10.48	0.5256	0.07827	16	0.004892
				Average	**6.203**	**10.98**	**0.5582**			**0.004709**
				Standard Dev.	**0.3868**	**0.4335**	**0.04019**			
				Coeff. of Var. [%]	**6.234**	**3.949**	**7.201**			
				Min.	**5.670**	**10.38**	**0.5003**			**0.004339**
				Max.	**7.109**	**11.87**	**0.6475**			**0.004978**
				Number of Spec.	**30**	**30**	**30**			**30**

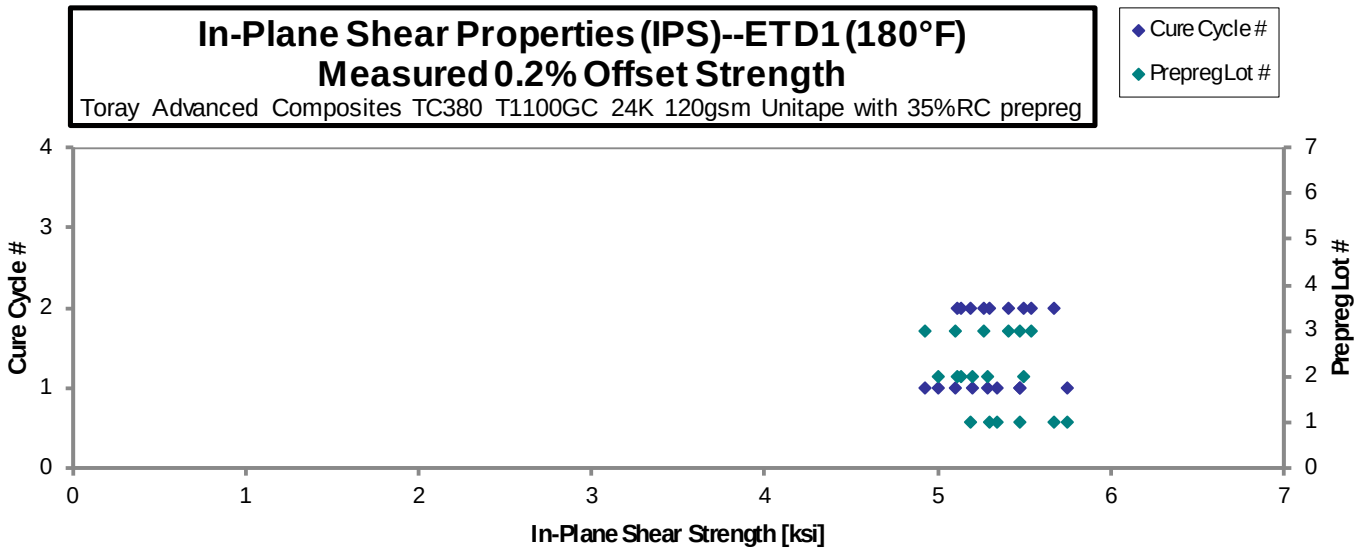

In-Plane Shear Properties (IPS)--RTD (70°F)
Measured 0.2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]

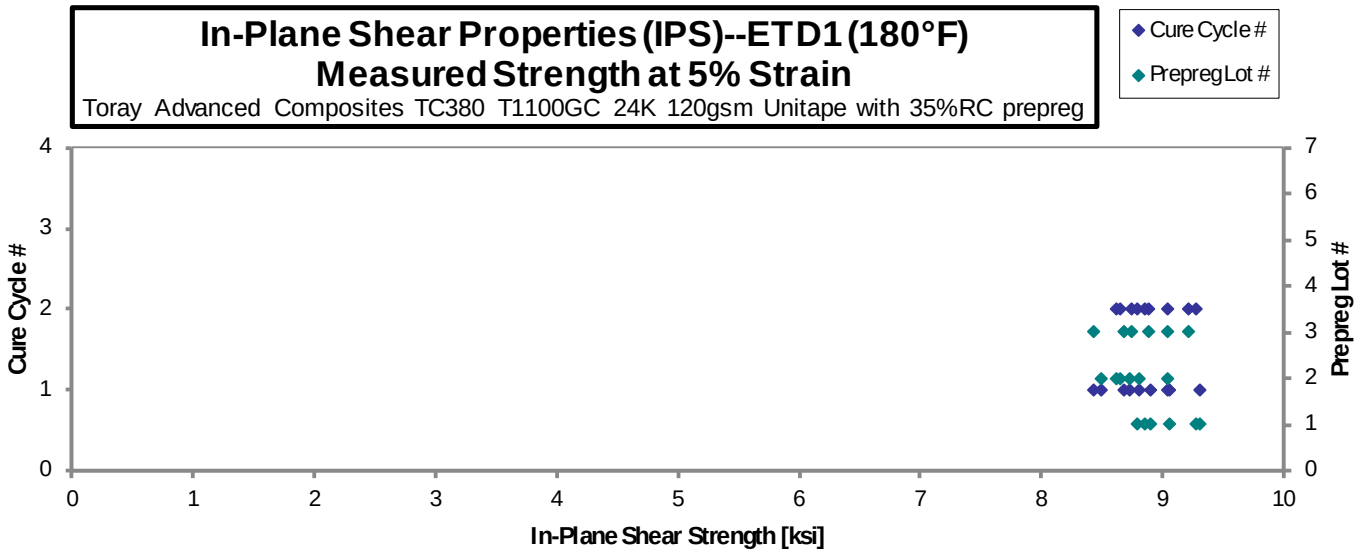

In-Plane Shear Properties (IPS)--RTD (70°F)
Measured Strength at 5% Strain
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]

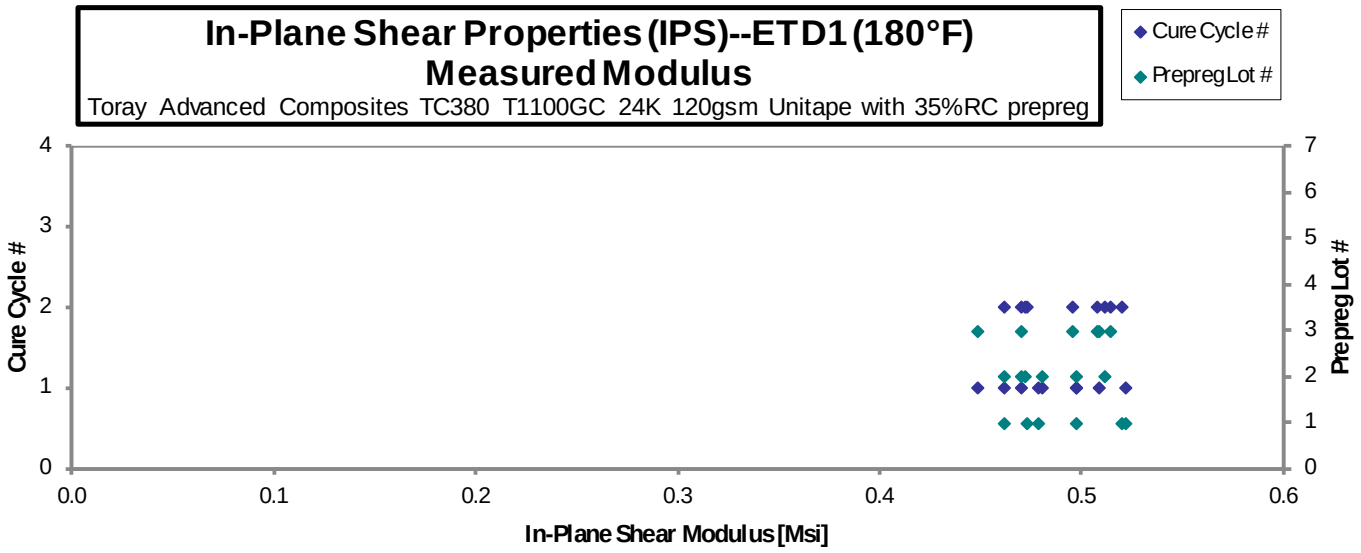

In-Plane Shear Properties (IPS)--RTD (70°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus [Msi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

In-Plane Shear Properties (IPS)--ETD1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCDNA111C	A	C1	1	1	5.342	8.889	0.4789	0.07425	16	0.004641
TCDNA112C	A	C1	1	1	5.471	9.048	0.4970	0.07435	16	0.004647
TCDNA113C	A	C1	1	1	5.742	9.304	0.5218	0.07230	16	0.004519
TCDNA211C	A	C2	1	2	5.189	8.780	0.4618	0.07467	16	0.004667
TCDNA212C	A	C2	1	2	5.294	8.853	0.4729	0.07405	16	0.004628
TCDNA213C	A	C2	1	2	5.669	9.273	0.5201	0.07275	16	0.004547
TCDNB111C	B	C1	2	1	4.998	8.487	0.4615	0.07748	16	0.004843
TCDNB112C	B	C1	2	1	5.197	8.722	0.4803	0.07497	16	0.004685
TCDNB113C	B	C1	2	1	5.282	8.805	0.4976	0.07200	16	0.004500
TCDNB211C	B	C2	2	2	5.110	8.620	0.4698	0.07613	16	0.004758
TCDNB212C	B	C2	2	2	5.127	8.652	0.4716	0.07407	16	0.004629
TCDNB213C	B	C2	2	2	5.496	9.034	0.5116	0.07025	16	0.004391
TCDNC111C	C	C1	3	1	4.920	8.427	0.4481	0.08007	16	0.005004
TCDNC112C	C	C1	3	1	5.095	8.675	0.4699	0.07682	16	0.004801
TCDNC113C	C	C1	3	1	5.468	9.030	0.5082	0.07350	16	0.004594
TCDNC211C	C	C2	3	2	5.536	9.203	0.5142	0.07277	16	0.004548
TCDNC212C	C	C2	3	2	5.404	8.882	0.5071	0.07352	16	0.004595
TCDNC213C	C	C2	3	2	5.265	8.737	0.4953	0.07703	16	0.004815
				Average	**5.311**	**8.857**	**0.4882**			**0.004656**
				Standard Dev.	**0.2251**	**0.2527**	**0.02261**			
				Coeff. of Var. [%]	**4.239**	**2.854**	**4.632**			
				Min.	**4.920**	**8.427**	**0.4481**			**0.004391**
				Max.	**5.742**	**9.304**	**0.5218**			**0.005004**
				Number of Spec.	**18**	**18**	**18**			**18**

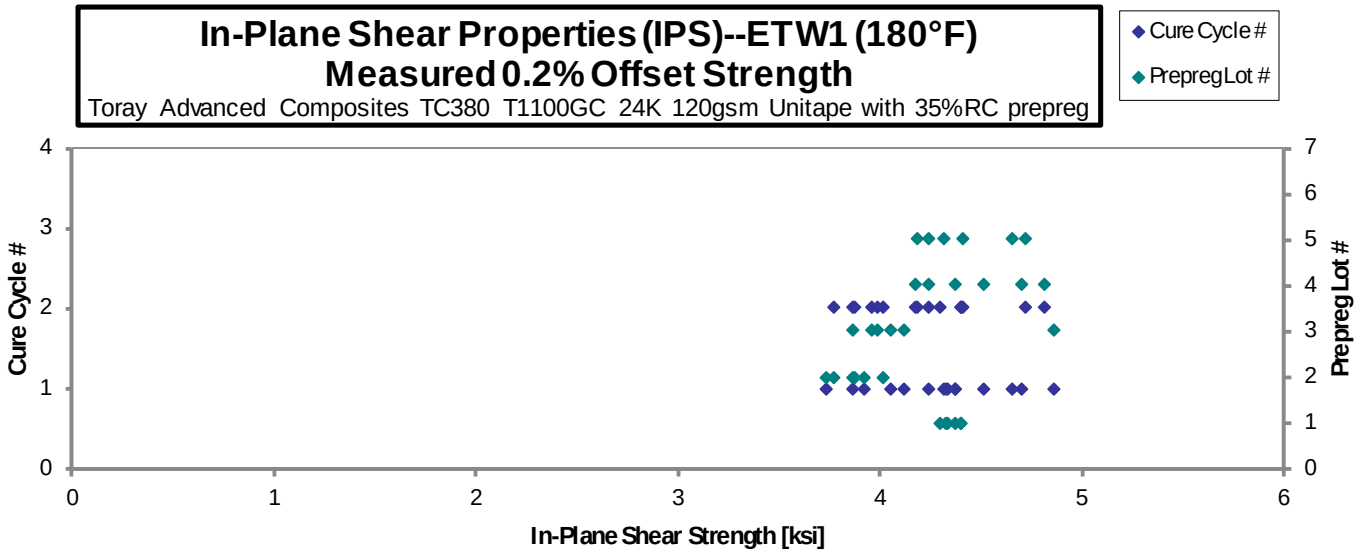

In-Plane Shear Properties (IPS)--ETD1 (180°F)
Measured 0.2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]

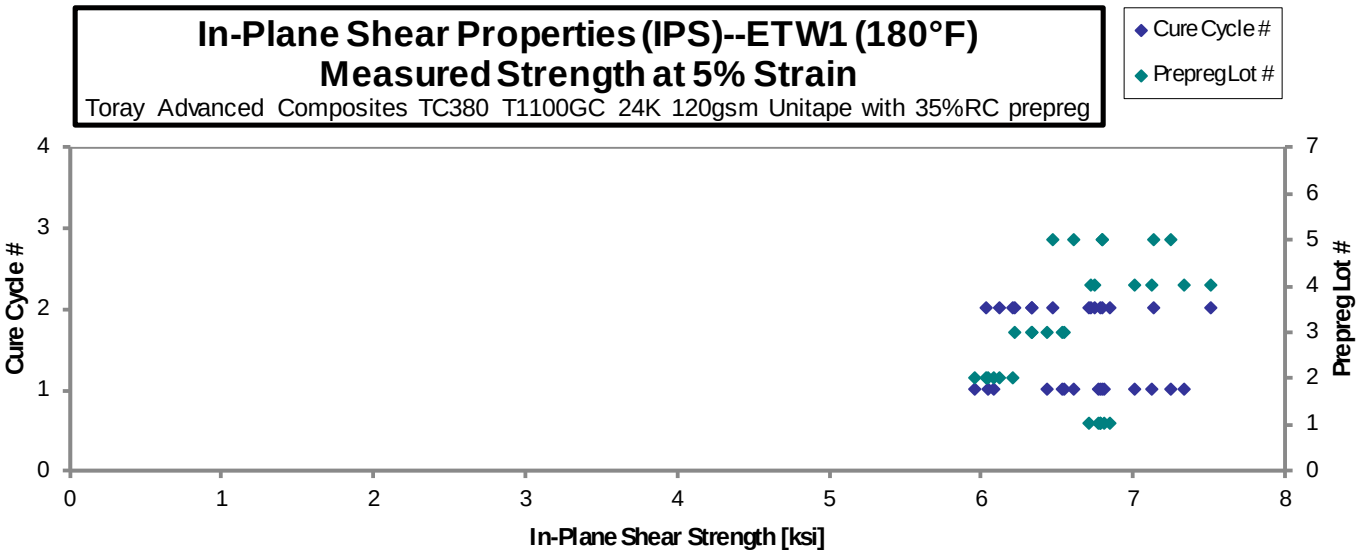

In-Plane Shear Properties (IPS)--ETD1 (180°F)
Measured Strength at 5% Strain
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]

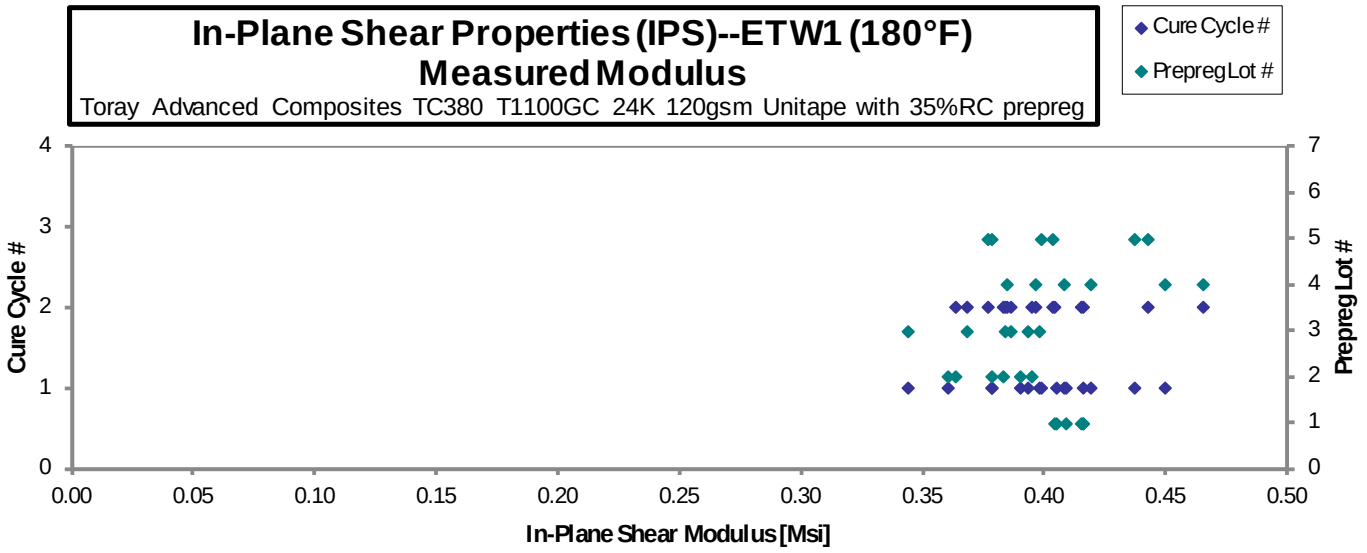

In-Plane Shear Properties (IPS)--ETD1 (180°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus [Msi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0.0
0.1
0.2
0.3
0.4
0.5
0.6

In-Plane Shear Properties (IPS)--ETW1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCDNA111D	A	C1	1	1	4.366	6.811	0.4168	0.07448	16	0.004655
TCDNA112D	A	C1	1	1	4.336	6.784	0.4094	0.07560	16	0.004725
TCDNA113D	A	C1	1	1	4.320	6.773	0.4054	0.07568	16	0.004730
TCDNA211D	A	C2	1	2	4.395	6.788	0.4157	0.07492	16	0.004682
TCDNA212D	A	C2	1	2	4.397	6.851	0.4167	0.07667	16	0.004792
TCDNA213D	A	C2	1	2	4.292	6.721	0.4046	0.07655	16	0.004784
TCDNB111D	B	C1	2	1	3.920	6.083	0.3905	0.07572	16	0.004732
TCDNB112D	B	C1	2	1	3.859	6.048	0.3790	0.07877	16	0.004923
TCDNB113D	B	C1	2	1	3.730	5.960	0.3606	0.08020	16	0.005013
TCDNB211D	B	C2	2	2	4.009	6.217	0.3957	0.07540	16	0.004713
TCDNB212D	B	C2	2	2	3.877	6.128	0.3838	0.07797	16	0.004873
TCDNB213D	B	C2	2	2	3.773	6.034	0.3643	0.07983	16	0.004990
TCDNC111D	C	C1	3	1	4.052	6.440	0.3938	0.07755	16	0.004847
TCDNC112D	C	C1	3	1	4.118	6.549	0.3988	0.07963	16	0.004977
TCDNC113D	C	C1	3	1	4.864	6.539	0.3445	0.08050	16	0.005031
TCDNC211D	C	C2	3	2	3.990	6.344	0.3868	0.07983	16	0.004990
TCDNC212D	C	C2	3	2	3.961	6.341	0.3847	0.08037	16	0.005023
TCDNC213D	C	C2	3	2	3.861	6.232	0.3685	0.08053	16	0.005033
TCDND111D	D	C1	4	1	4.370	7.020	0.4089	0.07652	16	0.004782
TCDND112D	D	C1	4	1	4.702	7.344	0.4499	0.07103	16	0.004440
TCDND113D	D	C1	4	1	4.511	7.127	0.4199	0.07422	16	0.004639
TCDND211D	D	C2	4	2	4.807	7.514	0.4655	0.06900	16	0.004313
TCDND212D	D	C2	4	2	4.242	6.747	0.3971	0.07667	16	0.004792
TCDND213D	D	C2	4	2	4.170	6.728	0.3852	0.07752	16	0.004845
TCDNE111D	E	C1	5	1	4.653	7.252	0.4380	0.07297	16	0.004560
TCDNE112D	E	C1	5	1	4.316	6.805	0.3997	0.07802	16	0.004876
TCDNE113D	E	C1	5	1	4.238	6.613	0.3791	0.07860	16	0.004913
TCDNE211D	E	C2	5	2	4.722	7.139	0.4431	0.07253	16	0.004533
TCDNE212D	E	C2	5	2	4.410	6.804	0.4043	0.07785	16	0.004866
TCDNE213D	E	C2	5	2	4.178	6.475	0.3774	0.07918	16	0.004949
				Average	**4.248**	**6.640**	**0.3996**			**0.004801**
				Standard Dev.	**0.3100**	**0.4085**	**0.02682**			
				Coeff. of Var. [%]	**7.297**	**6.152**	**6.713**			
				Min.	**3.730**	**5.960**	**0.3445**			**0.004313**
				Max.	**4.864**	**7.514**	**0.4655**			**0.005033**
				Number of Spec.	**30**	**30**	**30**			**30**


In-Plane Shear Properties (IPS)--ETW1 (180°F)
Measured 0.2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]


In-Plane Shear Properties (IPS)--ETW1 (180°F)
Measured Strength at 5% Strain
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]

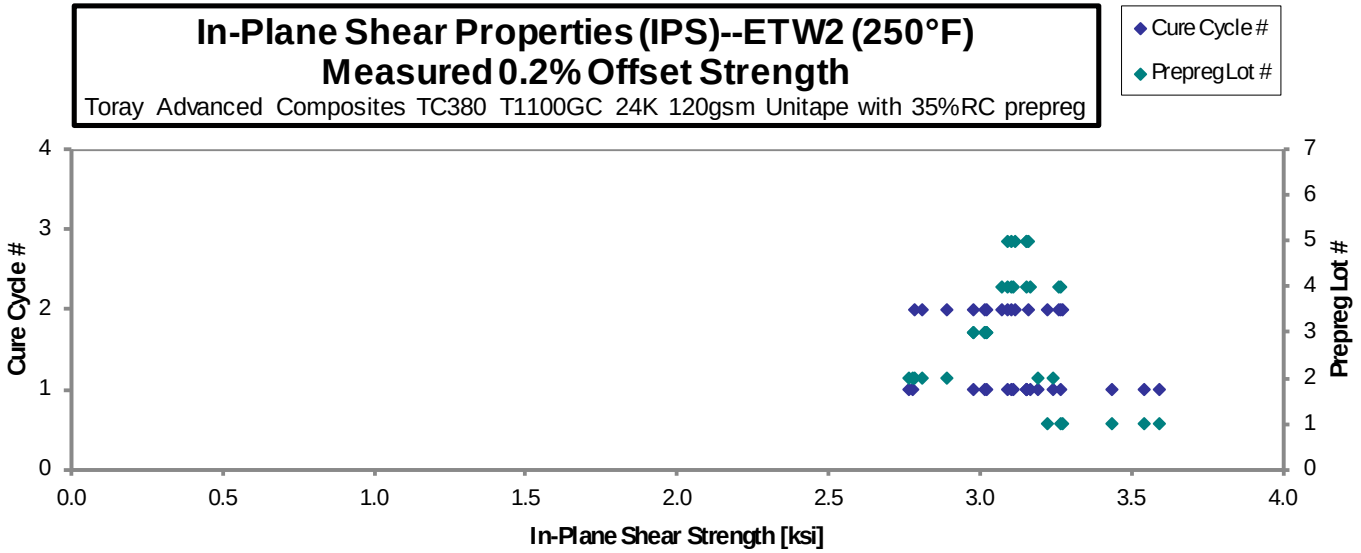

In-Plane Shear Properties (IPS)--ETW1 (180°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus [Msi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50

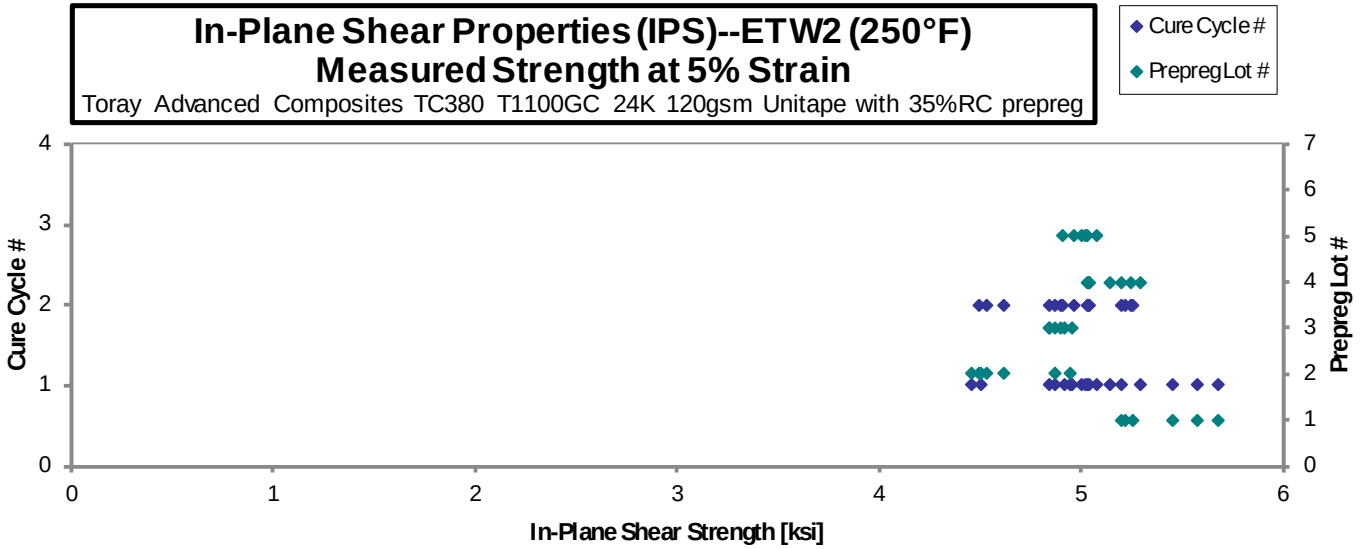
In-Plane Shear Properties (IPS)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

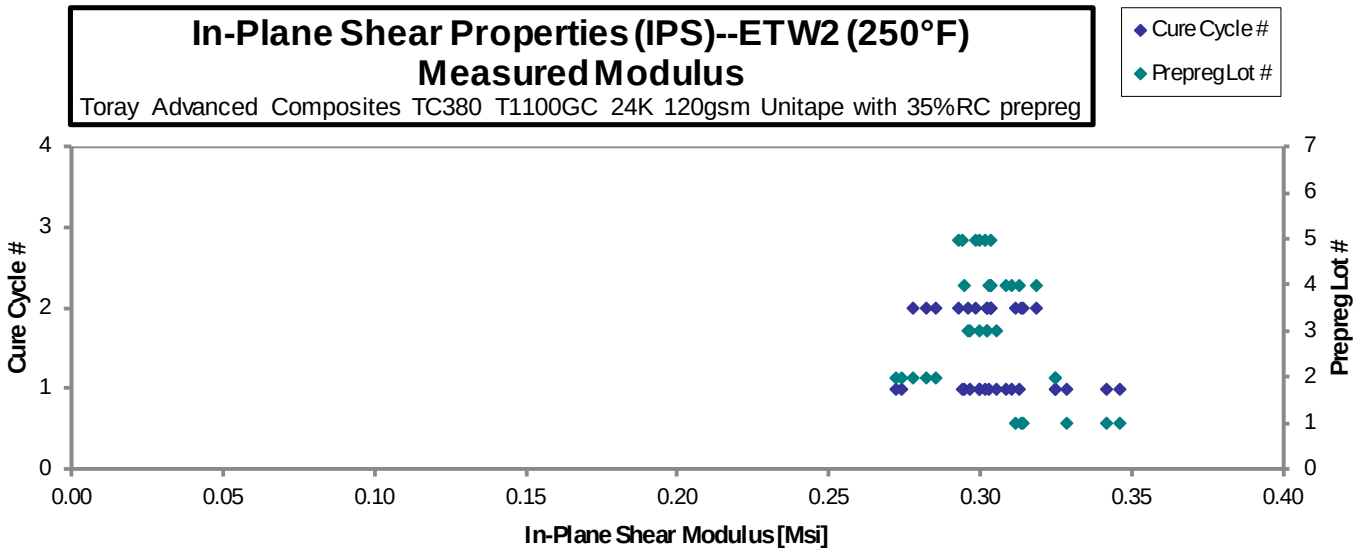
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]
TCDNA111E	A	C1	1	1	3.544	5.580	0.3413	0.07527	16	0.004704
TCDNA112E	A	C1	1	1	3.434	5.458	0.3282	0.07528	16	0.004705
TCDNA113E	A	C1	1	1	3.595	5.681	0.3462	0.07500	16	0.004688
TCDNA211E	A	C2	1	2	3.276	5.224	0.3142	0.07560	16	0.004725
TCDNA212E	A	C2	1	2	3.224	5.201	0.3115	0.07602	16	0.004751
TCDNA213E	A	C2	1	2	3.269	5.254	0.3135	0.07595	16	0.004747
TCDNB111E	B	C1	2	1	2.780	4.461	0.2741	0.08135	16	0.005084
TCDNB112E	B	C1	2	1	2.764	4.507	0.2718	0.08102	16	0.005064
TCDNB114E	B	C1	2	1	3.240	4.943	0.3245	0.07722	16	0.004826
TCDNB115E	B	C1	2	1	3.192	4.876	0.3247	0.07307	16	0.004567
TCDNB211E	B	C2	2	2	2.783	4.492	0.2779	0.08002	16	0.005001
TCDNB212E	B	C2	2	2	2.890	4.615	0.2850	0.07978	16	0.004986
TCDNB213E	B	C2	2	2	2.812	4.536	0.2819	0.07928	16	0.004955
TCDNC111E	C	C1	3	1	2.977	4.844	0.2965	0.08017	16	0.005010
TCDNC112E	C	C1	3	1	3.022	4.958	0.3053	0.08020	16	0.005013
TCDNC113E	C	C1	3	1	3.017	4.918	0.2995	0.07950	16	0.004969
TCDNC211E	C	C2	3	2	2.981	4.842	0.2960	0.08078	16	0.005049
TCDNC212E	C	C2	3	2	3.023	4.897	0.3023	0.07930	16	0.004956
TCDNC213E	C	C2	3	2	3.018	4.868	0.3018	0.07738	16	0.004836
TCDND111E*	D	C1	4	1	3.156	5.148	0.3104	0.07803	16	0.004877
TCDND112E*	D	C1	4	1	3.266	5.299	0.3125	0.07795	16	0.004872
TCDND113E	D	C1	4	1	3.108	5.045	0.3031	0.07810	16	0.004881
TCDND114E	D	C1	4	1	3.092	5.028	0.2944	0.07778	16	0.004861
TCDND115E	D	C1	4	1	3.169	5.199	0.3082	0.07713	16	0.004821
TCDND211E	D	C2	4	2	3.076	5.043	0.3034	0.07815	16	0.004884
TCDND212E	D	C2	4	2	3.262	5.248	0.3185	0.07770	16	0.004856
TCDND213E	D	C2	4	2	3.106	5.038	0.3037	0.07683	16	0.004802
TCDNE111E	E	C1	5	1	3.152	5.021	0.2995	0.07928	16	0.004955
TCDNE112E	E	C1	5	1	3.105	5.004	0.2938	0.07963	16	0.004977
TCDNE113E	E	C1	5	1	3.152	5.075	0.3014	0.07843	16	0.004902
TCDNE211E	E	C2	5	2	3.091	4.907	0.2925	0.07922	16	0.004951
TCDNE212E	E	C2	5	2	3.115	4.964	0.2986	0.07923	16	0.004952
TCDNE213E	E	C2	5	2	3.160	5.027	0.3036	0.07788	16	0.004868

* TCDND111E and TCDND112E data not traceable.

Average	**3.117**	**5.006**	**0.3042**	**0.004882**
Standard Dev.	**0.1950**	**0.2883**	**0.01695**	
Coeff. of Var. [%]	**6.258**	**5.758**	**5.571**	
Min.	**2.764**	**4.461**	**0.2718**	**0.004567**
Max.	**3.595**	**5.681**	**0.3462**	**0.005084**
Number of Spec.	**33**	**33**	**33**	**33**


In-Plane Shear Properties (IPS)--ETW2 (250°F)
Measured 0.2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
1
2
3
4
5
6
7


In-Plane Shear Properties (IPS)--ETW2 (250°F)
Measured Strength at 5% Strain
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]
0
1
2
3
4
5
6
0
1
2
3
4
5
6
7

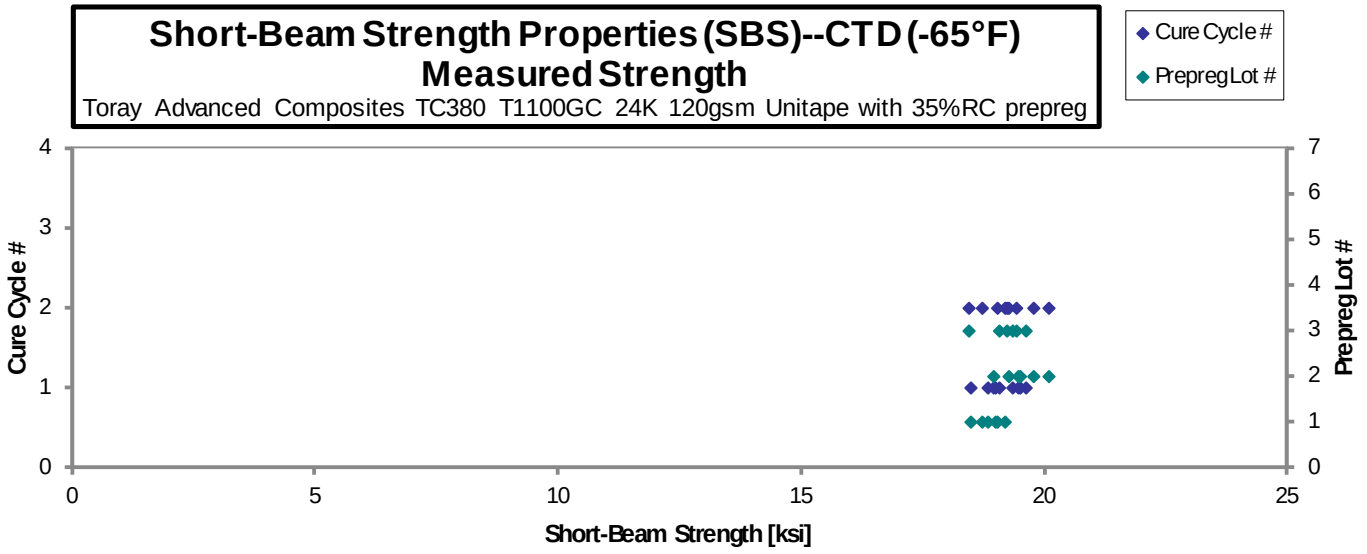

In-Plane Shear Properties (IPS)--ETW2 (250°F)
Measured Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus [Msi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40

4.7 Lamina Short-Beam Strength Properties (SBS)

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

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

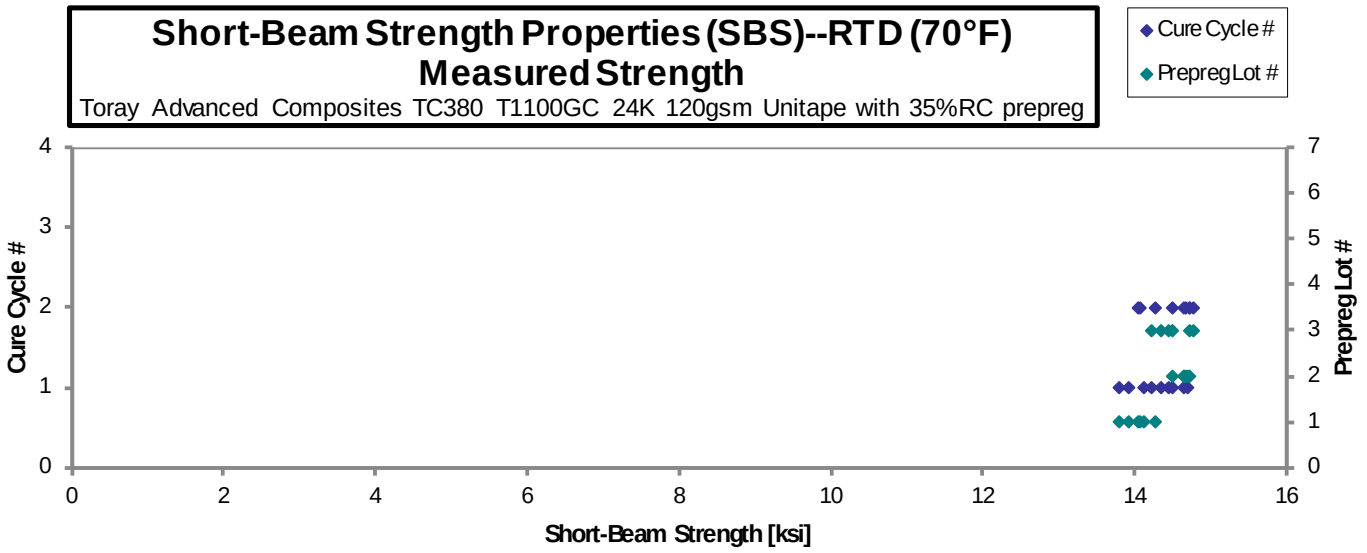
Average	**19.21**	**0.004562**
Standard Dev.	**0.4296**	
Coeff. of Var. [%]	**2.236**	
Min.	**18.46**	**0.004417**
Max.	**20.11**	**0.004721**
Number of Spec.	**18**	**18**


Short-Beam Strength Properties (SBS)--CTD (-65°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0
5
10
15
20
25

Short-Beam Strength Properties (SBS)--RTD (70°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

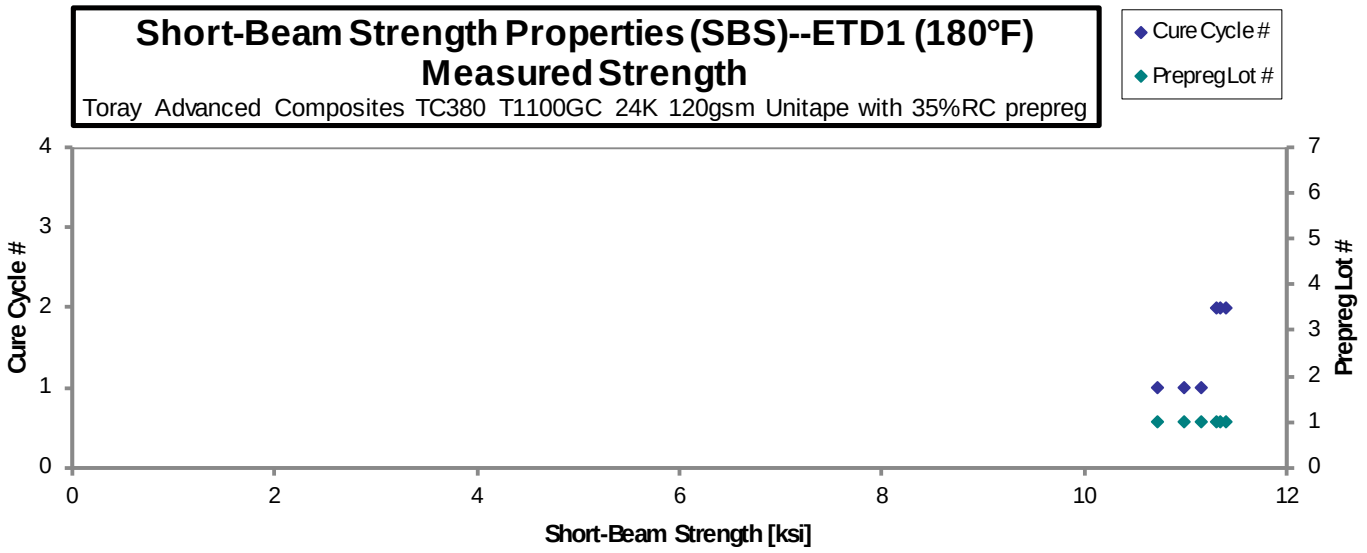
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA112A	A	C1	1	1	13.81	0.1462	32	0.004570	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113A	A	C1	1	1	14.12	0.1490	32	0.004655	INTERLAMINAR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

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


Short-Beam Strength Properties (SBS)--RTD (70°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12
14
16

Short-Beam Strength Properties (SBS)--ETD1 (180°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA111C	A	C1	1	1	11.16	0.1495	32	0.004671	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA112C	A	C1	1	1	10.72	0.1487	32	0.004646	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113C	A	C1	1	1	10.98	0.1492	32	0.004663	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA211C	A	C2	1	2	11.35	0.1459	32	0.004558	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212C	A	C2	1	2	11.31	0.1459	32	0.004560	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213C	A	C2	1	2	11.41	0.1457	32	0.004554	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
				Average	**11.15**			**0.004609**	
				Standard Dev.	**0.2616**				
				Coeff. of Var. [%]	**2.345**				
				Min.	**10.72**			**0.004554**	
				Max.	**11.41**			**0.004671**	
				Number of Spec.	**6**			**6**	

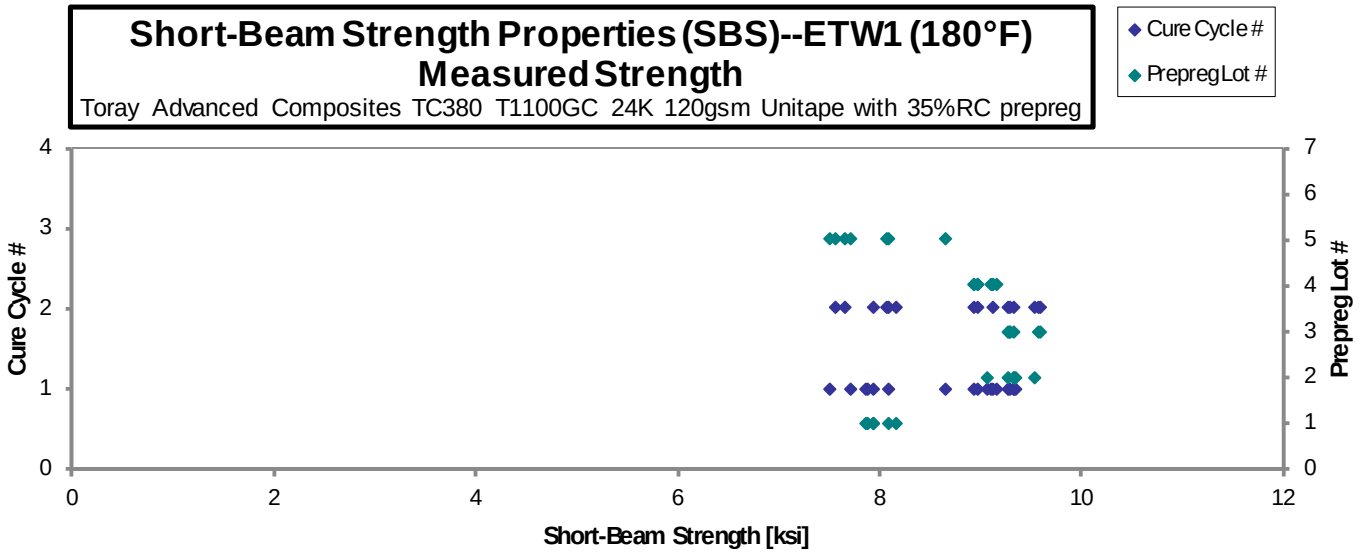

Short-Beam Strength Properties (SBS)--ETD1 (180°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12

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

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

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA111D	A	C1	1	1	7.879	0.1502	32	0.004693	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA112D	A	C1	1	1	7.939	0.1503	32	0.004698	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113D	A	C1	1	1	7.866	0.1502	32	0.004694	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212D	A	C2	1	2	8.159	0.1467	32	0.004585	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213D	A	C2	1	2	8.090	0.1480	32	0.004626	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA214D	A	C2	1	2	7.931	0.1492	32	0.004663	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB111D	B	C1	2	1	9.340	0.1431	32	0.004472	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB112D	B	C1	2	1	9.056	0.1426	32	0.004457	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB113D	B	C1	2	1	9.329	0.1425	32	0.004454	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB211D	B	C2	2	2	9.528	0.1436	32	0.004486	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB212D	B	C2	2	2	9.270	0.1437	32	0.004491	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQB213D	B	C2	2	2	9.327	0.1440	32	0.004499	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC113D	C	C1	3	1	9.333	0.1472	32	0.004600	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC114D	C	C1	3	1	9.269	0.1472	32	0.004598	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC115D	C	C1	3	1	9.283	0.1459	32	0.004560	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC211D	C	C2	3	2	9.571	0.1462	32	0.004569	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC212D	C	C2	3	2	9.590	0.1456	32	0.004549	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC213D	C	C2	3	2	9.295	0.1448	32	0.004523	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQD111D	D	C1	4	1	9.166	0.1515	32	0.004734	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD112D	D	C1	4	1	9.114	0.1525	32	0.004765	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD113D	D	C1	4	1	8.977	0.1524	32	0.004763	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD114D	D	C1	4	1	8.929	0.1529	32	0.004779	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD115D	D	C1	4	1	9.094	0.1531	32	0.004784	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD211D	D	C2	4	2	9.117	0.1508	32	0.004711	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD212D	D	C2	4	2	8.972	0.1519	32	0.004747	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD213D	D	C2	4	2	8.931	0.1523	32	0.004760	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE111D	E	C1	5	1	8.642	0.1526	32	0.004768	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE112D	E	C1	5	1	7.712	0.1516	32	0.004738	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE113D	E	C1	5	1	8.083	0.1534	32	0.004793	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE114D	E	C1	5	1	7.506	0.1531	32	0.004785	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE211D	E	C2	5	2	7.556	0.1525	32	0.004766	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE212D	E	C2	5	2	8.064	0.1534	32	0.004794	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE213D	E	C2	5	2	7.663	0.1543	32	0.004822	INTERLAMINAR SHEAR, INELASTIC DEFORMATION

Average	**8.715**	**0.004658**
Standard Dev.	**0.6859**	
Coeff. of Var. [%]	**7.870**	
Min.	**7.506**	**0.004454**
Max.	**9.590**	**0.004822**
Number of Spec.	**33**	**33**

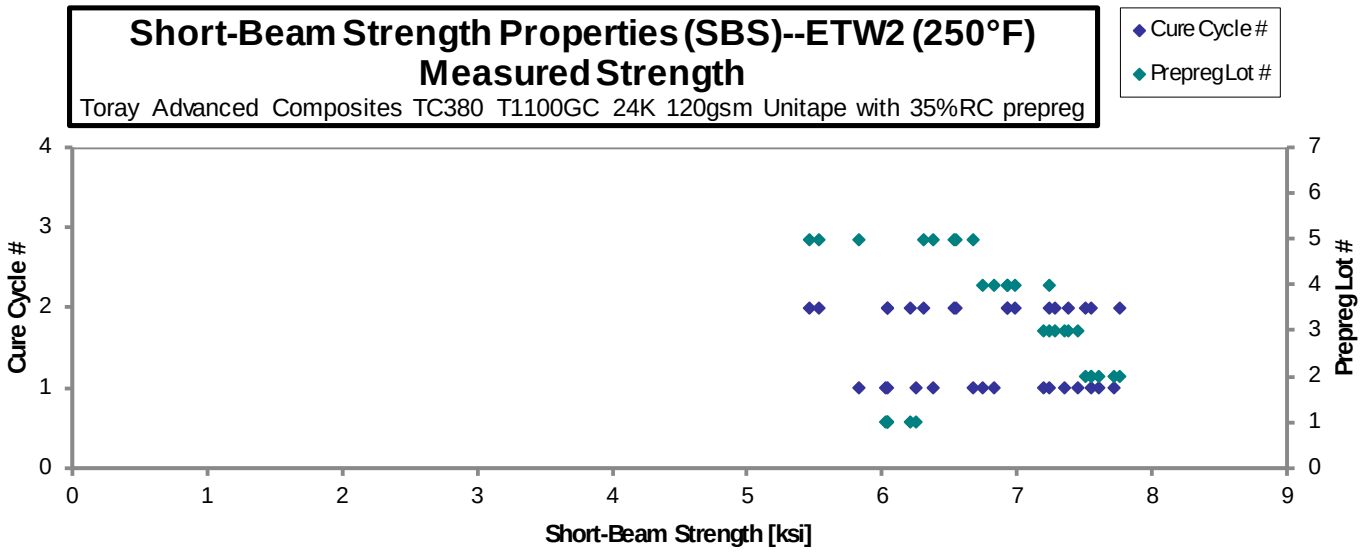

Short-Beam Strength Properties (SBS)--ETW1 (180°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12

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

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

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDQA111E	A	C1	1	1	6.249	0.1517	32	0.004741	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA113E	A	C1	1	1	6.045	0.1468	32	0.004586	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA114E	A	C1	1	1	6.026	0.1502	32	0.004693	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA211E	A	C2	1	2	6.043	0.1506	32	0.004707	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA212E	A	C2	1	2	6.050	0.1514	32	0.004731	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQA213E	A	C2	1	2	6.216	0.1515	32	0.004733	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB111E	B	C1	2	1	7.607	0.1406	32	0.004395	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB112E	B	C1	2	1	7.717	0.1399	32	0.004373	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB113E	B	C1	2	1	7.554	0.1394	32	0.004355	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQB211E	B	C2	2	2	7.552	0.1436	32	0.004489	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQB212E	B	C2	2	2	7.509	0.1434	32	0.004480	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQB213E	B	C2	2	2	7.760	0.1428	32	0.004463	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC111E	C	C1	3	1	7.195	0.1454	32	0.004545	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQC112E	C	C1	3	1	7.452	0.1443	32	0.004509	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC113E	C	C1	3	1	7.358	0.1431	32	0.004470	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC211E	C	C2	3	2	7.280	0.1489	32	0.004653	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC212E	C	C2	3	2	7.246	0.1493	32	0.004666	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQC213E	C	C2	3	2	7.381	0.1485	32	0.004639	INTERLAMINAR SHEAR, INELASTIC DEFORMATION, COMPRESSION
TCDQD111E	D	C1	4	1	7.241	0.1517	32	0.004740	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD112E	D	C1	4	1	6.833	0.1522	32	0.004757	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD113E	D	C1	4	1	6.742	0.1523	32	0.004759	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD211E	D	C2	4	2	6.934	0.1535	32	0.004796	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD212E	D	C2	4	2	6.928	0.1533	32	0.004789	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQD213E	D	C2	4	2	6.991	0.1525	32	0.004767	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE111E	E	C1	5	1	6.673	0.1549	32	0.004840	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE112E	E	C1	5	1	5.826	0.1547	32	0.004834	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE113E	E	C1	5	1	6.380	0.1542	32	0.004819	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE211E	E	C2	5	2	6.549	0.1550	32	0.004843	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE212E	E	C2	5	2	5.472	0.1548	32	0.004839	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE213E	E	C2	5	2	6.307	0.1549	32	0.004840	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE214E	E	C2	5	2	5.537	0.1540	32	0.004813	INTERLAMINAR SHEAR, INELASTIC DEFORMATION
TCDQE215E	E	C2	5	2	6.534	0.1534	32	0.004793	INTERLAMINAR SHEAR, INELASTIC DEFORMATION

Average	**6.787**	**0.004670**
Standard Dev.	**0.6671**	
Coeff. of Var. [%]	**9.829**	
Min.	**5.472**	**0.004355**
Max.	**7.760**	**0.004843**
Number of Spec.	**32**	**32**


Short-Beam Strength Properties (SBS)--ETW2 (250°F)
Measured Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0
1
2
3
4
5
6
7
8
9

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

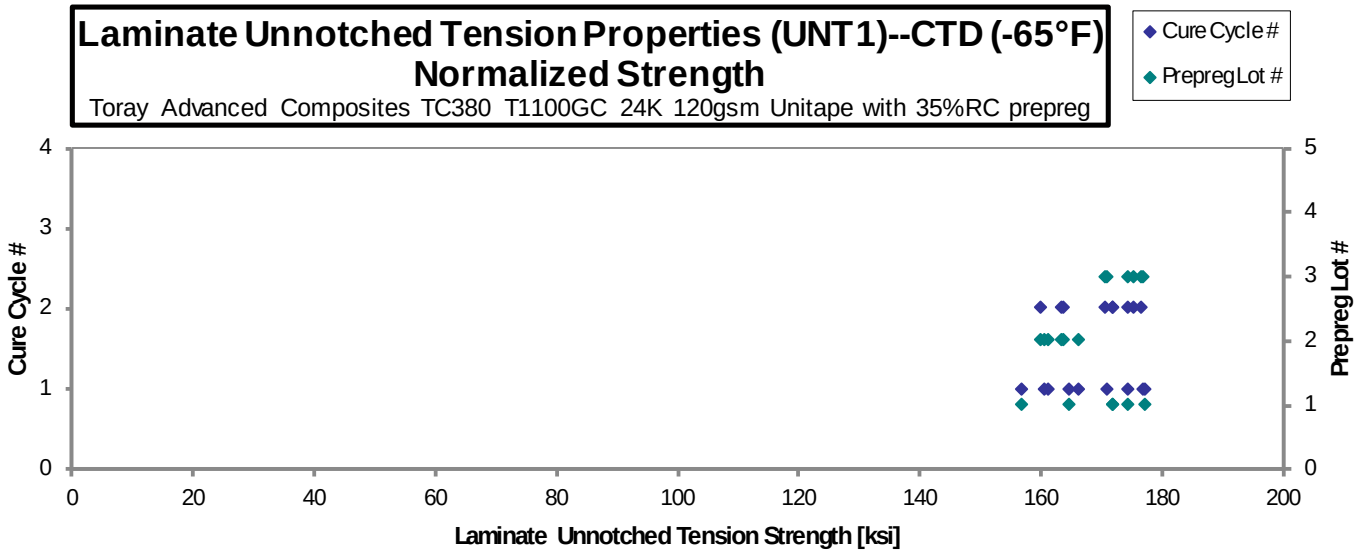
Laminate Unnotched Tension Properties (UNT1)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

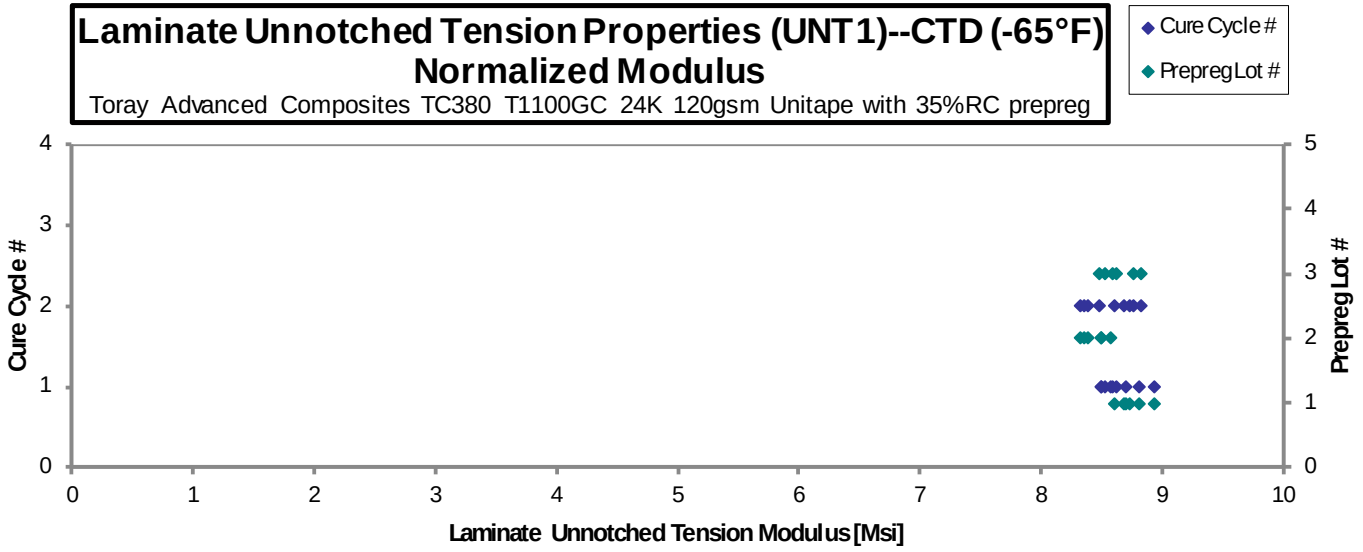
normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Unnotched Tension Properties (UNT1)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
160
180
200
Laminate Unnotched Tension Strength [ksi]


Laminate Unnotched Tension Properties (UNT1)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
1
2
3
4
5
6
7
8
9
10
Laminate Unnotched Tension Modulus [Msi]

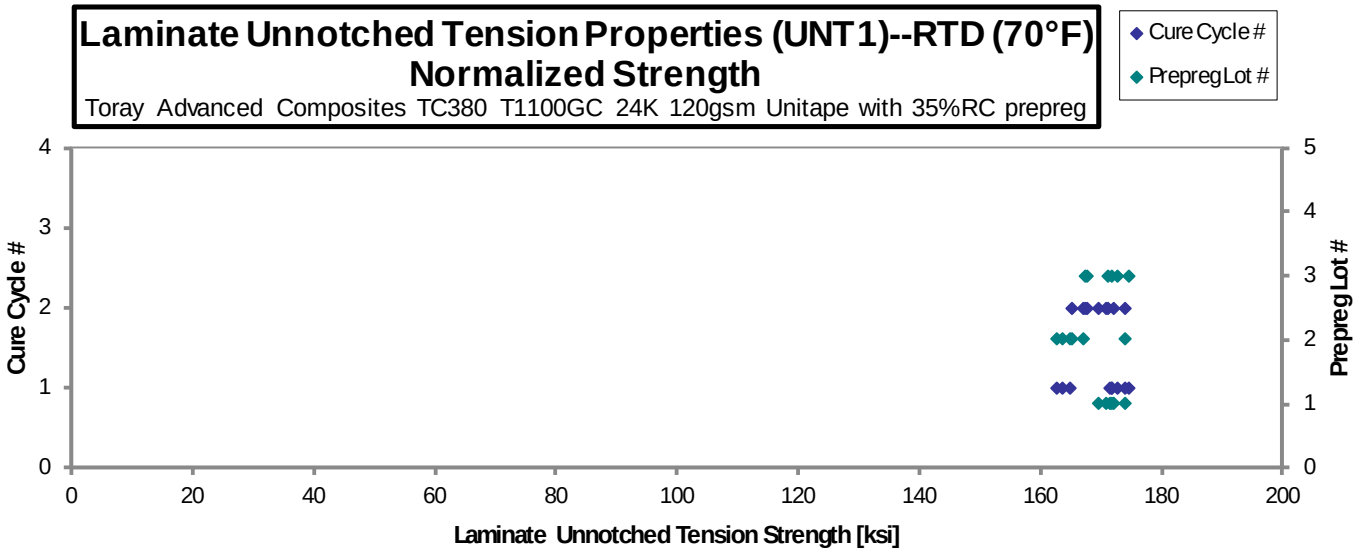
Laminate Unnotched Tension Properties (UNT1)--RTD (70°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

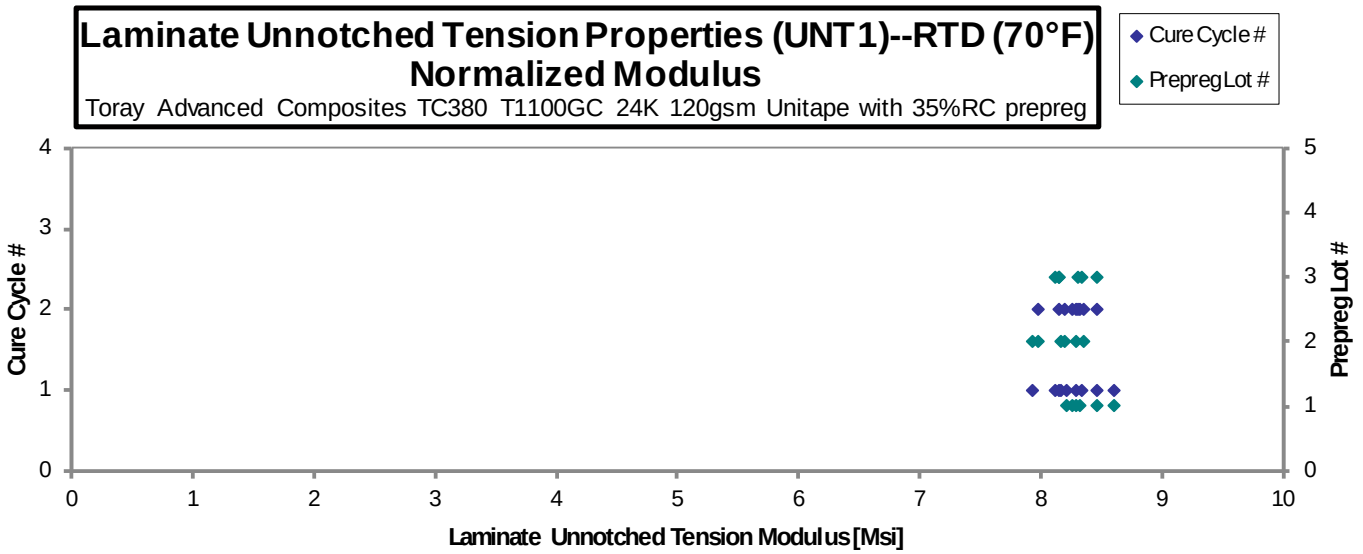
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDAA111A	A	C1	1	1	183.6	9.079	0.1091	24	M(A,D)GT	0.004547	173.9	8.599
TCDAA112A	A	C1	1	1	177.2	8.727	0.1117	24	M(A,D)GM	0.004653	171.7	8.461
TCDAA113A	A	C1	1	1	176.7	8.450	0.1119	24	M(A,D)GM	0.004663	171.6	8.208
TCDAA211A	A	C2	1	2	177.5	8.602	0.1110	24	M(A,D)GB, M(A,D)WT	0.004626	171.0	8.290
TCDAA212A	A	C2	1	2	175.7	8.436	0.1128	24	M(A,D)GB, M(A,D)WT	0.004700	172.0	8.260
TCDAA213A	A	C2	1	2	171.0	8.381	0.1143	24	M(D,L)WB, M(A,D)GT	0.004763	169.6	8.316
TCDAB111A	B	C1	2	1	160.0	8.016	0.1173	24	M(A,D,L)GB, M(A,D)WT	0.004886	162.9	8.160
TCDAB112A	B	C1	2	1	167.4	8.409	0.1135	24	M(A,D)GB, M(A,D)AT	0.004728	164.9	8.284
TCDAB113A	B	C1	2	1	163.4	7.922	0.1154	24	M(A,D)WB, M(A,D,L)WT	0.004809	163.7	7.937
TCDAB211A	B	C2	2	2	170.4	8.024	0.1177	24	M(A,D)WB, M(A,D)WT	0.004904	174.1	8.198
TCDAB212A	B	C2	2	2	166.9	8.440	0.1141	24	M(A,D)WB, M(A,D)WT	0.004754	165.3	8.360
TCDAB213A	B	C2	2	2	164.6	7.855	0.1169	24	M(A,D)GB, M(D,L)WT	0.004871	167.0	7.971
TCDAC111A	C	C1	3	1	174.4	8.458	0.1136	24	M(A,L)AT, AGB	0.004733	171.9	8.339
TCDAC112A	C	C1	3	1	170.5	8.044	0.1168	24	AWB, LWT	0.004867	172.8	8.157
TCDAC113A	C	C1	3	1	168.3	7.817	0.1196	24	LAB, AGT	0.004984	174.8	8.117
TCDAC211A	C	C2	3	2	163.3	8.096	0.1181	24	LWT, M(A,L)GM	0.004922	167.5	8.302
TCDAC212A	C	C2	3	2	160.4	8.093	0.1204	24	LWT, AGB	0.005018	167.7	8.461
TCDAC213A	C	C2	3	2	162.4	7.723	0.1216	24	M(A,L)WT, AWB	0.005065	171.3	8.149

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

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


Laminate Unnotched Tension Properties (UNT1)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
160
180
200
Laminate Unnotched Tension Strength [ksi]


Laminate Unnotched Tension Properties (UNT1)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
1
2
3
4
5
6
7
8
9
10
Laminate Unnotched Tension Modulus [Msi]

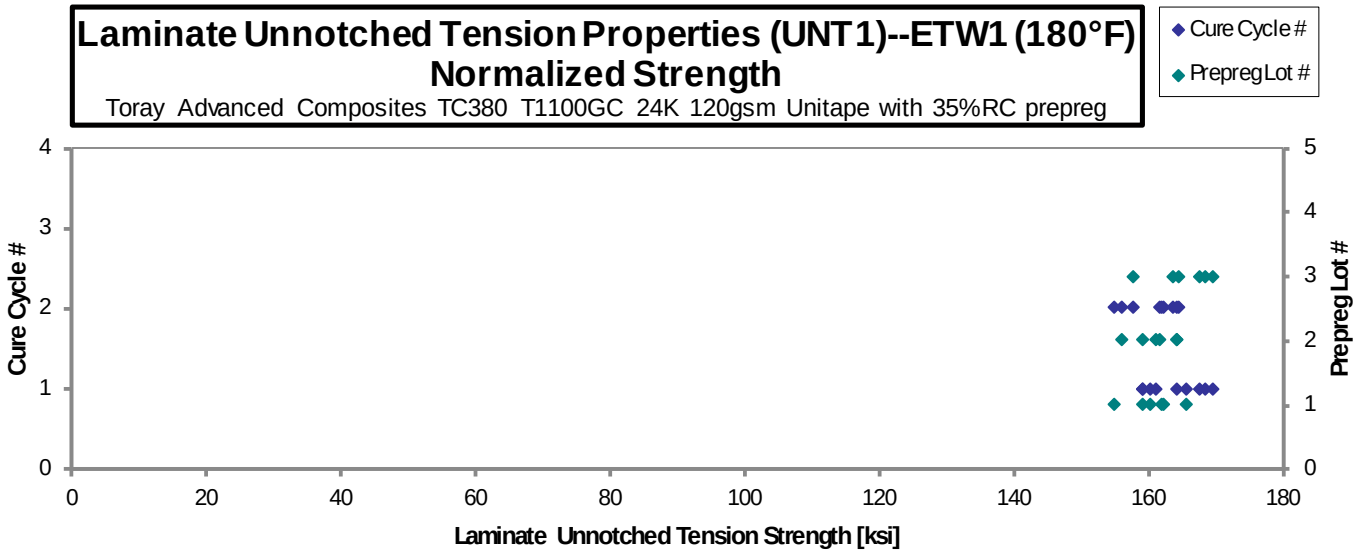
Laminate Unnotched Tension Properties (UNT1)--ETW1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

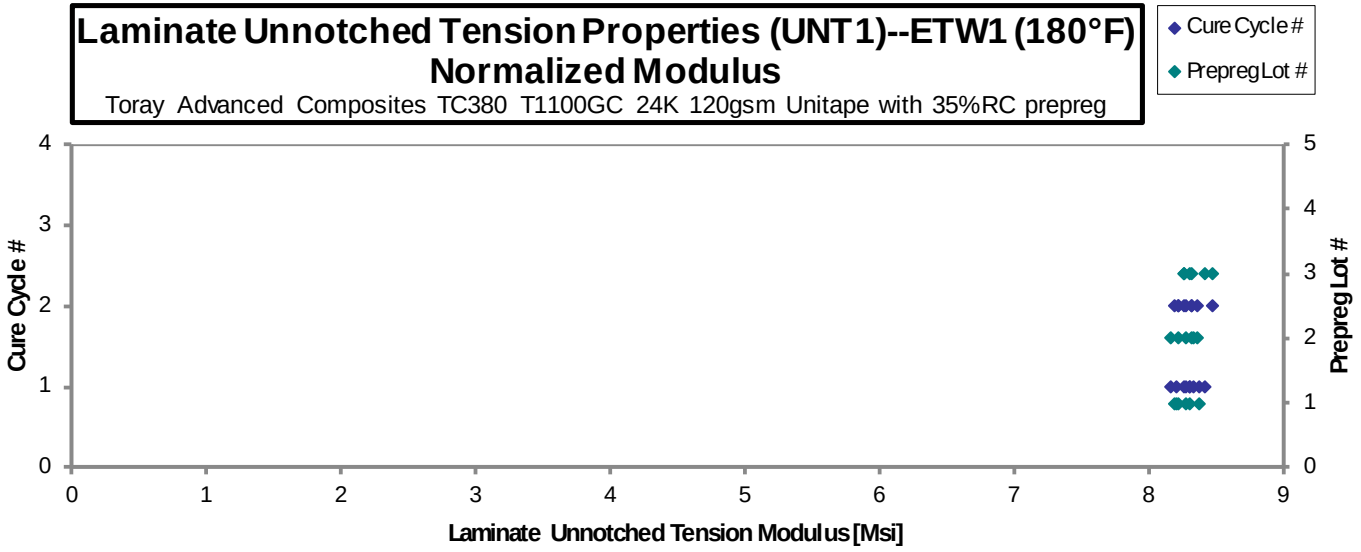
normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDAA111D	A	C1	1	1	161.6	8.445	0.1134	24	M(A,D)GT, AWT, LWB	0.004724	159.0	8.310
TCDAA112D	A	C1	1	1	173.9	8.806	0.1097	24	M(A,L)WB, LWT	0.004569	165.5	8.383
TCDAA113D	A	C1	1	1	163.6	8.390	0.1128	24	AWB, LGT, LWT	0.004698	160.1	8.211
TCDAA211D	A	C2	1	2	163.7	8.380	0.1139	24	M(A,L)GM, LWT, LWB	0.004747	161.9	8.287
TCDAA212D	A	C2	1	2	162.2	8.595	0.1099	24	M(A,L)GT, M(A,L)WB	0.004581	154.8	8.202
TCDAA213D	A	C2	1	2	165.2	8.362	0.1132	24	M(A,L)GT, M(A,L)WB	0.004717	162.3	8.218
TCDAB111D	B	C1	2	1	164.6	8.180	0.1150	24	AWB, LGT, AWT	0.004790	164.3	8.162
TCDAB112D	B	C1	2	1	164.2	8.545	0.1117	24	AGB, AWT, LWB	0.004653	159.2	8.284
TCDAB113D	B	C1	2	1	166.8	8.628	0.1113	24	AGT, LGB, LWB	0.004638	161.2	8.337
TCDAB211D	B	C2	2	2	161.2	8.296	0.1156	24	AGB, LWT, M(A,L)WB	0.004817	161.8	8.325
TCDAB212D	B	C2	2	2	161.3	8.646	0.1115	24	LWB, AWT	0.004644	156.1	8.365
TCDAB213D	B	C2	2	2	171.8	8.610	0.1100	24	LGB, AWT	0.004585	164.1	8.224
TCDAC111D	C	C1	3	1	166.5	8.217	0.1160	24	AGM, LWT, LAB	0.004831	167.6	8.270
TCDAC112D	C	C1	3	1	176.6	8.722	0.1098	24	AGB, AWB, LWT	0.004576	168.4	8.315
TCDAC113D	C	C1	3	1	162.4	8.071	0.1203	24	LWT, AWB	0.005012	169.6	8.428
TCDAC211D	C	C2	3	2	163.5	8.557	0.1112	24	M(A,L)WT, LWB	0.004633	157.8	8.260
TCDAC212D	C	C2	3	2	159.6	8.124	0.1180	24	M(A,L)WT, AWB	0.004916	163.5	8.321
TCDAC213D	C	C2	3	2	157.3	8.102	0.1205	24	AGB, LWT	0.005020	164.5	8.474

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

	t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	0.004731	162.3	8.299
$Standard\ Dev._{norm}$		4.093	0.08121
$Coeff.\ of\ Var.\ [\%]_{norm}$		2.522	0.9786
Min.	0.004569	154.8	8.162
Max.	0.005020	169.6	8.474
Number of Spec.	18	18	18


Laminate Unnotched Tension Properties (UNT1)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Strength [ksi]
0
20
40
60
80
100
120
140
160
180
0
1
2
3
4
5


Laminate Unnotched Tension Properties (UNT1)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5

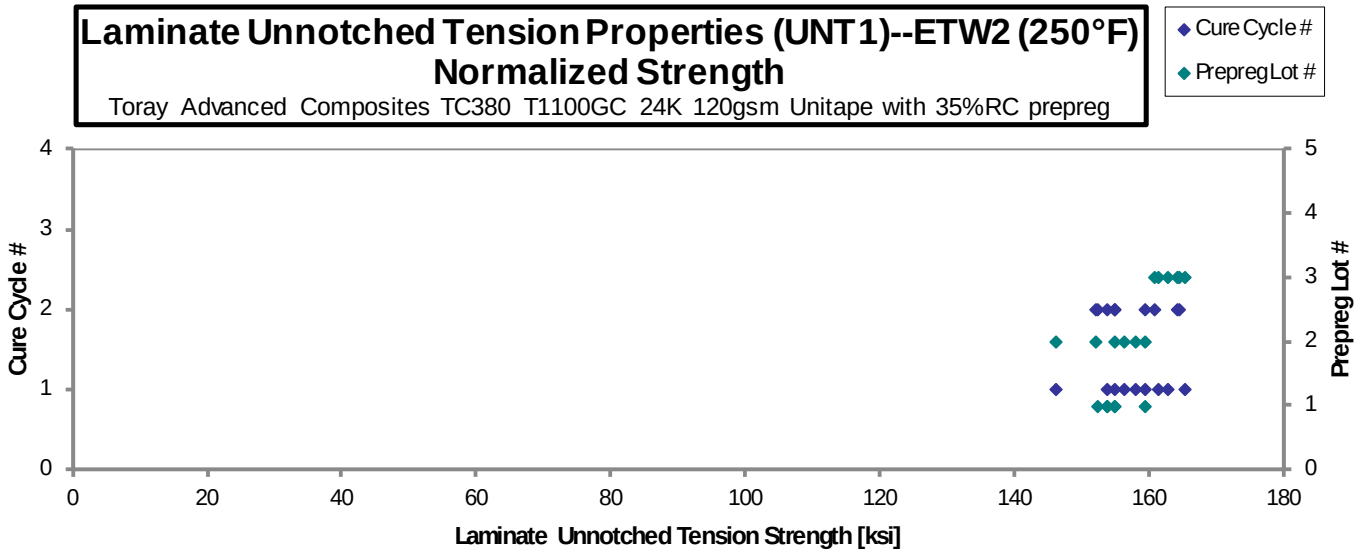
Laminate Unnotched Tension Properties (UNT1)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

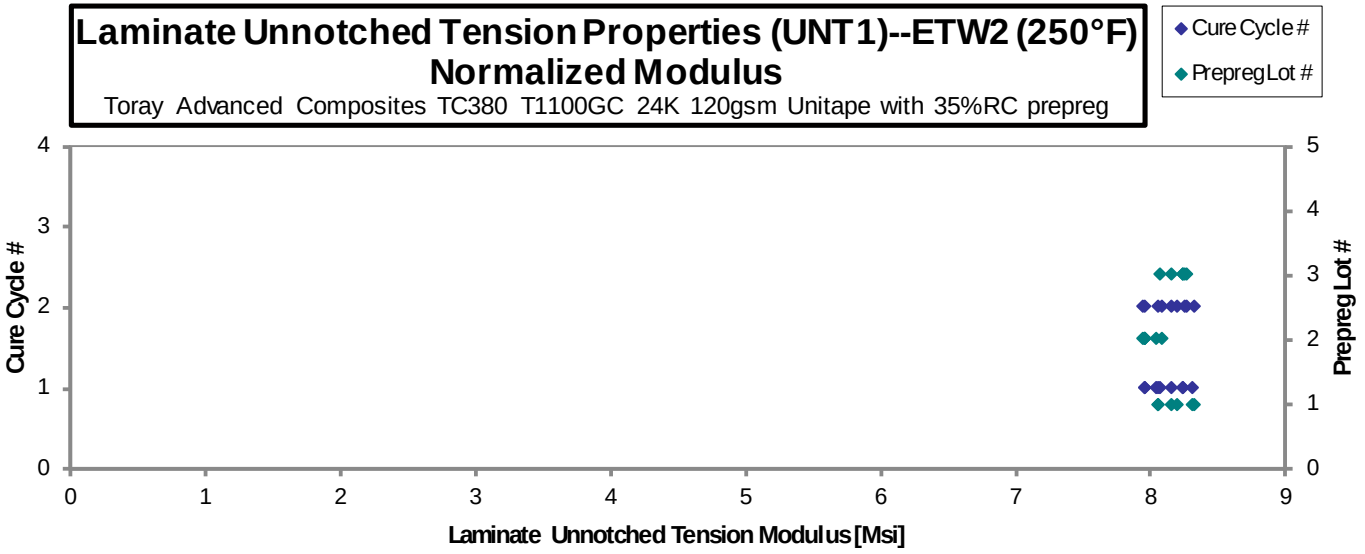
normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDAA111E	A	C1	1	1	161.5	8.421	0.1137	24	M(A,D)WB, M(A,L)WT	0.004735	159.3	8.308
TCDAA112E	A	C1	1	1	156.2	8.297	0.1133	24	M(A,D)WB, M(A,D)GM, M(A,D)WT	0.004719	153.5	8.158
TCDAA113E	A	C1	1	1	156.9	8.173	0.1137	24	M(A,D)WT, M(A,D)GB	0.004736	154.8	8.064
TCDAA211E	A	C2	1	2	154.0	8.355	0.1149	24	M(A,L)GB	0.004785	153.5	8.329
TCDAA212E	A	C2	1	2	151.9	8.178	0.1155	24	M(A,D)GB, M(A,D)WT	0.004810	152.3	8.196
TCDAA213E	A	C2	1	2	155.3	8.085	0.1149	24	M(A,D)GB, M(A,L)WT	0.004786	154.9	8.061
TCDAB111E	B	C1	2	1	150.5	7.664	0.1209	24	AGT, AWB	0.005037	158.0	8.042
TCDAB112E	B	C1	2	1	138.6	7.568	0.1213	24	AGT, AWB, LGB	0.005052	145.9	7.965
TCDAB113E	B	C1	2	1	147.8	7.531	0.1218	24	AGT, LWB	0.005073	156.2	7.960
TCDAB211E	B	C2	2	2	152.0	7.713	0.1208	24	AGB, LWT	0.005031	159.3	8.085
TCDAB212E	B	C2	2	2	146.2	7.518	0.1220	24	AGM, LWT	0.005081	154.7	7.959
TCDAB213E	B	C2	2	2	144.1	7.535	0.1215	24	AGM , LWT, LWB	0.005063	152.0	7.949
TCDAC111E	C	C1	3	1	155.9	7.776	0.1220	24	AGM, LWT, LWB	0.005083	165.1	8.235
TCDAC112E	C	C1	3	1	153.5	7.676	0.1211	24	AGM	0.005046	161.4	8.069
TCDAC113E	C	C1	3	1	157.4	7.978	0.1190	24	AGB, LWT	0.004960	162.6	8.243
TCDAC211E	C	C2	3	2	155.1	7.802	0.1221	24	AGB, LWT	0.005086	164.3	8.267
TCDAC212E	C	C2	3	2	153.1	7.867	0.1209	24	AWT, LWB	0.005038	160.7	8.258
TCDAC213E	C	C2	3	2	157.7	7.840	0.1198	24	AGT, LWB	0.004990	164.0	8.150

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

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	0.004951	157.4	8.128
$Standard\ Dev._{norm}$		5.156	0.1276
$Coeff.\ of\ Var.\ [\%]_{norm}$		3.277	1.570
Min.	0.004719	145.9	7.949
Max.	0.005086	165.1	8.329
Number of Spec.	18	18	18


Laminate Unnotched Tension Properties (UNT1)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Strength [ksi]
0
20
40
60
80
100
120
140
160
180
0
1
2
3
4
5


Laminate Unnotched Tension Properties (UNT1)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5

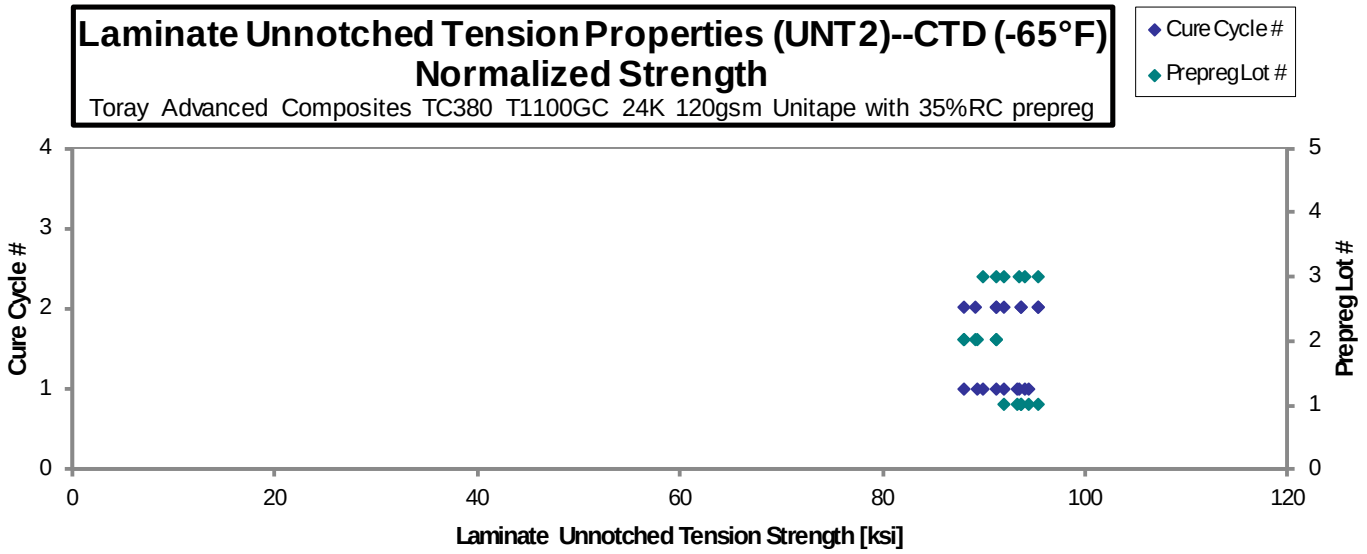
4.9 "10/80/10" Unnotched Tension 2 Properties (UNT2)

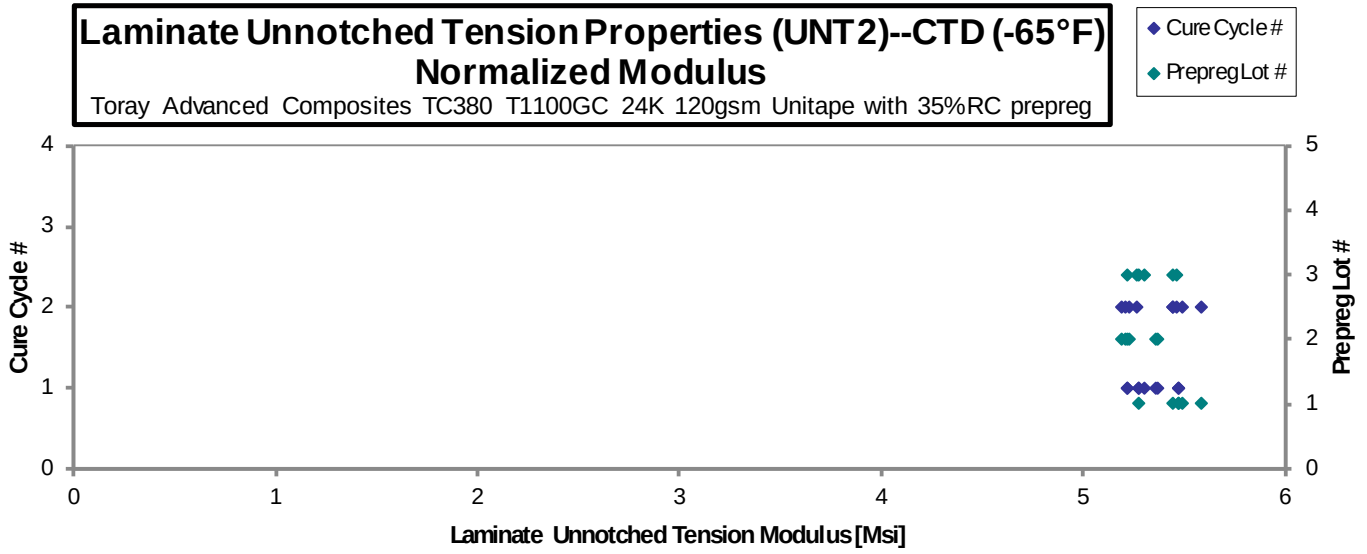
Laminate Unnotched Tension Properties (UNT2)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

Average	**91.53**	**5.322**	**$Average_{norm}$**	**0.004829**	**92.00**	**5.349**
Standard Dev.	**3.833**	**0.2163**	**$Standard\ Dev._{norm}$**		**2.347**	**0.1216**
Coeff. of Var. [%]	**4.187**	**4.064**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.551**	**2.274**
Min.	**86.72**	**5.025**	**Min.**	**0.004631**	**88.00**	**5.188**
Max.	**97.82**	**5.696**	**Max.**	**0.005064**	**95.41**	**5.581**
Number of Spec.	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Tension Properties (UNT2)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
Laminate Unnotched Tension Strength [ksi]

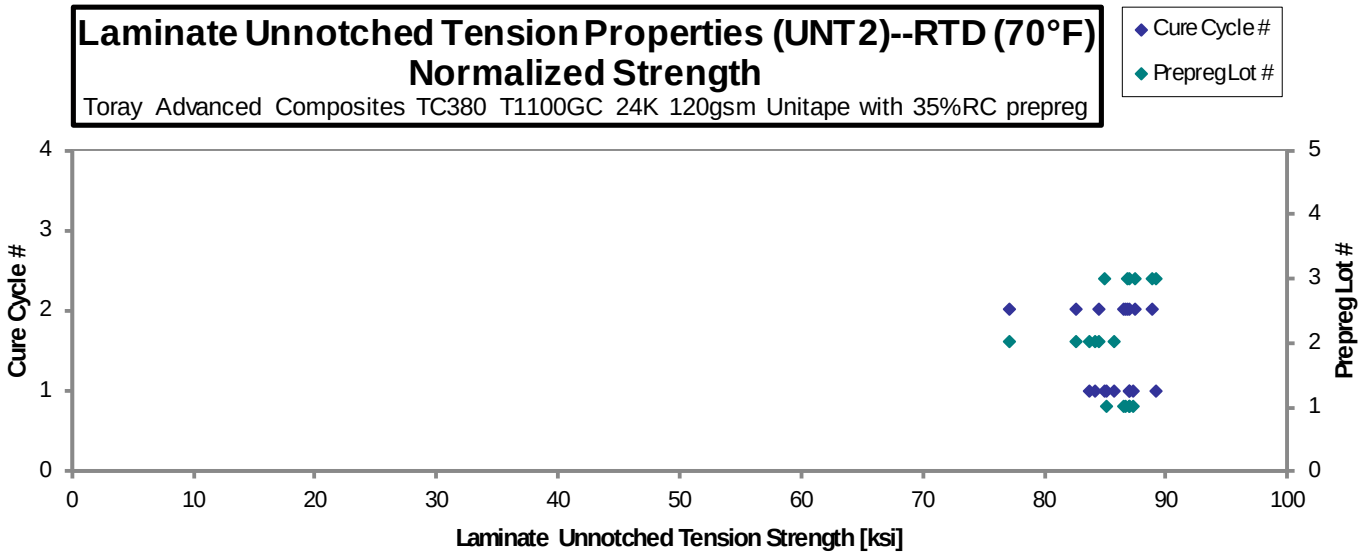

Laminate Unnotched Tension Properties (UNT2)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
6
Laminate Unnotched Tension Modulus [Msi]

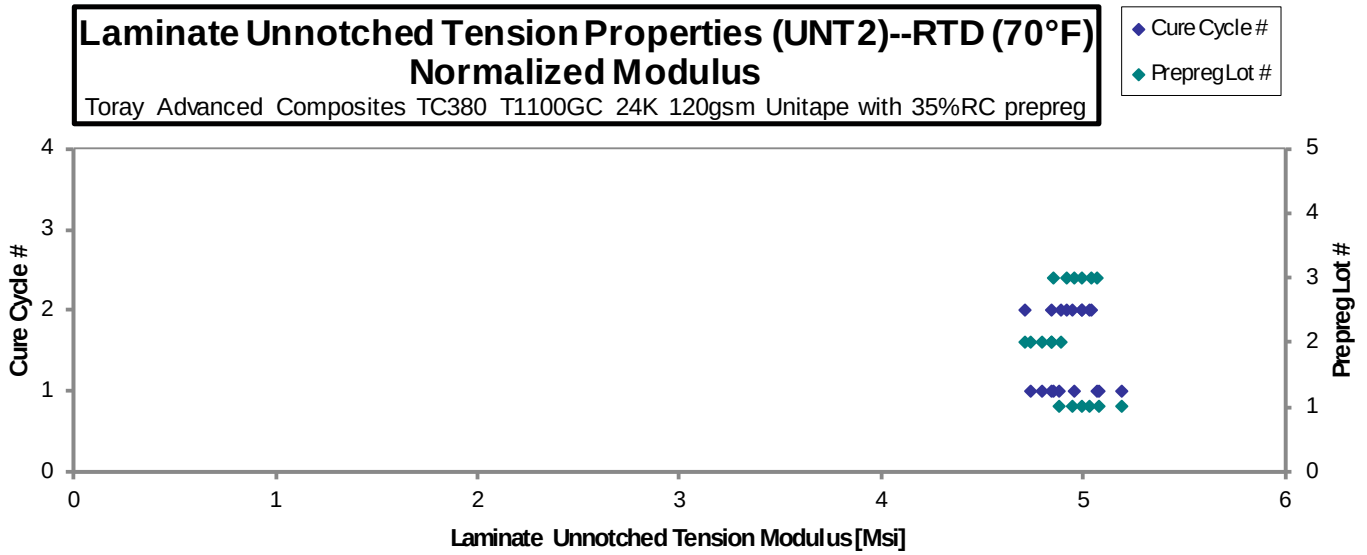
Laminate Unnotched Tension Properties (UNT2)--RTD (70°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDBA111A	A	C1	1	1	92.24	5.508	0.09050	20	M(A,D)GM	0.004525	86.96	5.192
TCDBA112A	A	C1	1	1	90.86	5.289	0.09223	20	M(A,D)GM	0.004612	87.30	5.081
TCDBA113A	A	C1	1	1	87.22	5.002	0.09370	20	M(A,D)WT	0.004685	85.13	4.882
TCDBA211A	A	C2	1	2	90.34	5.245	0.09202	20	M(A,D)WT	0.004601	86.59	5.027
TCDBA212A	A	C2	1	2	88.99	5.074	0.09358	20	M(A,D)GT	0.004679	86.75	4.947
TCDBA213A	A	C2	1	2	88.04	5.054	0.09488	20	M(A,D)GM	0.004744	87.02	4.995
TCDBB111A	B	C1	2	1	89.84	5.145	0.08948	20	M(A,D)GT	0.004474	83.74	4.796
TCDBB112A	B	C1	2	1	87.28	4.930	0.09432	20	M(A,D)GB	0.004716	85.75	4.844
TCDBB113A	B	C1	2	1	83.53	4.700	0.09677	20	M(A,D)GB	0.004838	84.20	4.738
TCDBB211A	B	C2	2	2	82.40	5.222	0.08990	20	M(A,D)GT	0.004495	77.16	4.890
TCDBB212A	B	C2	2	2	85.90	4.924	0.09440	20	M(A,D)WT	0.004720	84.47	4.842
TCDBB213A	B	C2	2	2	81.96	4.667	0.09688	20	M(A,D)GM	0.004844	82.72	4.710
TCDBC111A	C	C1	3	1	95.43	5.425	0.08973	20	AGM	0.004487	89.21	5.071
TCDBC112A	C	C1	3	1	87.04	5.074	0.09380	20	AWB	0.004690	85.04	4.957
TCDBC113A	C	C1	3	1	87.13	4.859	0.09588	20	AWB	0.004794	87.02	4.853
TCDBC211A	C	C2	3	2	91.12	5.206	0.09213	20	AWB	0.004607	87.45	4.996
TCDBC212A	C	C2	3	2	87.44	4.957	0.09532	20	AGM	0.004766	86.82	4.922
TCDBC213A	C	C2	3	2	87.74	4.978	0.09727	20	AGT	0.004863	88.90	5.043

Average	**88.03**	**5.070**	**$Average_{norm}$**	**0.004674**	**85.68**	**4.933**
Standard Dev.	**3.400**	**0.2241**	**$Standard\ Dev._{norm}$**		**2.728**	**0.1264**
Coeff. of Var. [%]	**3.862**	**4.420**	**Coeff. of Var. [%]$_{norm}$**		**3.184**	**2.562**
Min.	**81.96**	**4.667**	**Min.**	**0.004474**	**77.16**	**4.710**
Max.	**95.43**	**5.508**	**Max.**	**0.004863**	**89.21**	**5.192**
Number of Spec.	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Tension Properties (UNT2)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Strength [ksi]
0
10
20
30
40
50
60
70
80
90
100
0
1
2
3
4
5


Laminate Unnotched Tension Properties (UNT2)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Modulus [Msi]
0
1
2
3
4
5
6
0
1
2
3
4
5

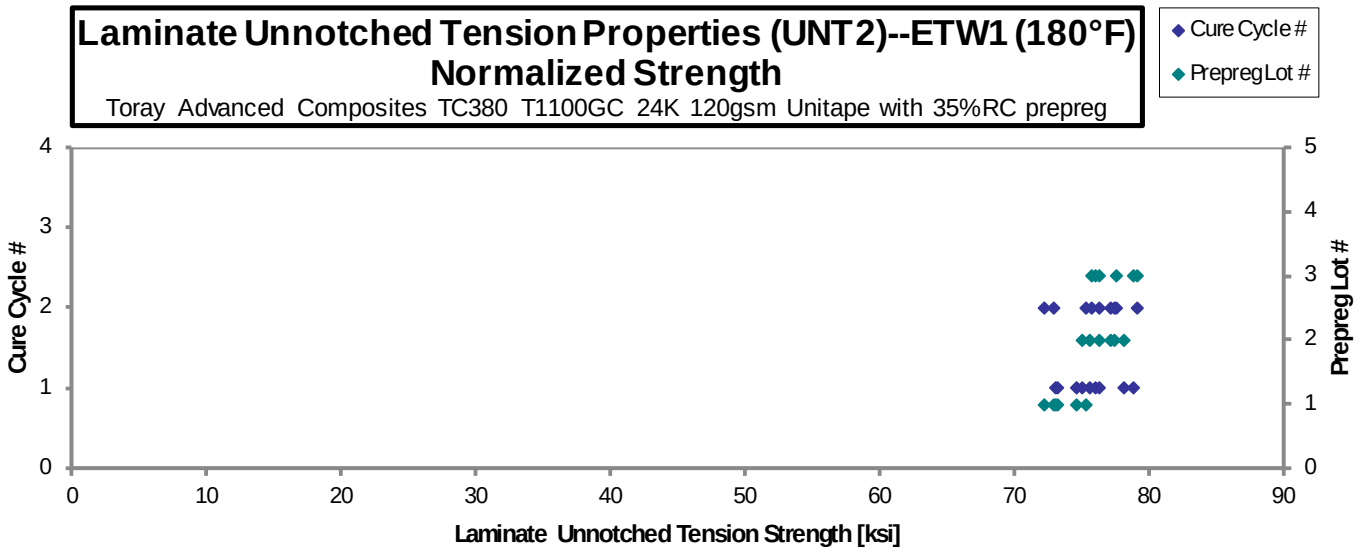
Laminate Unnotched Tension Properties (UNT2)--ETW1 (180°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

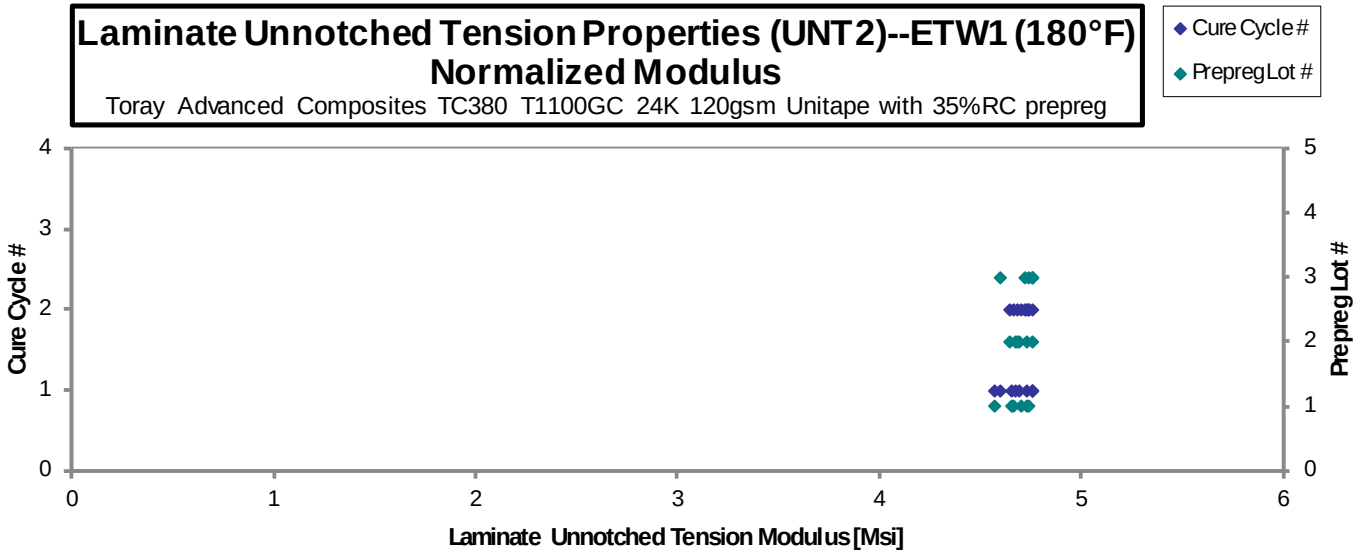
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDBA111D	A	C1	1	1	76.36	4.770	0.09370	20	M(A,D)GB	0.004685	74.53	4.656
TCDBA112D	A	C1	1	1	76.81	4.966	0.09147	20	M(A,D)GB	0.004573	73.18	4.731
TCDBA113D	A	C1	1	1	75.23	4.712	0.09313	20	M(A,D)GM	0.004657	72.99	4.572
TCDBA211D	A	C2	1	2	74.38	4.764	0.09400	20	M(A,D)WB	0.004700	72.83	4.664
TCDBA212D	A	C2	1	2	75.06	4.934	0.09227	20	M(A,D)WB	0.004613	72.14	4.742
TCDBA213D	A	C2	1	2	76.33	4.769	0.09470	20	M(A,D)WB	0.004735	75.30	4.705
TCDBB111D	B	C1	2	1	76.31	4.719	0.09513	20	AGT	0.004757	75.62	4.676
TCDBB112D	B	C1	2	1	81.48	4.964	0.09198	20	AGB	0.004599	78.07	4.756
TCDBB113D	B	C1	2	1	78.56	4.909	0.09172	20	M(A,D)GB	0.004586	75.05	4.690
TCDBB211D	B	C2	2	2	77.48	4.662	0.09562	20	AGB	0.004781	77.17	4.644
TCDBB212D	B	C2	2	2	80.43	4.869	0.09237	20	AGB	0.004618	77.39	4.684
TCDBB213D	B	C2	2	2	79.71	4.945	0.09180	20	AGT	0.004590	76.22	4.728
TCDBC111D	C	C1	3	1	76.18	4.616	0.09568	20	M(A,D)GM	0.004784	75.93	4.601
TCDBC112D	C	C1	3	1	79.44	4.960	0.09217	20	AGB	0.004608	76.27	4.762
TCDBC113D	C	C1	3	1	78.86	4.759	0.09597	20	AGT	0.004798	78.84	4.758
TCDBC211D	C	C2	3	2	76.97	4.594	0.09862	20	AGB	0.004931	79.07	4.719
TCDBC212D	C	C2	3	2	78.80	4.935	0.09218	20	AGT	0.004609	75.66	4.739
TCDBC213D	C	C2	3	2	77.33	4.744	0.09618	20	AWB	0.004809	77.48	4.754

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

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


Laminate Unnotched Tension Properties (UNT2)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Strength [ksi]
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4
5


Laminate Unnotched Tension Properties (UNT2)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Modulus [Msi]
0
1
2
3
4
5
6
0
1
2
3
4
5

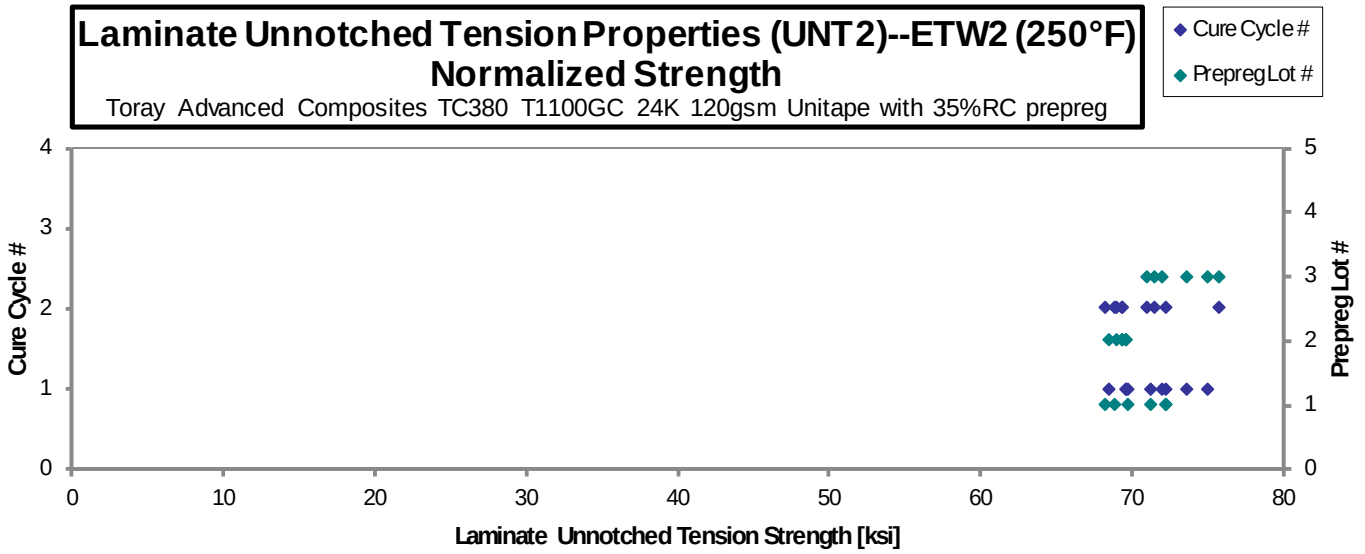
Laminate Unnotched Tension Properties (UNT2)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

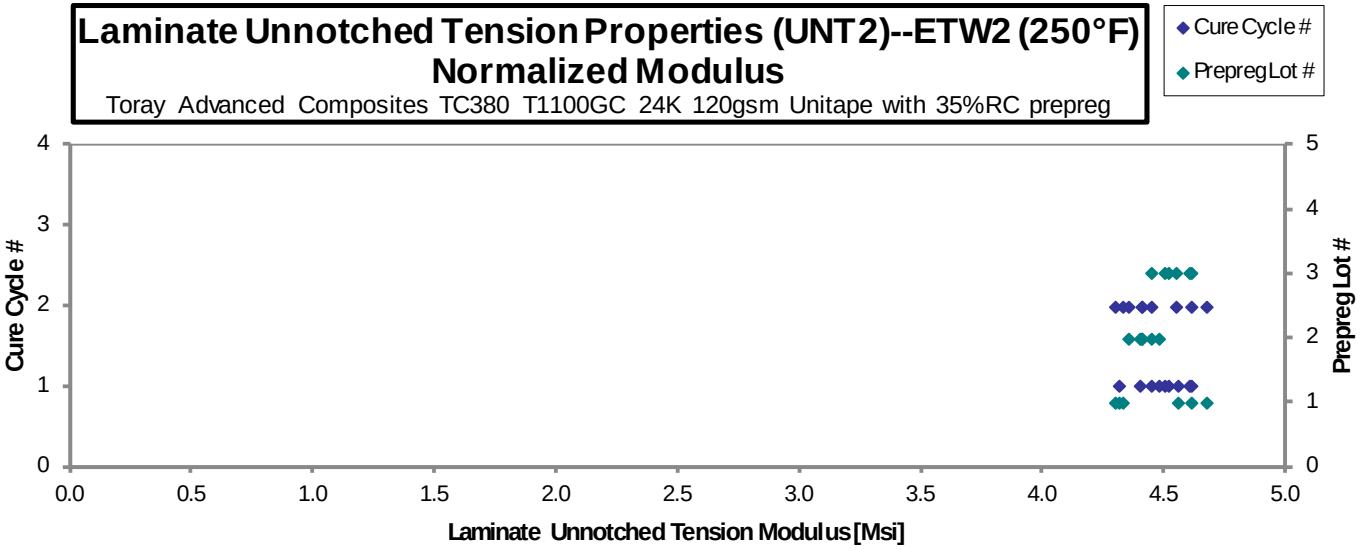
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDBA111E	A	C1	1	1	73.90	4.680	0.09372	20	DGM	0.004686	72.14	4.569
TCDBA112E	A	C1	1	1	71.50	4.635	0.09560	20	M(A,D)GB	0.004780	71.20	4.616
TCDBA113E	A	C1	1	1	71.10	4.417	0.09400	20	M(A,D)GB	0.004700	69.62	4.325
TCDBA211E	A	C2	1	2	69.72	4.400	0.09470	20	M(A,D)WB	0.004735	68.77	4.341
TCDBA212E	A	C2	1	2	72.98	4.734	0.09500	20	M(A,D)WB	0.004750	72.21	4.685
TCDBA213E	A	C2	1	2	68.57	4.333	0.09540	20	M(A,D)WB	0.004770	68.14	4.306
TCDBB111E	B	C1	2	1	65.83	4.237	0.09982	20	M(A,D)GM	0.004991	68.44	4.405
TCDBB112E	B	C1	2	1	65.83	4.214	0.1014	20	M(A,D)GM	0.005071	69.55	4.452
TCDBB113E	B	C1	2	1	66.84	4.310	0.09985	20	M(A,D)GM	0.004993	69.52	4.482
TCDBB211E	B	C2	2	2	65.55	4.146	0.1010	20	M(A,D)GT	0.005049	68.96	4.361
TCDBB212E	B	C2	2	2	66.10	4.212	0.1007	20	M(A,D)GB	0.005036	69.34	4.418
TCDBB213E	B	C2	2	2	66.01	4.202	0.1008	20	M(A,D)GM	0.005040	69.32	4.412
TCDBC111E	C	C1	3	1	70.59	4.329	0.1001	20	M(A,D)GM	0.005004	73.59	4.513
TCDBC112E	C	C1	3	1	71.87	4.419	0.1001	20	M(A,D)GM	0.005007	74.96	4.609
TCDBC113E	C	C1	3	1	69.16	4.349	0.09983	20	M(A,D)GT	0.004992	71.92	4.523
TCDBC211E	C	C2	3	2	68.42	4.365	0.1002	20	M(A,D)GT	0.005010	71.42	4.556
TCDBC212E	C	C2	3	2	67.74	4.252	0.1005	20	M(A,D)GB	0.005025	70.92	4.451
TCDBC213E	C	C2	3	2	72.79	4.446	0.09980	20	M(A,D)GM	0.004990	75.67	4.622

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

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


Laminate Unnotched Tension Properties (UNT2)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Strength [ksi]


Laminate Unnotched Tension Properties (UNT2)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Modulus [Msi]

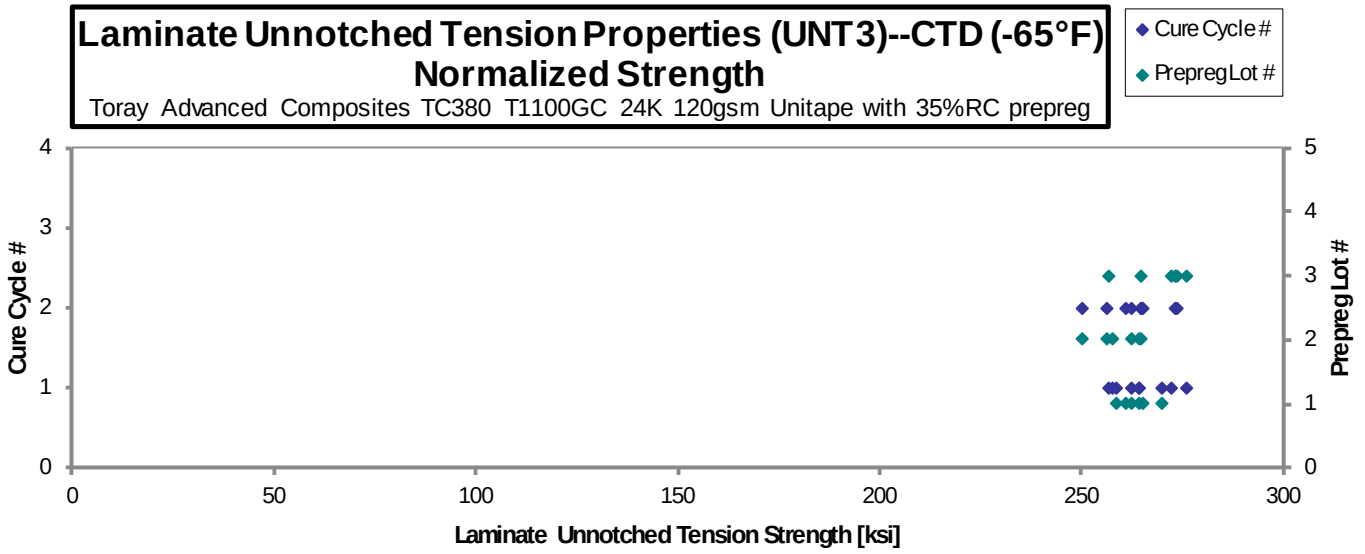
4.10 "50/40/10" Unnotched Tension 3 Properties (UNT3)

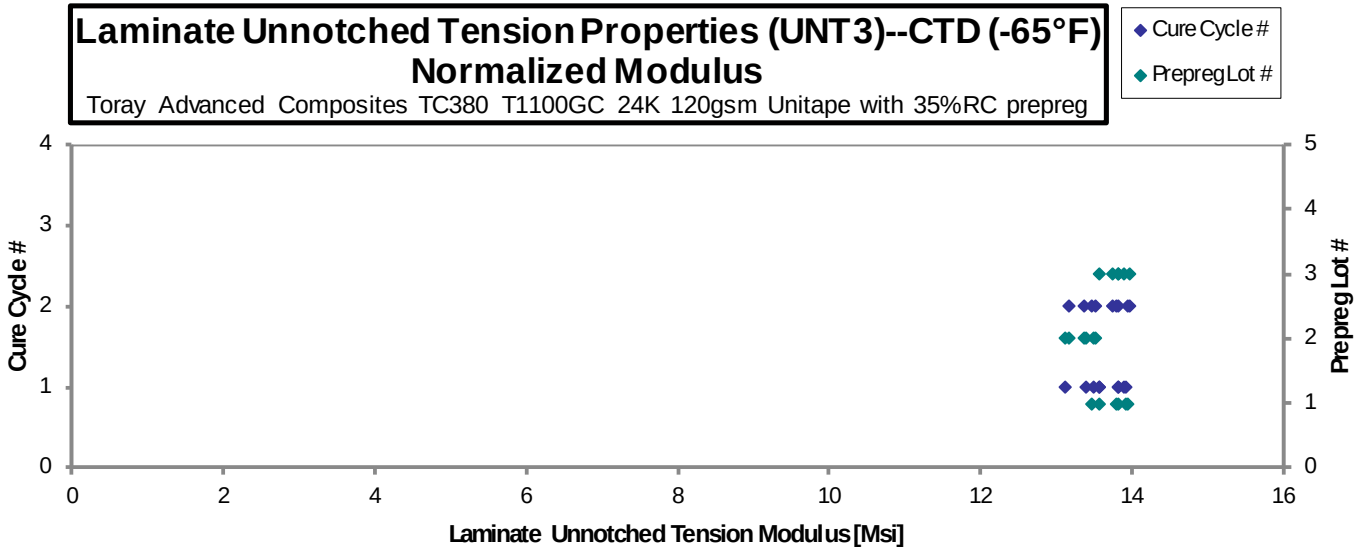
Laminate Unnotched Tension Properties (UNT3)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDCA111B	A	C1	1	1	271.1	13.92	0.09355	20	M(A,D)WT, M(A,D)WB	0.004678	264.2	13.56
TCDCA112B	A	C1	1	1	264.2	14.21	0.09398	20	M(A,D)WT, M(A,D)WB	0.004699	258.7	13.91
TCDCA113B	A	C1	1	1	273.8	14.01	0.09458	20	M(A,D)GT, M(A,D)WB	0.004729	269.8	13.80
TCDCA211B	A	C2	1	2	267.3	13.90	0.09525	20	M(A,D)WT, M(A,D)WB	0.004763	265.2	13.79
TCDCA212B	A	C2	1	2	263.0	13.97	0.09570	20	M(A,D)WT, M(A,D)WB	0.004785	262.2	13.93
TCDCA213B	A	C2	1	2	262.3	13.53	0.09547	20	M(A,D)WT, M(A,D)WB	0.004773	260.9	13.46
TCDCB111B	B	C1	2	1	261.6	13.35	0.09695	20	M(A,D)GT, M(A,D)WB	0.004848	264.1	13.49
TCDCB112B	B	C1	2	1	260.8	13.29	0.09658	20	M(A,D)GT, M(A,D)WB	0.004829	262.4	13.37
TCDCB113B	B	C1	2	1	254.3	12.93	0.09723	20	M(D,L)WB, M(A,D)WT	0.004862	257.6	13.10
TCDCB211B	B	C2	2	2	243.4	13.03	0.09855	20	M(A,D)GM	0.004928	249.9	13.37
TCDCB212B	B	C2	2	2	257.6	13.16	0.09862	20	M(A,D)GM, M(A,D)WB	0.004931	264.6	13.51
TCDCB213B	B	C2	2	2	252.1	12.95	0.09762	20	M(A,D)WT, M(A,D)WB	0.004881	256.3	13.17
TCDCC111B	C	C1	3	1	264.6	13.00	0.1001	20	AGM, LWT, M(A,L)WB	0.005004	275.9	13.55
TCDCC112B	C	C1	3	1	261.4	13.34	0.09990	20	AWT, AGM, M(A,L)WB	0.004995	272.1	13.89
TCDCC113B	C	C1	3	1	246.6	13.27	0.09997	20	AWT, LGB	0.004998	256.8	13.82
TCDCC211B	C	C2	3	2	269.6	13.63	0.09733	20	M(A,L)WB, M(A,L)GT	0.004867	273.3	13.82
TCDCC212B	C	C2	3	2	267.3	13.68	0.09798	20	M(A,L)WB, M(A,L)WT	0.004899	272.8	13.96
TCDCC213B	C	C2	3	2	260.1	13.51	0.09760	20	AWT, AGB	0.004880	264.4	13.73

Average	**261.2**	**13.48**		**$Average_{norm}$**	**0.004853**	**264.0**	**13.62**
Standard Dev.	**8.056**	**0.3997**		**Standard $Dev._{norm}$**		**6.872**	**0.2637**
Coeff. of Var. [%]	**3.084**	**2.965**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.603**	**1.936**
Min.	**243.4**	**12.93**		**Min.**	**0.004678**	**249.9**	**13.10**
Max.	**273.8**	**14.21**		**Max.**	**0.005004**	**275.9**	**13.96**
Number of Spec.	**18**	**18**		**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Tension Properties (UNT3)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
50
100
150
200
250
300
Laminate Unnotched Tension Strength [ksi]


Laminate Unnotched Tension Properties (UNT3)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
2
4
6
8
10
12
14
16
Laminate Unnotched Tension Modulus [Msi]

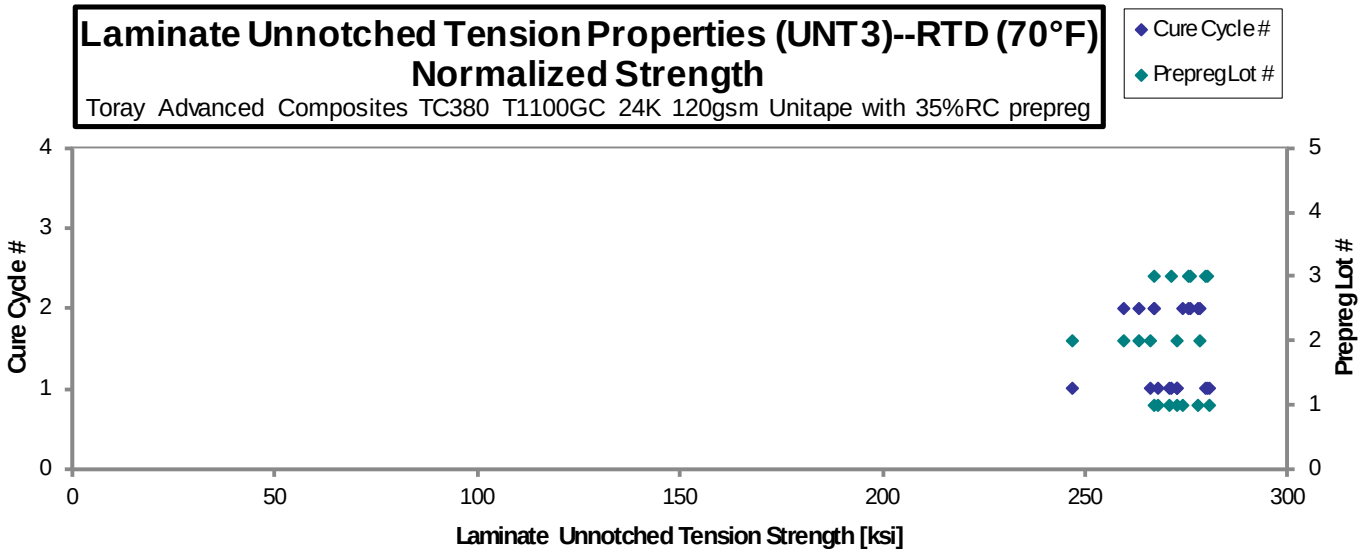
Laminate Unnotched Tension Properties (UNT3)--RTD (70°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

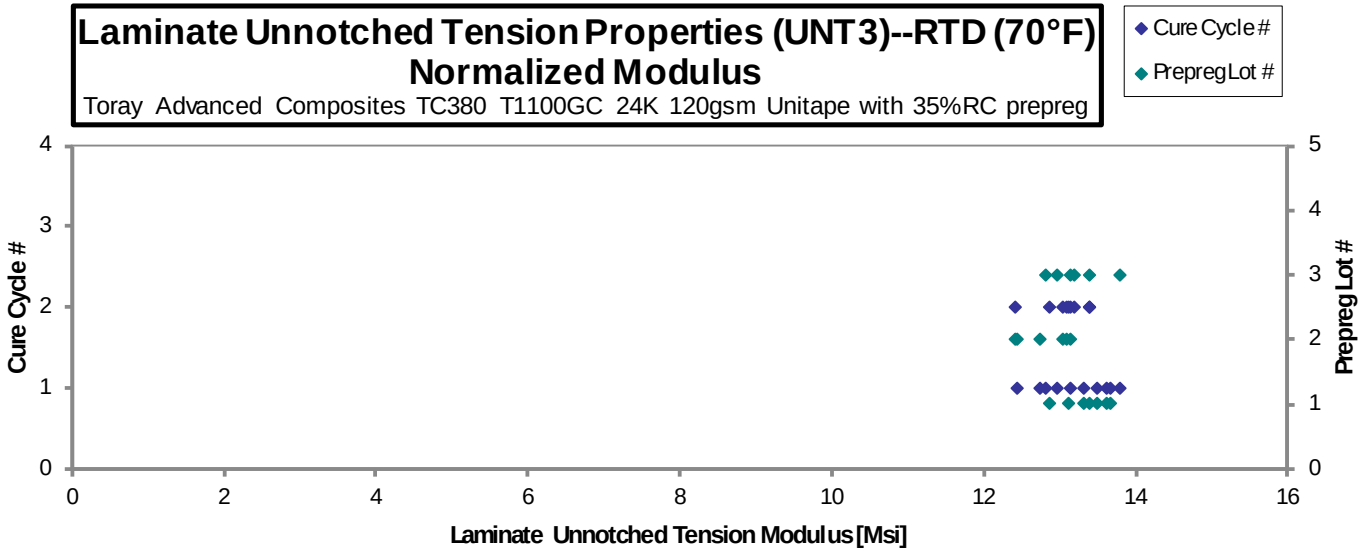
normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDCA111A	A	C1	1	1	284.2	14.23	0.09220	20	M(A,D)WB, M(A,D)WT	0.004610	272.9	13.66
TCDCA112A	A	C1	1	1	287.1	13.93	0.09383	20	M(A,D)GB, M(A,D)WT	0.004692	280.6	13.61
TCDCA113A	A	C1	1	1	274.6	13.51	0.09472	20	M(A,D)WB, M(A,D)WT	0.004736	270.9	13.33
TCDCA114A	A	C1	1	1	272.8	13.74	0.09428	20	M(A,D)WB, M(A,D)WT	0.004714	267.9	13.50
TCDCA211A	A	C2	1	2	291.5	14.05	0.09160	20	M(A,D)GB, M(A,D)WT	0.004580	278.2	13.41
TCDCA212A	A	C2	1	2	280.1	13.13	0.09403	20	M(A,D)WB, M(A,D)WT	0.004702	274.4	12.86
TCDCA213A	A	C2	1	2	268.5	13.20	0.09553	20	M(A,D)WB, M(A,D)WT	0.004777	267.2	13.13
TCDCB111A	B	C1	2	1	285.5	13.36	0.09167	20	M(A,D)WB, M(A,D)GT	0.004583	272.6	12.75
TCDCB112A	B	C1	2	1	273.1	13.49	0.09362	20	M(A,D)GB, M(A,D)WT	0.004681	266.3	13.16
TCDCB113A	B	C1	2	1	246.7	12.43	0.09613	20	M(D,L)AB, M(A,D)WT	0.004807	247.0	12.45
TCDCB211A	B	C2	2	2	292.5	13.74	0.09143	20	M(A,D)WB, M(A,D)WT	0.004572	278.6	13.09
TCDCB212A	B	C2	2	2	265.5	13.14	0.09528	20	M(A,D)GB, M(A,D)WT	0.004764	263.5	13.04
TCDCB213A	B	C2	2	2	254.3	12.16	0.09795	20	M(A,D)WB, M(A,D)WT	0.004898	259.5	12.41
TCDCC111A	C	C1	3	1	295.4	13.50	0.09110	20	AWB, AWT	0.004555	280.3	12.81
TCDCC112A	C	C1	3	1	271.2	13.79	0.09602	20	AWB, LWT	0.004801	271.3	13.79
TCDCC113A	C	C1	3	1	272.2	12.63	0.09868	20	LWB, AWT	0.004934	279.8	12.98
TCDCC211A	C	C2	3	2	269.5	13.31	0.09525	20	AWB, M(A,L)GT	0.004763	267.4	13.20
TCDCC212A	C	C2	3	2	270.8	13.17	0.09773	20	AWT, LWB	0.004887	275.7	13.40
TCDCC213A	C	C2	3	2	271.1	12.90	0.09782	20	LWB, AGT	0.004891	276.2	13.14

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

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	**0.004734**	**271.1**	**13.14**
Standard $Dev._{norm}$		**8.348**	**0.3809**
Coeff. of Var. $[\%]_{norm}$		**3.079**	**2.898**
Min.	**0.004555**	**247.0**	**12.41**
Max.	**0.004934**	**280.6**	**13.79**
Number of Spec.	**19**	**19**	**19**


Laminate Unnotched Tension Properties (UNT3)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
50
100
150
200
250
300
Laminate Unnotched Tension Strength [ksi]


Laminate Unnotched Tension Properties (UNT3)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
2
4
6
8
10
12
14
16
Laminate Unnotched Tension Modulus [Msi]

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

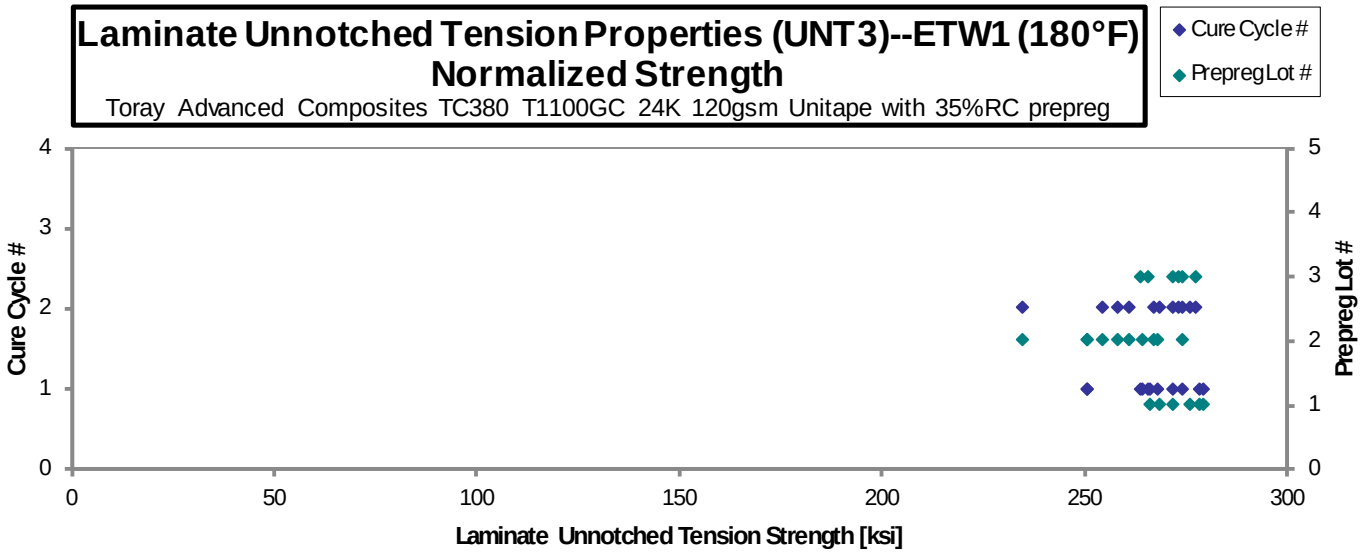
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

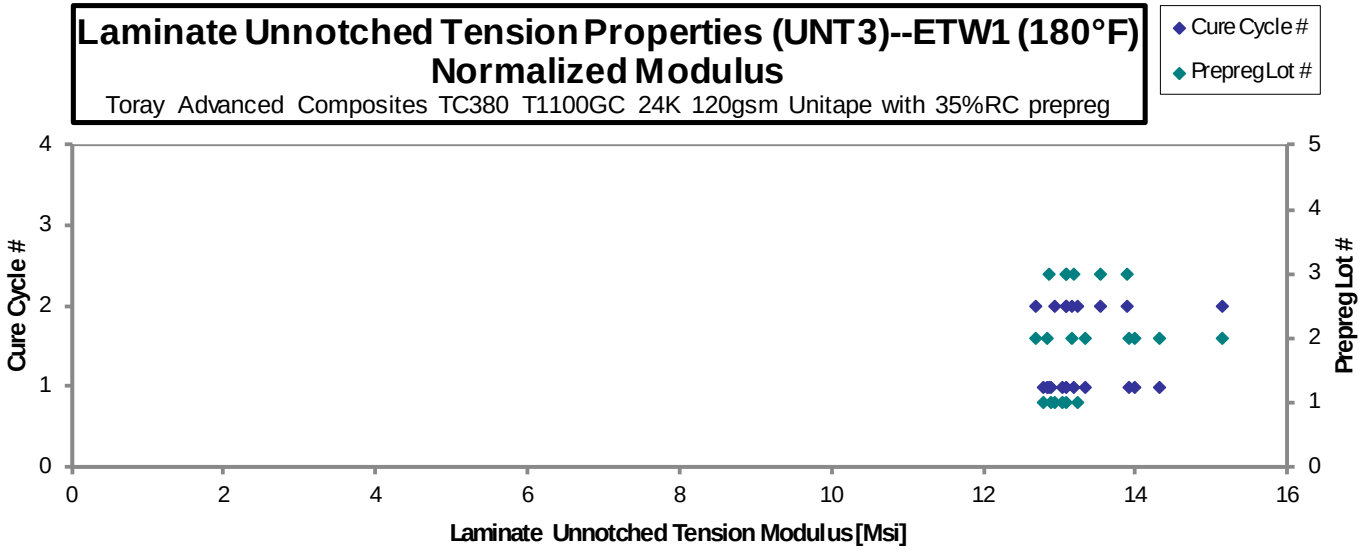
normalizing t_{ply} [in]
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDCA111D	A	C1	1	1	283.7	13.25	0.09458	20	M(A,L)GM, LWT	0.004729	279.5	13.06
TCDCA112D	A	C1	1	1	292.5	13.56	0.09140	20	M(A,L)GM, AWT, AWB	0.004570	278.4	12.91
TCDCA113D	A	C1	1	1	271.0	13.04	0.09432	20	M(A,L)WT, M(A,L)WB, LGM	0.004716	266.2	12.81
TCDCA211D	A	C2	1	2	276.6	13.28	0.09580	20	AGM, M(A,L)WB, M(A,L)WT	0.004790	276.0	13.25
TCDCA212D	A	C2	1	2	275.8	13.46	0.09345	20	LWT, M(A,L)GB	0.004673	268.5	13.10
TCDCA213D	A	C2	1	2	269.3	12.82	0.09688	20	LWT, AGT, M(A,L)WT	0.004844	271.8	12.94
TCDCB111D	B	C1	2	1	247.8	14.13	0.09725	20	M(A,D)GT, LWB	0.004863	251.0	14.32
TCDCB112D	B	C1	2	1	281.3	14.35	0.09363	20	M(A,D)GM, LWT, LWB	0.004682	274.4	14.00
TCDCB113D	B	C1	2	1	272.9	14.36	0.09307	20	M(A,D)GM, M(A,D)WB	0.004653	264.5	13.92
TCDCB114D	B	C1	2	1	263.6	13.13	0.09770	20	M(A,D)GB, M(A,D)GT, M(A,D)WB	0.004885	268.3	13.36
TCDCB115D	B	C1	2	1	241.6	12.38	0.09962	20	M(A,D)WT, M(A,D,L)WB	0.004981	250.7	12.85
TCDCB211D*	B	C2	2	2	255.7		0.09702	20	M(A,D)WB, M(A,L)WT	0.004851	258.4	
TCDCB212D	B	C2	2	2	264.6	15.34	0.09480	20	M(A,D,L)WB, AWT	0.004740	261.3	15.14
TCDCB213D*	B	C2	2	2	276.6		0.09275	20	M(A,D)GT, M(A,D)WB	0.004638	267.2	
TCDCB214D	B	C2	2	2	250.2	12.94	0.09773	20	M(A,D)GT, M(A,D,L)WB	0.004887	254.7	13.18
TCDCB215D	B	C2	2	2	224.8	12.15	0.10030	20	M(A,D)WB, M(A,D)WT	0.005015	234.9	12.70
TCDCC111D	C	C1	3	1	267.7	12.89	0.09758	20	M(A,D)GM, AWT, AWB	0.004879	272.1	13.10
TCDCC112D	C	C1	3	1	278.8	13.50	0.09148	20	M(A,D)WB, M(A,D)WT	0.004574	265.7	12.87
TCDCC113D	C	C1	3	1	262.6	13.13	0.09650	20	M(A,L)WT, M(A,D)GM	0.004825	264.0	13.20
TCDCC211D	C	C2	3	2	286.2	13.71	0.09170	20	M(A,D)GM, AWB, AWT, SGT	0.004585	273.4	13.09
TCDCC212D	C	C2	3	2	268.6	13.28	0.09802	20	M(A,D)GM, AWB, AWT, SGT	0.004901	274.3	13.56
TCDCC213D	C	C2	3	2	267.4	13.39	0.09972	20	M(A,D)GM, AWT, LWB	0.004986	277.7	13.91

* Modulus is not reported due to erroneous strain data.

Average	**267.2**	**13.40**	**Average$_{norm}$**	**0.004785**	**266.0**	**13.36**
Standard Dev.	**15.73**	**0.7240**	**Standard Dev.$_{norm}$**		**10.89**	**0.6136**
Coeff. of Var. [%]	**5.887**	**5.401**	**Coeff. of Var. [%]$_{norm}$**		**4.094**	**4.592**
Min.	**224.8**	**12.15**	**Min.**	**0.004570**	**234.9**	**12.70**
Max.	**292.5**	**15.34**	**Max.**	**0.005015**	**279.5**	**15.14**
Number of Spec.	**22**	**20**	**Number of Spec.**	**22**	**22**	**20**


Laminate Unnotched Tension Properties (UNT3)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
50
100
150
200
250
300
Laminate Unnotched Tension Strength [ksi]


Laminate Unnotched Tension Properties (UNT3)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
2
4
6
8
10
12
14
16
Laminate Unnotched Tension Modulus [Msi]

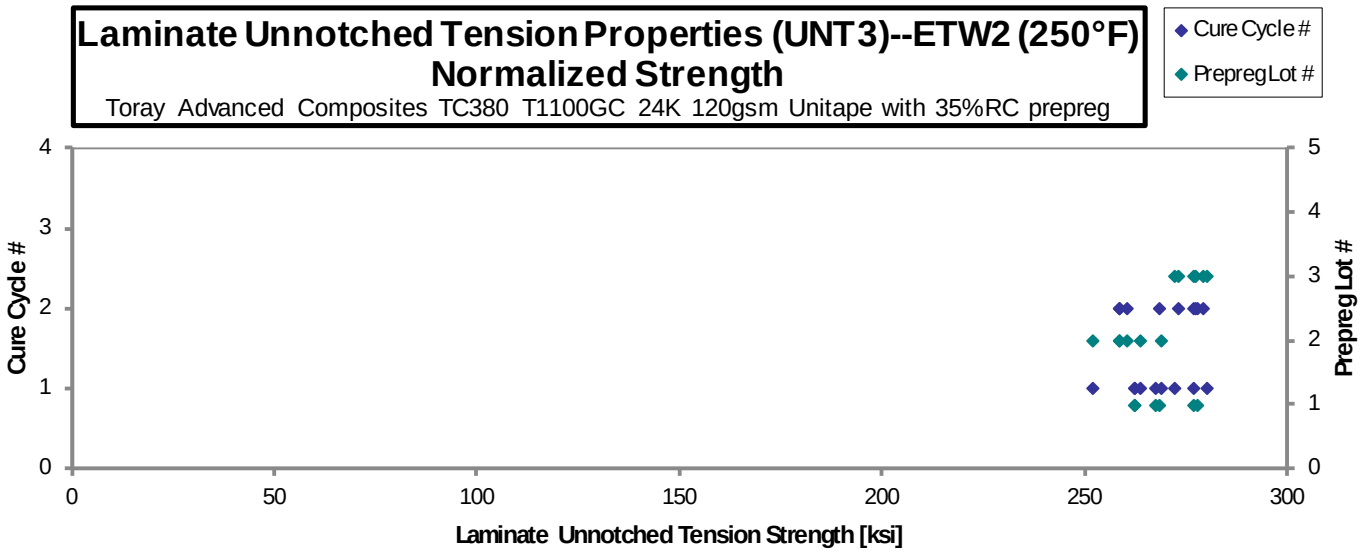
Laminate Unnotched Tension Properties (UNT3)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

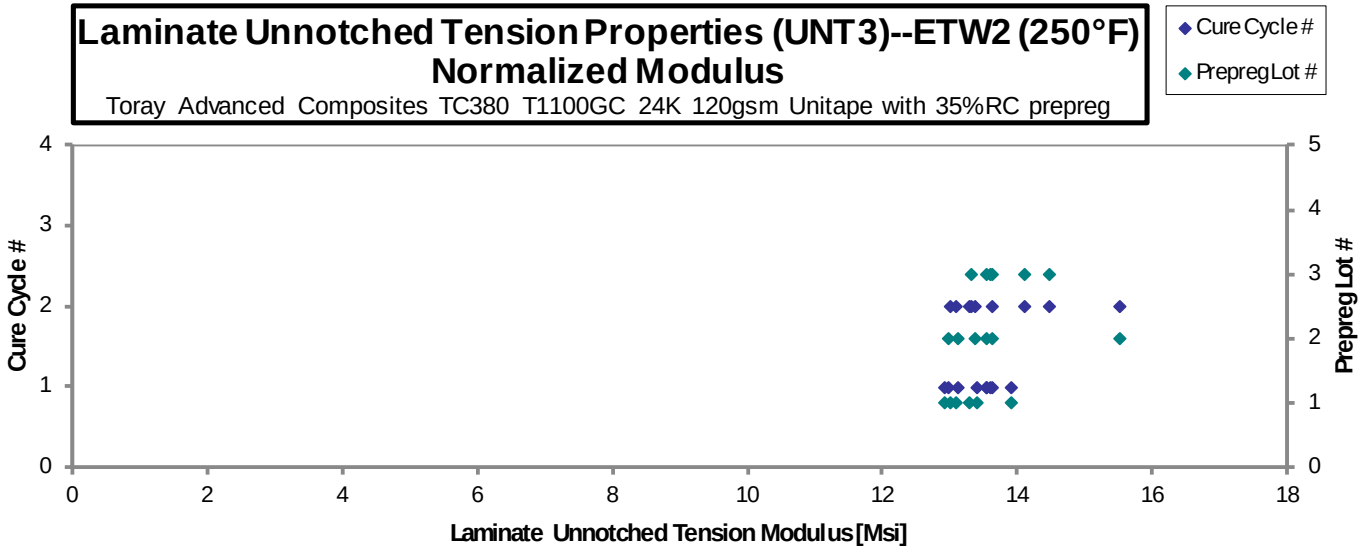
normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Unnotched Tension Properties (UNT3)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Strength [ksi]
0
50
100
150
200
250
300
0
1
2
3
4
5


Laminate Unnotched Tension Properties (UNT3)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Tension Modulus [Msi]
0
2
4
6
8
10
12
14
16
18
0
1
2
3
4
5

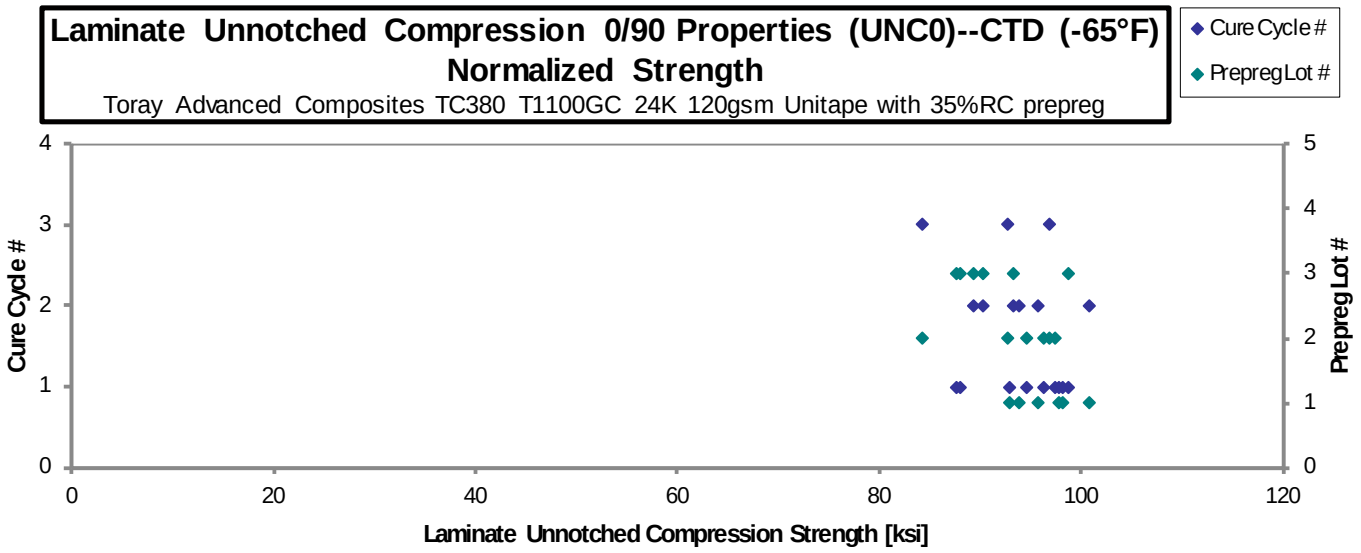
4.11 "33/0/67" Unnotched Compression 0/90 Properties (UNC0)

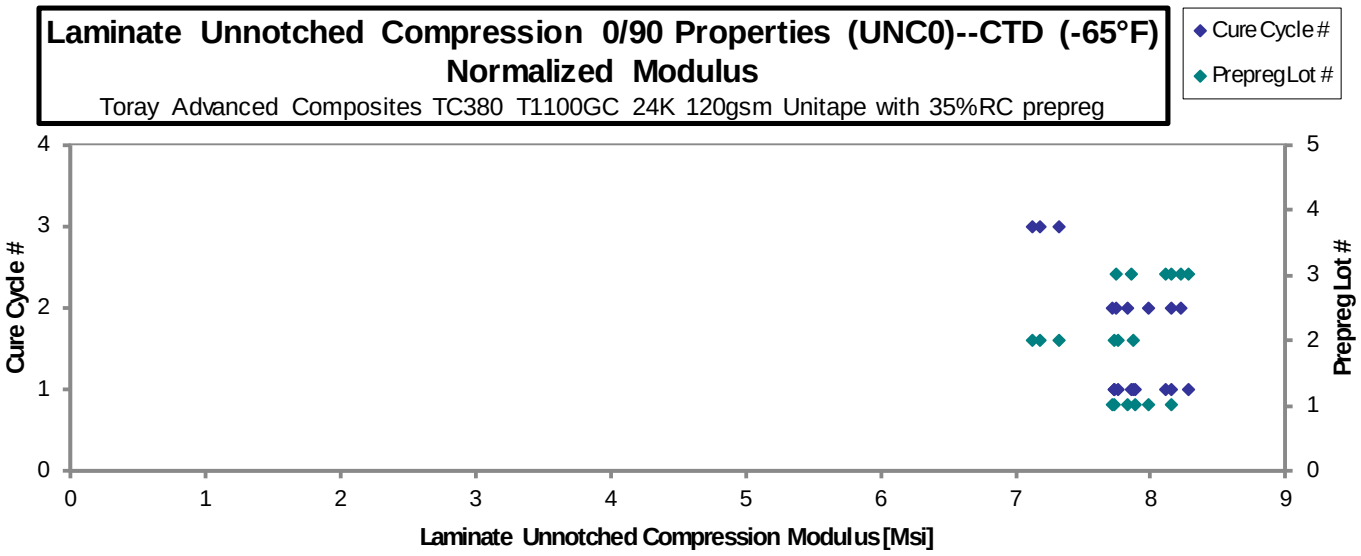
Laminate Unnotched Compression 0/90 Properties (UNC0)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDRA111B	A	C1	1	1	93.45	7.777	0.1003	21	BAT	0.004776	92.99	7.738
TCDRA112B	A	C1	1	1	98.08	7.887	0.1008	21	BGM	0.004802	98.11	7.889
TCDRA113B	A	C1	1	1	96.97	8.085	0.1017	21	BGM	0.004841	97.80	8.155
TCDRA211B	A	C2	1	2	94.87	7.809	0.09968	21	BAB	0.004747	93.81	7.722
TCDRA212B	A	C2	1	2	101.1	8.014	0.1005	21	HAB, BAT	0.004783	100.7	7.986
TCDRA213B	A	C2	1	2	95.59	7.820	0.1010	21	BGM, HAB	0.004810	95.78	7.835
TCDRB111B	B	C1	2	1	95.15	7.778	0.1021	21	BAT	0.004861	96.36	7.878
TCDRB112B	B	C1	2	1	96.19	7.635	0.1022	21	BAT	0.004866	97.51	7.739
TCDRB113B	B	C1	2	1	91.51	7.503	0.1042	21	BAT	0.004963	94.63	7.759
TCDRB311B	B	C3	2	3	92.27	7.286	0.1014	21	BAT	0.004828	92.80	7.328
TCDRB312B	B	C3	2	3	82.83	7.010	0.1025	21	BGM	0.004883	84.26	7.131
TCDRB313B	B	C3	2	3	94.16	6.981	0.1038	21	BGM	0.004940	96.92	7.186
TCDRC111B	C	C1	3	1	84.69	7.599	0.1043	21	BGM	0.004967	87.64	7.864
TCDRC112B	C	C1	3	1	84.37	7.770	0.1053	21	BAT	0.005012	88.10	8.113
TCDRC113B	C	C1	3	1	93.84	7.871	0.1061	21	BAT	0.005052	98.76	8.283
TCDRC211B	C	C2	3	2	88.39	7.593	0.1029	21	BGM	0.004899	90.22	7.750
TCDRC212B	C	C2	3	2	85.79	7.896	0.1049	21	BGM	0.004997	89.30	8.220
TCDRC213B	C	C2	3	2	88.89	7.768	0.1058	21	BAB	0.005038	93.30	8.154

Average	**92.12**	**7.671**		**$Average_{norm}$**	**0.004893**	**93.84**	**7.818**
Standard Dev.	**5.203**	**0.3078**		**$Standard\ Dev._{norm}$**		**4.462**	**0.3319**
Coeff. of Var. [%]	**5.648**	**4.013**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.756**	**4.245**
Min.	**82.83**	**6.981**		**Min.**	**0.004747**	**84.26**	**7.131**
Max.	**101.1**	**8.085**		**Max.**	**0.005052**	**100.7**	**8.283**
Number of Spec.	**18**	**18**		**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Compression 0/90 Properties (UNC0)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
5


Laminate Unnotched Compression 0/90 Properties (UNC0)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5

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

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

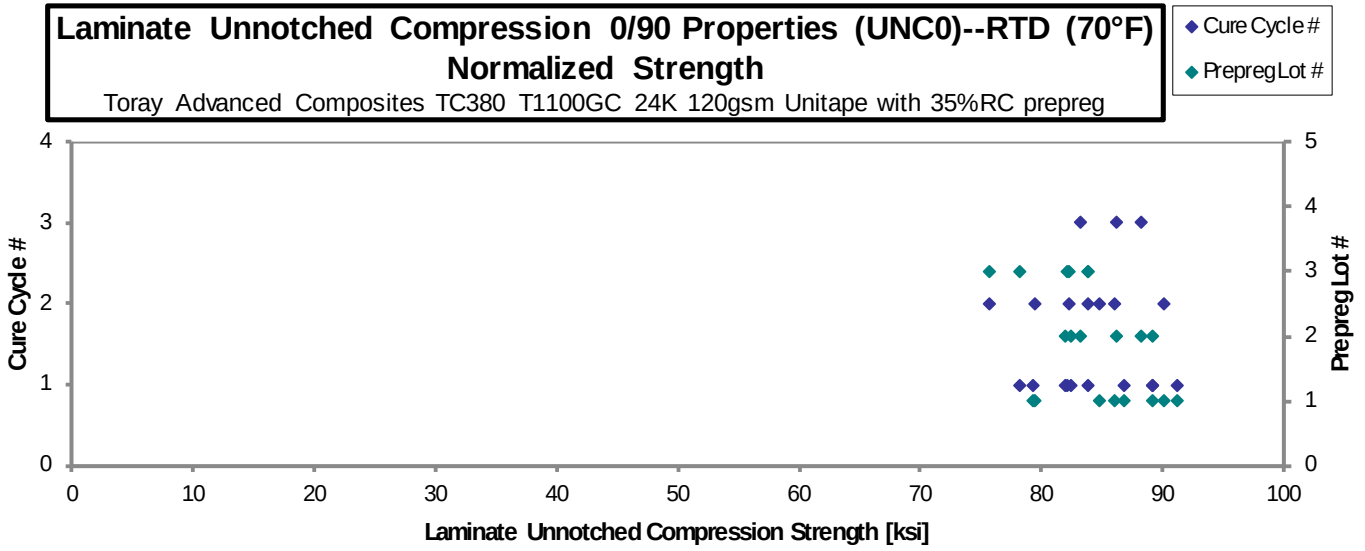
normalizing t_{ply} [in]: 0.004800

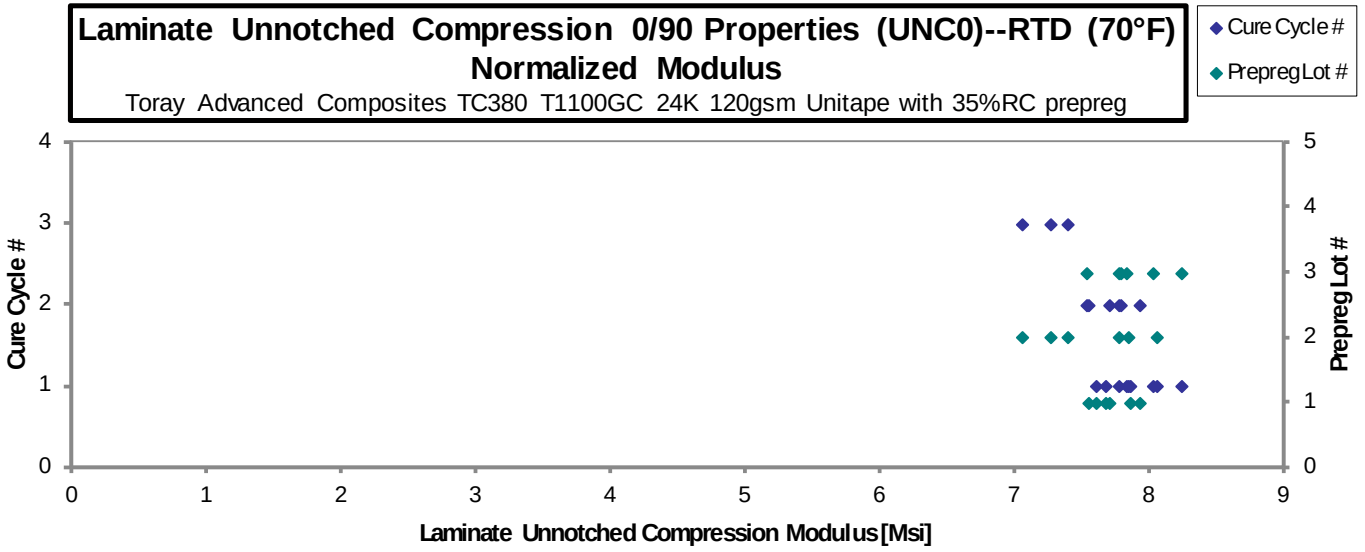
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDRA111A*	A	C1	1	1	83.88	8.069	0.09520	21	BAB, HIB	0.004533	79.22	7.621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

* Modulus are averaged values of 2 strain gages.

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

Average	**87.69**	**8.079**		**$Average_{norm}$**	**0.004608**	**84.16**	**7.729**
Standard Dev.	**4.448**	**0.2939**		**$Standard\ Dev._{norm}$**		**4.208**	**0.2871**
Coeff. of Var. [%]	**5.073**	**3.638**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.000**	**3.715**
Min.	**78.37**	**7.293**		**Min.**	**0.004387**	**75.57**	**7.069**
Max.	**94.76**	**8.595**		**Max.**	**0.004813**	**91.16**	**8.249**
Number of Spec.	**20**	**18**		**Number of Spec.**	**20**	**20**	**18**


Laminate Unnotched Compression 0/90 Properties (UNC0)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
80
90
100
0
1
2
3
4
5


Laminate Unnotched Compression 0/90 Properties (UNC0)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5

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

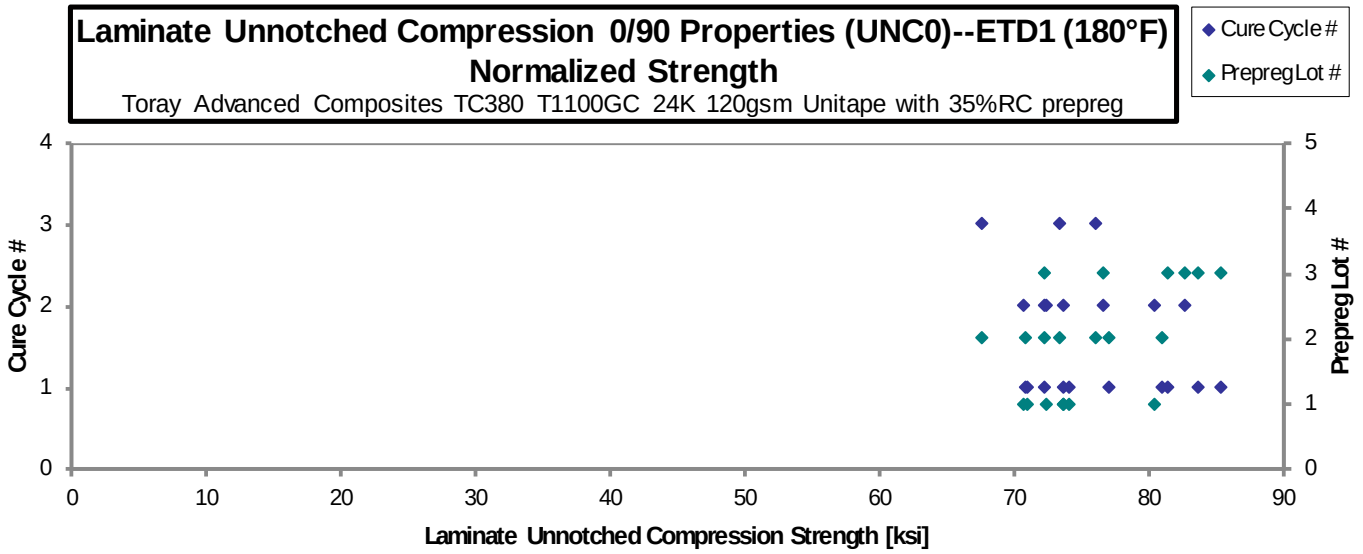
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

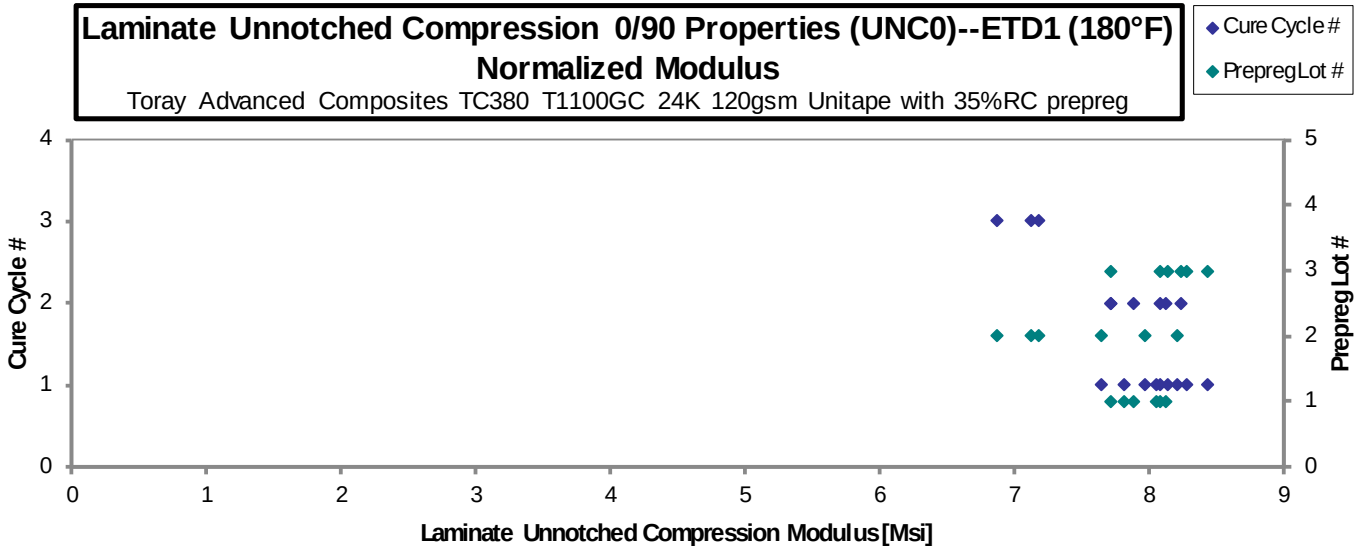
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDRA111C	A	C1	1	1	72.96	7.975	0.1017	21	BAB	0.004841	73.58	8.043
TCDRA112C	A	C1	1	1	73.41	7.748	0.1016	21	BAB	0.004840	74.02	7.812
TCDRA113C	A	C1	1	1	70.72	8.045	0.1011	21	BGM	0.004816	70.96	8.071
TCDRA211C	A	C2	1	2	80.08	7.858	0.1011	21	HAT/HIT	0.004814	80.32	7.881
TCDRA212C	A	C2	1	2	73.25	7.683	0.1012	21	BAB	0.004817	73.52	7.711
TCDRA213C	A	C2	1	2	70.63	8.129	0.1007	21	BGM	0.004797	70.58	8.124
TCDRA214C*	A	C2	1	2	72.72		0.1003	21	BGM	0.004775	72.35	
TCDRB111C	B	C1	2	1	69.56	7.361	0.1046	21	BAT	0.004979	72.14	7.635
TCDRB112C	B	C1	2	1	78.06	7.908	0.1046	21	HAT/HIT	0.004979	80.96	8.202
TCDRB113C	B	C1	2	1	68.84	7.738	0.1037	21	HAT	0.004937	70.81	7.960
TCDRB114C*	B	C1	2	1	85.58		0.09062	21	HAT/HIT	0.004315	76.93	
TCDRB311C	B	C3	2	3	65.02	6.612	0.1047	21	BAT	0.004985	67.52	6.867
TCDRB312C	B	C3	2	3	70.61	6.920	0.1045	21	BAT	0.004978	73.23	7.176
TCDRB313C	B	C3	2	3	73.32	6.873	0.1045	21	BAB	0.004974	75.98	7.122
TCDRC111C	C	C1	3	1	76.75	7.672	0.1068	21	BGM	0.005084	81.29	8.126
TCDRC112C	C	C1	3	1	81.10	7.865	0.1060	21	BGM, HIT	0.005046	85.26	8.268
TCDRC113C	C	C1	3	1	79.97	8.066	0.1054	21	BAT	0.005018	83.60	8.433
TCDRC211C	C	C2	3	2	68.46	7.314	0.1063	21	BGM	0.005062	72.19	7.713
TCDRC212C	C	C2	3	2	78.67	7.694	0.1058	21	BGM, HAT/HIT	0.005038	82.57	8.076
TCDRC213C	C	C2	3	2	72.79	7.820	0.1061	21	M(B,H)AT	0.005051	76.59	8.228

* Specimen was not gaged, only strength is tested.

Average	**74.12**	**7.627**	**$Average_{norm}$**	**0.004907**	**75.72**	**7.858**
Standard Dev.	**5.128**	**0.4386**	**$Standard\ Dev._{norm}$**		**5.014**	**0.4283**
Coeff. of Var. [%]	**6.918**	**5.751**	**Coeff. of Var. [%]$_{norm}$**		**6.622**	**5.450**
Min.	**65.02**	**6.612**	**Min.**	**0.004315**	**67.52**	**6.867**
Max.	**85.58**	**8.129**	**Max.**	**0.005084**	**85.26**	**8.433**
Number of Spec.	**20**	**18**	**Number of Spec.**	**20**	**20**	**18**


Laminate Unnotched Compression 0/90 Properties (UNC0)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4
5


Laminate Unnotched Compression 0/90 Properties (UNC0)--ETD1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5

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

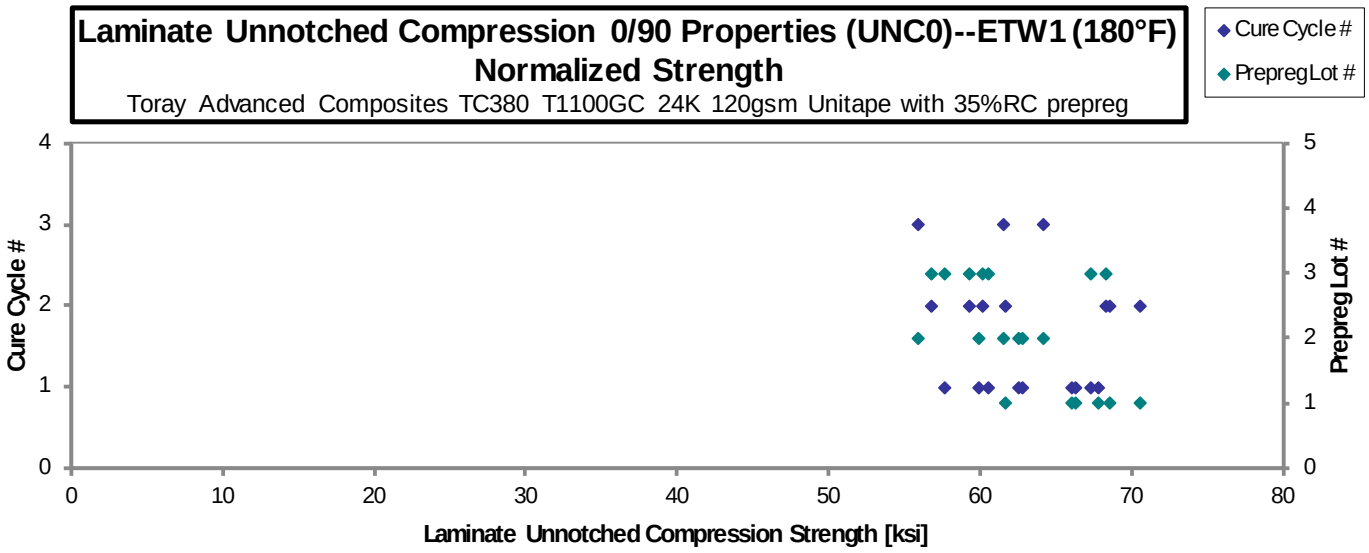
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

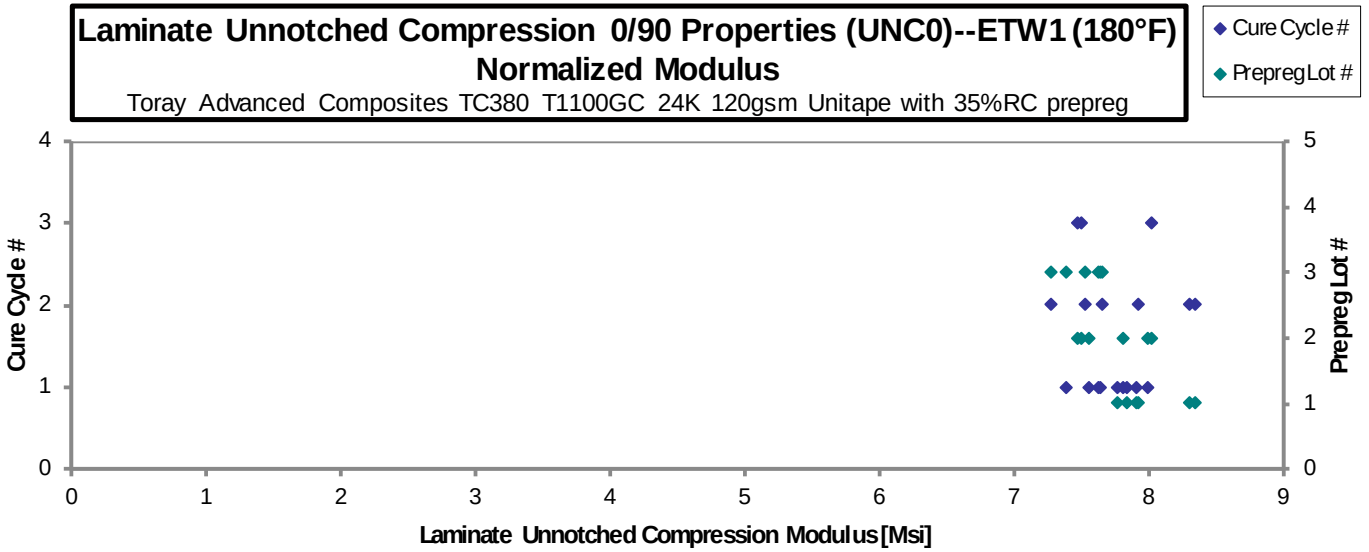
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDRA111D	A	C1	1	1	68.75	8.051	0.09733	21	M(B,H)GM	0.004635	66.39	7.774
TCDRA112D	A	C1	1	1	67.57	8.016	0.09863	21	BAT	0.004697	66.11	7.844
TCDRA113D	A	C1	1	1	68.38	7.973	0.1000	21	BAB	0.004763	67.86	7.912
TCDRA211D	A	C2	1	2	69.15	7.986	0.1001	21	BGM	0.004764	68.64	7.926
TCDRA212D	A	C2	1	2	62.41	8.408	0.09967	21	BAB, BAT	0.004746	61.71	8.314
TCDRA213D	A	C2	1	2	71.68	8.473	0.09935	21	BAB, HIT	0.004731	70.65	8.351
TCDRB111D	B	C1	2	1	67.23	8.087	0.09418	21	BAB, BAT	0.004485	62.81	7.557
TCDRB112D	B	C1	2	1	61.82	8.061	0.09770	21	BAB, HIT	0.004652	59.92	7.813
TCDRB113D	B	C1	2	1	63.07	8.059	0.1001	21	BGM	0.004767	62.64	8.004
TCDRB311D	B	C3	2	3	55.44	7.430	0.1018	21	BAB	0.004846	55.98	7.501
TCDRB312D	B	C3	2	3	64.11	7.466	0.1010	21	BAB	0.004810	64.25	7.482
TCDRB313D	B	C3	2	3	62.30	8.128	0.09963	21	BAB	0.004744	61.57	8.034
TCDRC111D	C	C1	3	1	59.00	7.208	0.1035	21	BAT	0.004927	60.56	7.398
TCDRC112D	C	C1	3	1	57.59	7.631	0.1009	21	BGM	0.004806	57.66	7.640
TCDRC113D	C	C1	3	1	68.54	7.782	0.09905	21	BAB, HIB	0.004717	67.35	7.647
TCDRC211D	C	C2	3	2	66.25	7.304	0.1040	21	BAB	0.004953	68.37	7.537
TCDRC212D	C	C2	3	2	58.70	7.571	0.1019	21	BAT	0.004853	59.35	7.655
TCDRC213D	C	C2	3	2	56.80	7.283	0.1008	21	BAT	0.004802	56.82	7.286
TCDRC214D*	C	C2	3	2	61.57		0.09857	21	M(B,H)AB, HIT	0.004694	60.21	

* Specimen was not gaged, only strength is tested.

Average	**63.70**	**7.829**		**$Average_{norm}$**	**0.004758**	**63.10**	**7.760**
Standard Dev.	**4.775**	**0.3836**		**$Standard\ Dev._{norm}$**		**4.350**	**0.2951**
Coeff. of Var. [%]	**7.496**	**4.900**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**6.894**	**3.803**
Min.	**55.44**	**7.208**		**Min.**	**0.004485**	**55.98**	**7.286**
Max.	**71.68**	**8.473**		**Max.**	**0.004953**	**70.65**	**8.351**
Number of Spec.	**19**	**18**		**Number of Spec.**	**19**	**19**	**18**


Laminate Unnotched Compression 0/90 Properties (UNC0)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression 0/90 Properties (UNC0)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
1
2
3
4
5
6
7
8
9
Laminate Unnotched Compression Modulus [Msi]

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

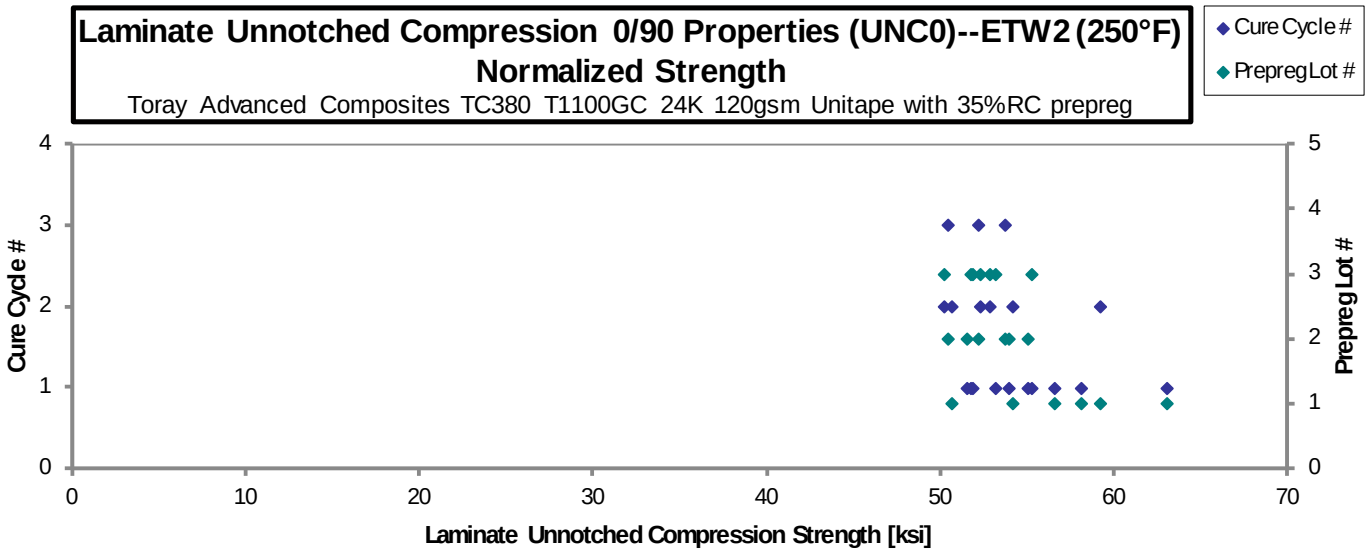
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

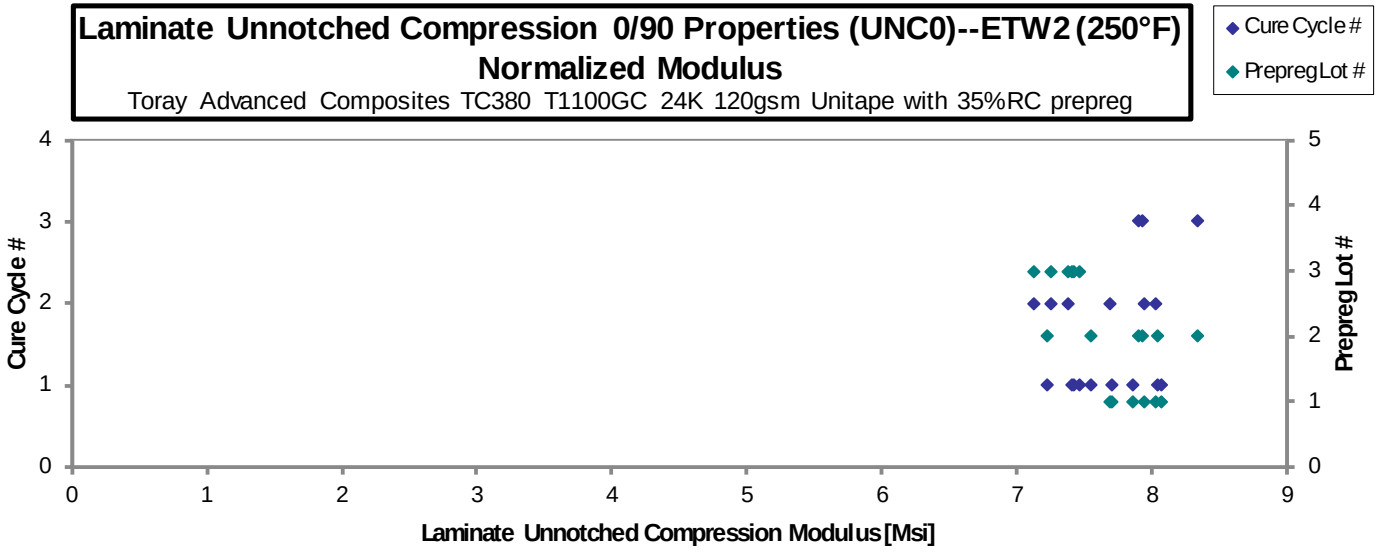
normalizing t_{ply} [in]
0.004800

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

* Specimen was not gaged, only strength is tested.

Average	**54.68**	**7.762**		**$Average_{norm}$**	**0.004752**	**54.09**	**7.688**
Standard Dev.	**3.209**	**0.5192**		**$Standard\ Dev._{norm}$**		**3.312**	**0.3465**
Coeff. of Var. [%]	**5.869**	**6.689**		**Coeff. of Var. $[\%]_{norm}$**		**6.123**	**4.507**
Min.	**48.43**	**6.777**		**Min.**	**0.004460**	**50.34**	**7.125**
Max.	**62.16**	**8.964**		**Max.**	**0.005125**	**63.13**	**8.348**
Number of Spec.	**19**	**18**		**Number of Spec.**	**19**	**19**	**18**


Laminate Unnotched Compression 0/90 Properties (UNC0)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4
5


Laminate Unnotched Compression 0/90 Properties (UNC0)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5

4.12 "25/50/25" Unnotched Compression 1 Properties (UNC1)

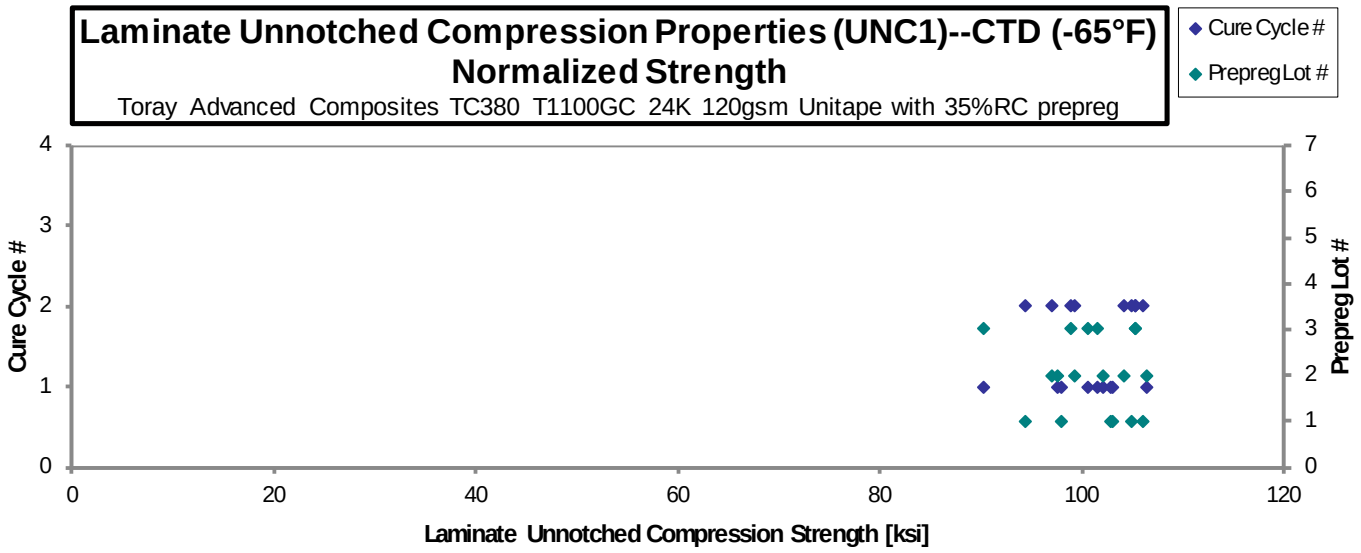
Laminate Unnotched Compression Properties (UNC1)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

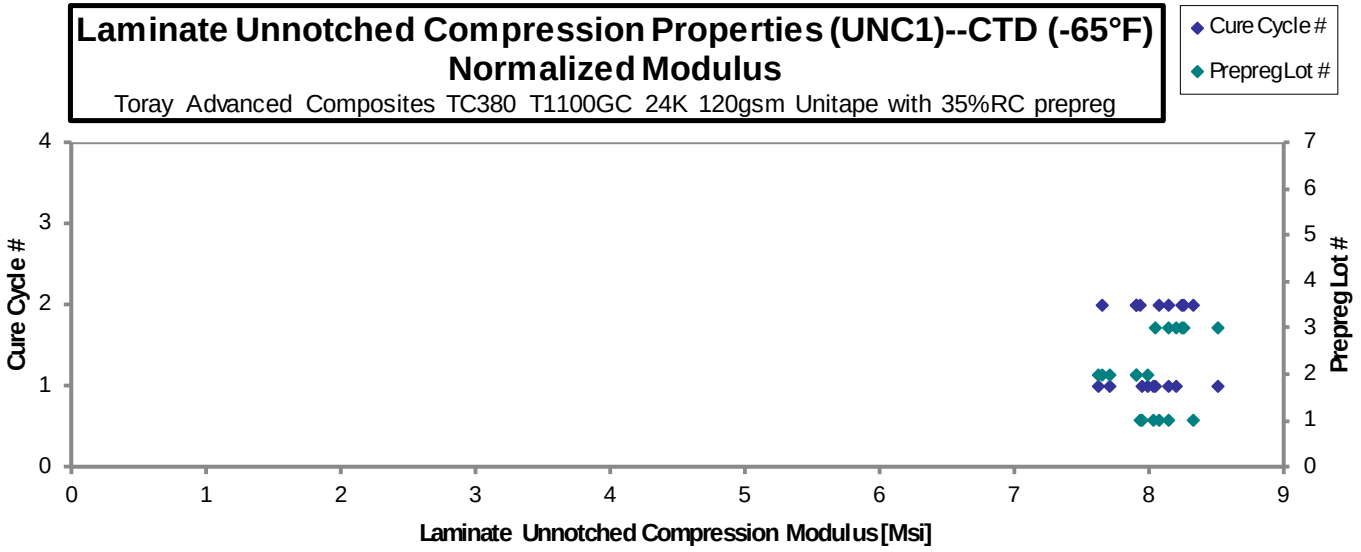
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDWA111B	A	C1	1	1	103.6	8.092	0.1146	24	M(B,H)AT	0.004774	103.1	8.047
TCDWA112B	A	C1	1	1	98.20	7.983	0.1148	24	BGM	0.004782	97.83	7.953
TCDWA113B	A	C1	1	1	102.9	8.165	0.1151	24	BGM	0.004796	102.8	8.158
TCDWA211B	A	C2	1	2	106.5	8.474	0.1134	24	BGM	0.004726	104.9	8.344
TCDWA212B	A	C2	1	2	95.60	8.046	0.1138	24	M(B,H)GM	0.004742	94.44	7.948
TCDWA213B	A	C2	1	2	107.2	8.176	0.1139	24	BGM	0.004744	105.9	8.081
TCDWB111B	B	C1	2	1	105.7	7.947	0.1161	24	BGM	0.004835	106.5	8.006
TCDWB112B	B	C1	2	1	95.23	7.461	0.1179	24	BGM	0.004913	97.46	7.635
TCDWB113B	B	C1	2	1	98.25	7.440	0.1196	24	BGM	0.004983	102.0	7.724
TCDWB211B	B	C2	2	2	100.1	7.993	0.1141	24	BGM	0.004756	99.17	7.919
TCDWB212B	B	C2	2	2	96.12	7.833	0.1163	24	BGM	0.004847	97.05	7.909
TCDWB213B	B	C2	2	2	102.6	7.549	0.1170	24	BGM	0.004873	104.2	7.664
TCDWC111B	C	C1	3	1	100.5	8.124	0.1163	24	BGM	0.004847	101.5	8.204
TCDWC112B	C	C1	3	1	101.1	8.568	0.1145	24	BGM	0.004771	100.5	8.516
TCDWC113B	C	C1	3	1	92.45	8.265	0.1124	24	BAT, BAB	0.004682	90.18	8.062
TCDWC211B	C	C2	3	2	104.5	8.218	0.1159	24	BGM	0.004829	105.2	8.268
TCDWC212B	C	C2	3	2	97.04	8.105	0.1173	24	BGM	0.004888	98.81	8.253
TCDWC213B	C	C2	3	2	102.5	7.942	0.1183	24	BGM	0.004928	105.3	8.154

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

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


Laminate Unnotched Compression Properties (UNC1)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
0
1
2
3
4
5
6
7


Laminate Unnotched Compression Properties (UNC1)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
0
1
2
3
4
5
6
7

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

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

normalizing t_{ply} [in]
0.004800

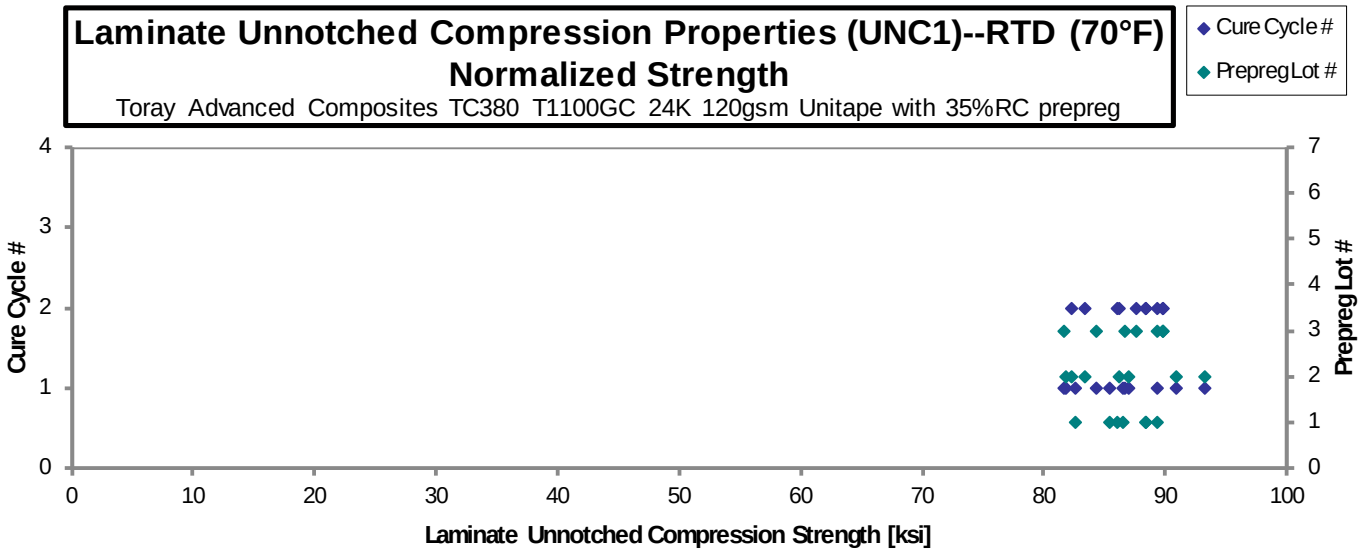
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDWA111A*	A	C1	1	1	90.46	8.334	0.1088	24	M(B,H)GM	0.004533	85.43	7.871
TCDWA112A*	A	C1	1	1	85.74	8.408	0.1110	24	BGM	0.004624	82.58	8.099
TCDWA113A	A	C1	1	1	88.52	8.194	0.1126	24	HAT, HIT	0.004693	86.55	8.012
TCDWA114A**	A	C1	1	1	90.56		0.1138	24	HAT, HIT	0.004742	89.46	
TCDWA211A	A	C2	1	2	94.19	8.369	0.1081	24	HAB	0.004504	88.39	7.853
TCDWA212A	A	C2	1	2	92.91	8.370	0.1097	24	BGM	0.004571	88.47	7.971
TCDWA213A	A	C2	1	2	88.06	8.272	0.1127	24	BGM	0.004694	86.13	8.090
TCDWB111A	B	C1	2	1	89.21	8.429	0.1057	24	BAB, HIB	0.004405	81.87	7.735
TCDWB112A	B	C1	2	1	98.90	8.547	0.1087	24	BAB	0.004528	93.29	8.062
TCDWB113A	B	C1	2	1	89.51	8.038	0.1121	24	BAT, HIT	0.004669	87.06	7.819
TCDWB114A**	B	C1	2	1	91.87		0.1140	24	BGM	0.004749	90.90	
TCDWB211A	B	C2	2	2	91.70	8.472	0.1034	24	BGM	0.004308	82.29	7.603
TCDWB212A	B	C2	2	2	91.96	8.426	0.1080	24	BAB	0.004499	86.19	7.897
TCDWB213A***	B	C2	2	2		8.207	0.1104	24	HIT	0.004599		7.863
TCDWB214A**	B	C2	2	2	85.28		0.1127	24	BGM	0.004694	83.40	
TCDWC111A	C	C1	3	1	78.67	7.724	0.1197	24	BGM	0.004989	81.77	8.028
TCDWC112A	C	C1	3	1	84.46	7.715	0.1184	24	BGM	0.004932	86.78	7.927
TCDWC113A	C	C1	3	1	82.85	7.776	0.1173	24	BGM	0.004885	84.32	7.915
TCDWC211A	C	C2	3	2	93.46	8.196	0.1081	24	HAB, HIB	0.004503	87.68	7.690
TCDWC212A	C	C2	3	2	93.27	8.121	0.1103	24	BAT	0.004597	89.33	7.778
TCDWC213A	C	C2	3	2	91.87	7.832	0.1128	24	BAT	0.004699	89.94	7.668
TCDWC214A**	C	C2	3	2	90.17		0.1148	24	BAT	0.004783	89.85	

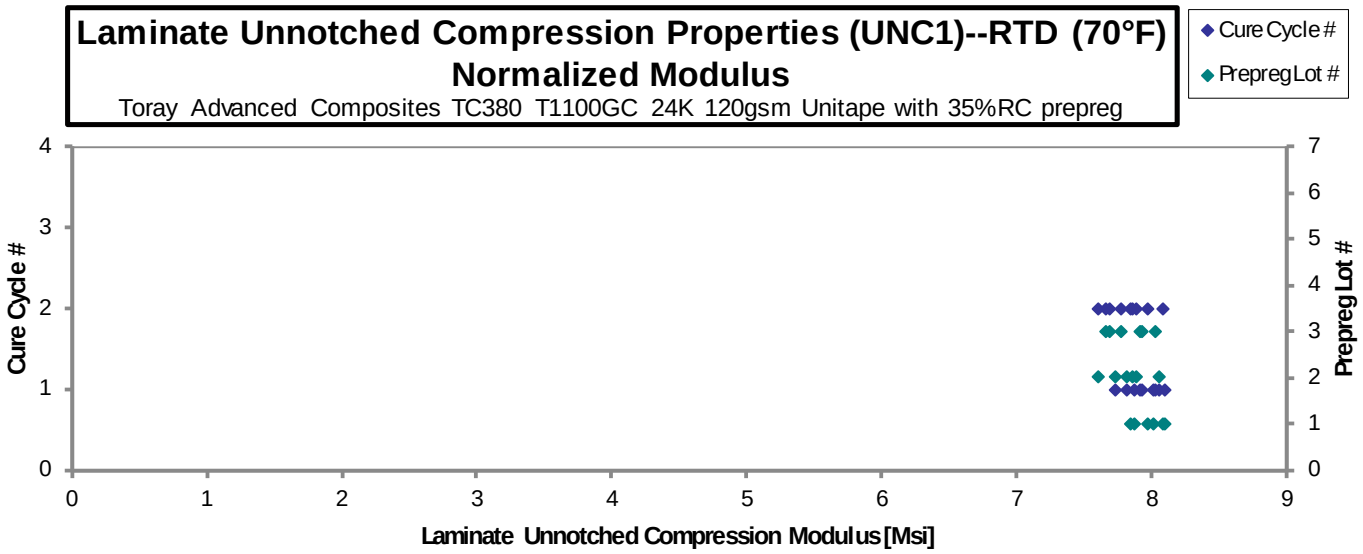
* Modulus are averaged values of 2 strain gages.

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

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

Average	**89.70**	**8.191**		**$Average_{norm}$**	**0.004645**	**86.75**	**7.882**
Standard Dev.	**4.458**	**0.2689**		**$Standard\ Dev._{norm}$**		**3.208**	**0.1476**
Coeff. of Var. [%]	**4.970**	**3.283**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.698**	**1.873**
Min.	**78.67**	**7.715**		**Min.**	**0.004308**	**81.77**	**7.603**
Max.	**98.90**	**8.547**		**Max.**	**0.004989**	**93.29**	**8.099**
Number of Spec.	**21**	**18**		**Number of Spec.**	**22**	**21**	**18**


Laminate Unnotched Compression Properties (UNC1)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
80
90
100
0
1
2
3
4
5
6
7


Laminate Unnotched Compression Properties (UNC1)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
5
6
7

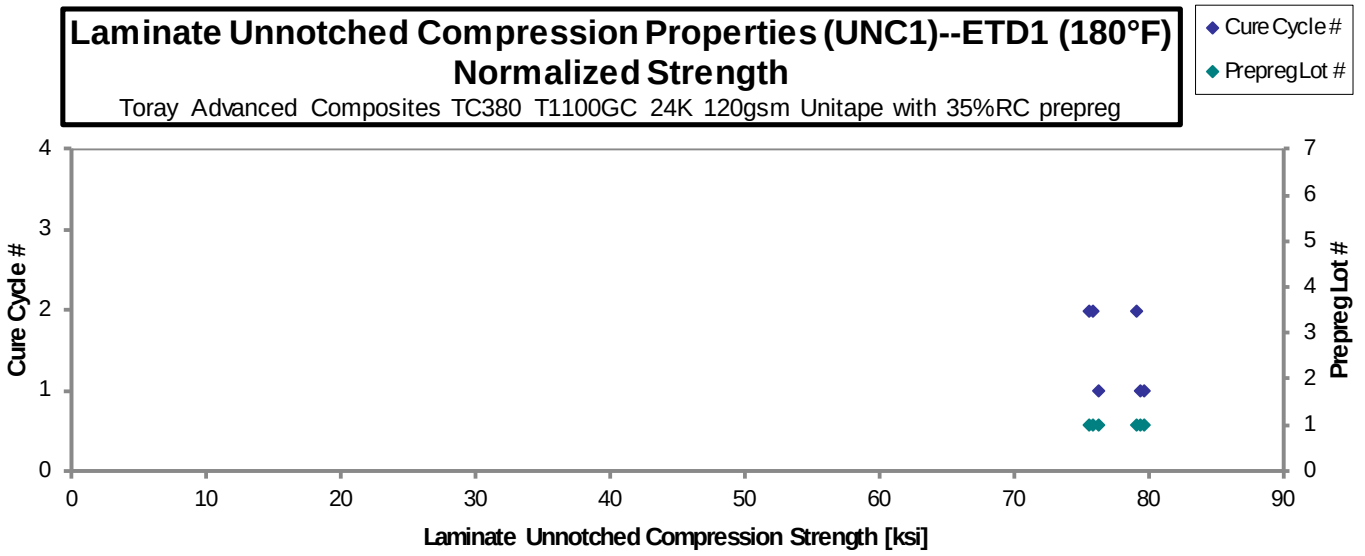
Laminate Unnotched Compression Properties (UNC1)--ETD1 (180°F)
Strength & Modulus

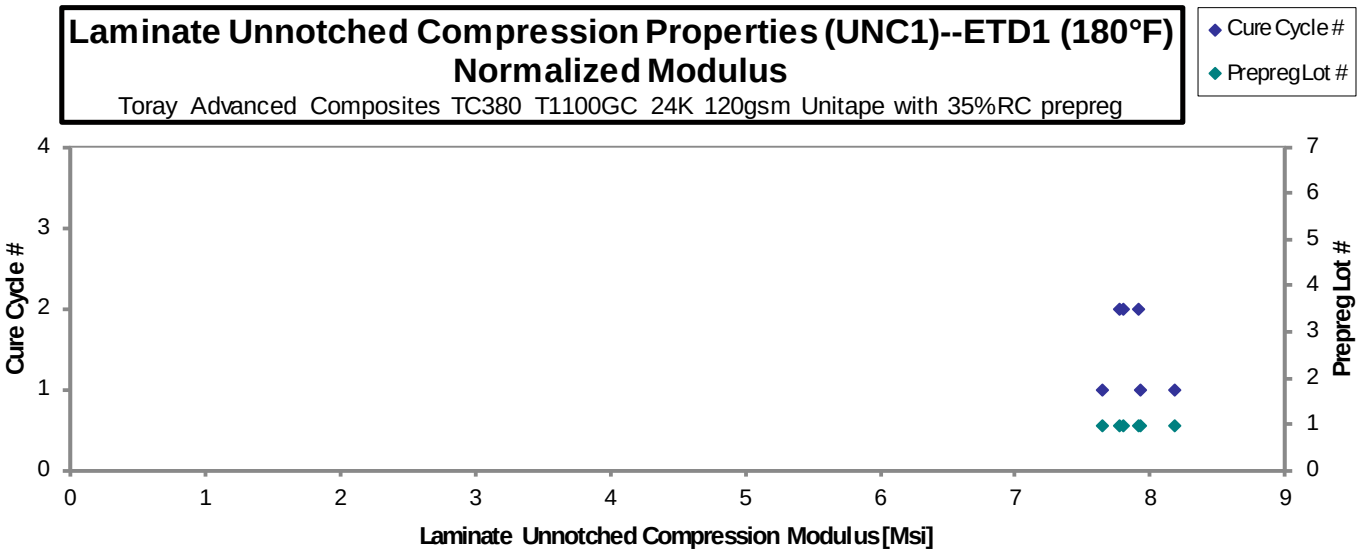
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDWA111C	A	C1	1	1	76.78	7.688	0.1146	24	BGM	0.004774	76.36	7.645
TCDWA112C	A	C1	1	1	80.12	7.992	0.1142	24	BGM	0.004760	79.45	7.925
TCDWA113C	A	C1	1	1	80.40	8.252	0.1143	24	BAT	0.004761	79.75	8.185
TCDWA211C	A	C2	1	2	76.75	8.014	0.1139	24	BGM	0.004746	75.88	7.923
TCDWA212C	A	C2	1	2	76.61	7.880	0.1138	24	BGM	0.004740	75.66	7.782
TCDWA213C	A	C2	1	2	79.86	7.887	0.1141	24	BGM	0.004753	79.08	7.809

Average	**78.42**	**7.952**		**Average$_{norm}$**	**0.004756**	**77.70**	**7.878**
Standard Dev.	**1.878**	**0.1869**		**Standard Dev.$_{norm}$**		**1.919**	**0.1826**
Coeff. of Var. [%]	**2.395**	**2.351**		**Coeff. of Var. [%]$_{norm}$**		**2.470**	**2.318**
Min.	**76.61**	**7.688**		**Min.**	**0.004740**	**75.66**	**7.645**
Max.	**80.40**	**8.252**		**Max.**	**0.004774**	**79.75**	**8.185**
Number of Spec.	**6**	**6**		**Number of Spec.**	**6**	**6**	**6**


Laminate Unnotched Compression Properties (UNC1)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
80
90


Laminate Unnotched Compression Properties (UNC1)--ETD1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9

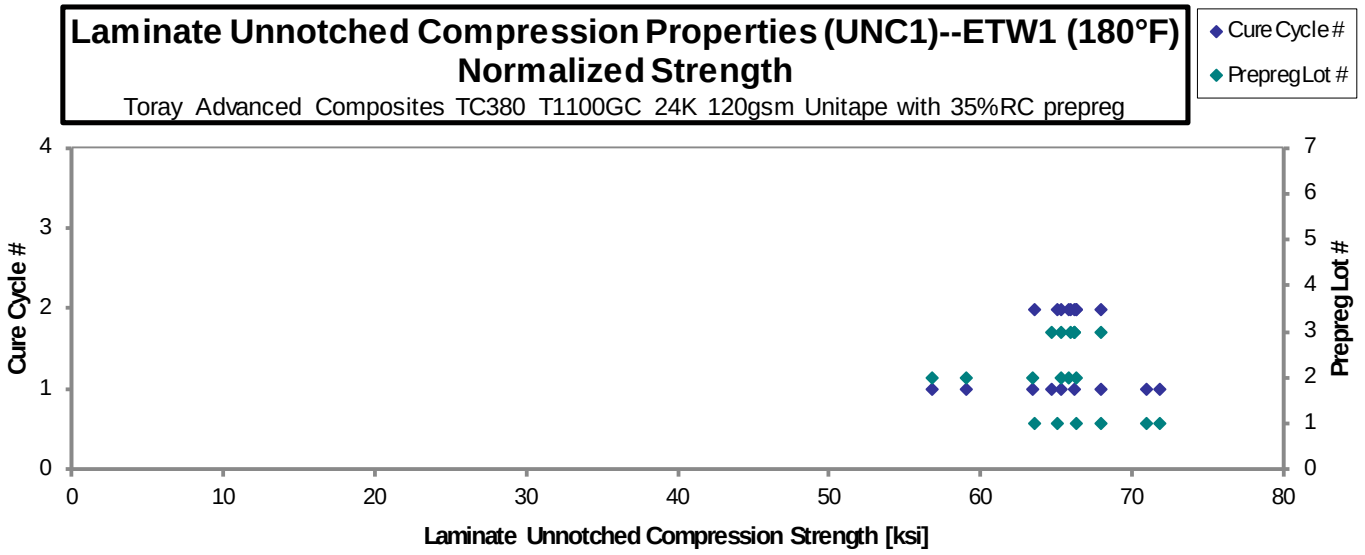
Laminate Unnotched Compression Properties (UNC1)--ETW1 (180°F)
Strength & Modulus

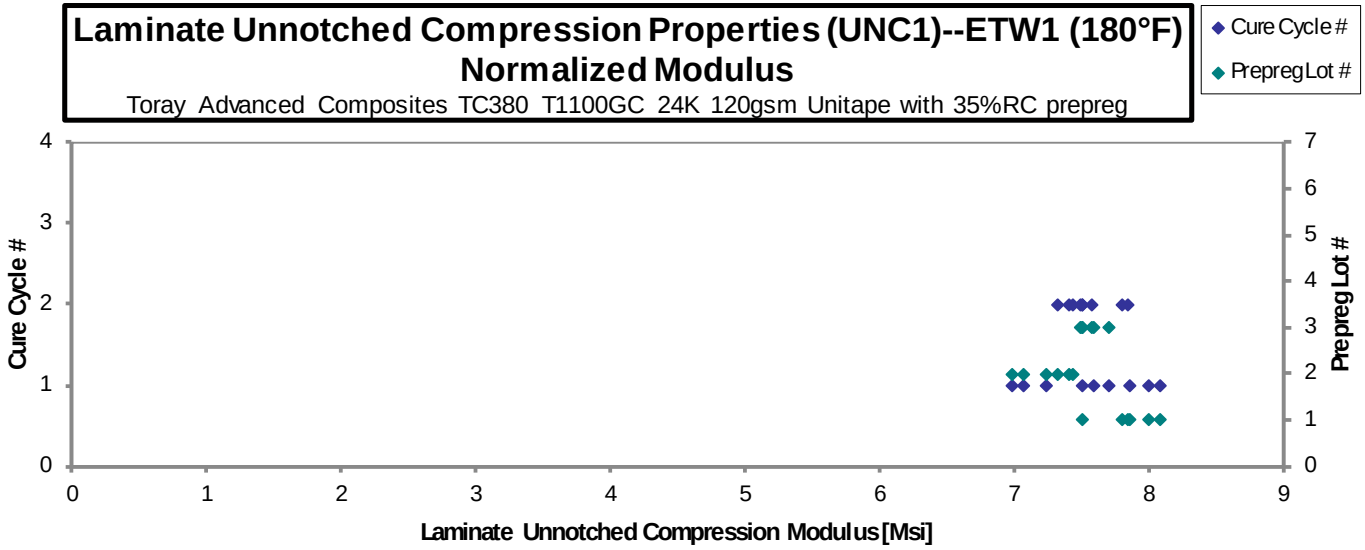
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDWA111D	A	C1	1	1	71.33	8.466	0.1098	24	BAT	0.004576	68.00	8.071
TCDWA112D	A	C1	1	1	74.08	8.238	0.1118	24	BAT, HIT	0.004657	71.87	7.992
TCDWA113D	A	C1	1	1	72.08	7.981	0.1134	24	BGM, BAT, HIT	0.004725	70.95	7.856
TCDWA211D	A	C2	1	2	64.55	7.610	0.1135	24	M(B,H)AT	0.004729	63.60	7.498
TCDWA212D	A	C2	1	2	66.24	7.948	0.1131	24	M(B,H)GM	0.004711	65.02	7.801
TCDWA213D	A	C2	1	2	68.23	8.058	0.1120	24	HAT, HIT	0.004668	66.35	7.837
TCDWB111D	B	C1	2	1	61.28	6.825	0.1192	24	BGM	0.004965	63.38	7.059
TCDWB112D	B	C1	2	1	54.40	6.687	0.1202	24	BGM	0.005006	56.74	6.974
TCDWB113D	B	C1	2	1	57.75	7.065	0.1179	24	BGM	0.004913	59.10	7.230
TCDWB211D	B	C2	2	2	64.04	7.178	0.1193	24	BAT	0.004972	66.33	7.435
TCDWB212D	B	C2	2	2	63.58	7.134	0.1183	24	BGM	0.004927	65.26	7.323
TCDWB213D	B	C2	2	2	64.06	7.205	0.1184	24	M(B,H)GM	0.004931	65.82	7.402
TCDWC111D	C	C1	3	1	70.26	8.282	0.1071	24	BAT	0.004463	65.32	7.700
TCDWC112D	C	C1	3	1	61.49	7.123	0.1213	24	BGM	0.005053	64.73	7.499
TCDWC113D	C	C1	3	1	62.90	7.202	0.1212	24	BAT	0.005051	66.19	7.578
TCDWC211D	C	C2	3	2	63.71	7.220	0.1198	24	BGM	0.004990	66.23	7.505
TCDWC212D	C	C2	3	2	63.67	7.306	0.1193	24	M(B,H)AT	0.004969	65.92	7.564
TCDWC213D	C	C2	3	2	65.74	7.253	0.1190	24	BAT	0.004958	67.90	7.491

Average	**64.97**	**7.488**		**Average$_{norm}$**	**0.004848**	**65.48**	**7.545**
Standard Dev.	**4.944**	**0.5359**		**Standard Dev.$_{norm}$**		**3.529**	**0.2973**
Coeff. of Var. [%]	**7.611**	**7.157**		**Coeff. of Var. [%]$_{norm}$**		**5.389**	**3.940**
Min.	**54.40**	**6.687**		**Min.**	**0.004463**	**56.74**	**6.974**
Max.	**74.08**	**8.466**		**Max.**	**0.005053**	**71.87**	**8.071**
Number of Spec.	**18**	**18**		**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Compression Properties (UNC1)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
10
20
30
40
50
60
70
80
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC1)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
1
2
3
4
5
6
7
8
9
Laminate Unnotched Compression Modulus [Msi]

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

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

normalizing t_{ply} [in]: 0.004800

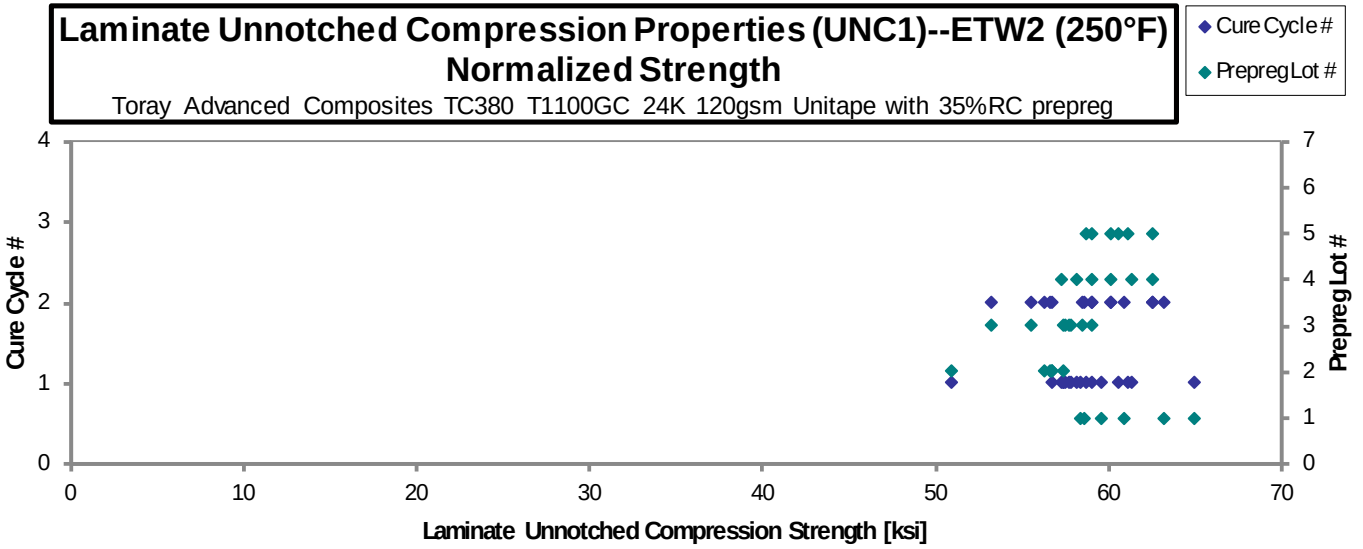
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDWA111E	A	C1	1	1	59.66	8.033	0.1150	24	BGM	0.004790	59.53	8.017
TCDWA112E	A	C1	1	1	65.20	7.793	0.1147	24	BGM	0.004778	64.90	7.757
TCDWA113E	A	C1	1	1	58.32	7.622	0.1153	24	BGM	0.004804	58.37	7.629
TCDWA211E	A	C2	1	2	62.53	7.959	0.1079	24	M(B,H)AT	0.004494	58.55	7.453
TCDWA212E	A	C2	1	2	65.94	8.124	0.1104	24	BGM	0.004599	63.17	7.784
TCDWA213E	A	C2	1	2	62.67	7.976	0.1119	24	BAT	0.004664	60.89	7.750
TCDWB111E	B	C1	2	1	57.46	7.427	0.1136	24	HAT, HIT	0.004731	56.64	7.321
TCDWB112E	B	C1	2	1	59.18	7.602	0.1116	24	BGM	0.004648	57.31	7.361
TCDWB113E	B	C1	2	1	53.58	7.311	0.1094	24	HAT	0.004558	50.88	6.942
TCDWB211E	B	C2	2	2	56.53	7.631	0.1154	24	BGM	0.004807	56.61	7.642
TCDWB212E	B	C2	2	2	58.01	7.480	0.1126	24	BAB	0.004693	56.72	7.313
TCDWB213E	B	C2	2	2	59.58	7.384	0.1088	24	BAB	0.004533	56.26	6.973
TCDWC111E	C	C1	3	1	55.72	7.094	0.1194	24	HAB, HIB	0.004974	57.74	7.350
TCDWC112E	C	C1	3	1	56.75	7.338	0.1171	24	BAT	0.004880	57.69	7.460
TCDWC113E	C	C1	3	1	57.64	7.374	0.1145	24	BAB, HIB	0.004770	57.28	7.328
TCDWC114E*	C	C1	3	1	60.67		0.1121	24	HAB, HIB	0.004670	59.03	
TCDWC115E*	C	C1	3	1	61.00		0.1085	24	HAB, HIB	0.004520	57.45	
TCDWC211E	C	C2	3	2	55.30	7.361	0.1155	24	HAT	0.004814	55.46	7.382
TCDWC212E	C	C2	3	2	59.20	7.638	0.1137	24	BGM	0.004736	58.41	7.536
TCDWC213E	C	C2	3	2	54.94	7.279	0.1114	24	BAT	0.004642	53.12	7.039
TCDWD111E	D	C1	4	1	58.27	7.226	0.1150	24	HAB, HIB	0.004790	58.15	7.211
TCDWD112E*,**	D	C1	4	1		7.479	0.1135	24	HIB	0.004728		7.367
TCDWD113E	D	C1	4	1	59.60	7.327	0.1105	24	HAB, HIB	0.004605	57.18	7.029
TCDWD114E*	D	C1	4	1	65.56		0.1077	24	HAB	0.004486	61.28	
TCDWD211E	D	C2	4	2	60.12	7.554	0.1151	24	BGM	0.004794	60.04	7.544
TCDWD212E*,**	D	C2	4	2		7.277	0.1136	24	HIB	0.004735		7.178
TCDWD213E	D	C2	4	2	60.64	7.520	0.1120	24	BGM	0.004665	58.93	7.308
TCDWD214E*	D	C2	4	2	66.28		0.1087	24	BGM	0.004528	62.52	
TCDWE111E	E	C1	5	1	59.68	7.401	0.1168	24	BGM	0.004865	60.49	7.501
TCDWE112E	E	C1	5	1	61.10	8.361	0.1152	24	BGM	0.004800	61.10	8.361
TCDWE113E	E	C1	5	1	59.60	7.553	0.1134	24	BGM	0.004724	58.66	7.434
TCDWD211E	E	C2	5	2	60.12	7.554	0.1151	24	BGM	0.004794	60.04	7.544
TCDWD212E*,**	E	C2	5	2		7.277	0.1136	24	HIB	0.004735		7.178
TCDWD213E	E	C2	5	2	60.64	7.520	0.1120	24	BGM	0.004665	58.93	7.308
TCDWD214E*	E	C2	5	2	66.28		0.1087	24	BGM	0.004528	62.52	

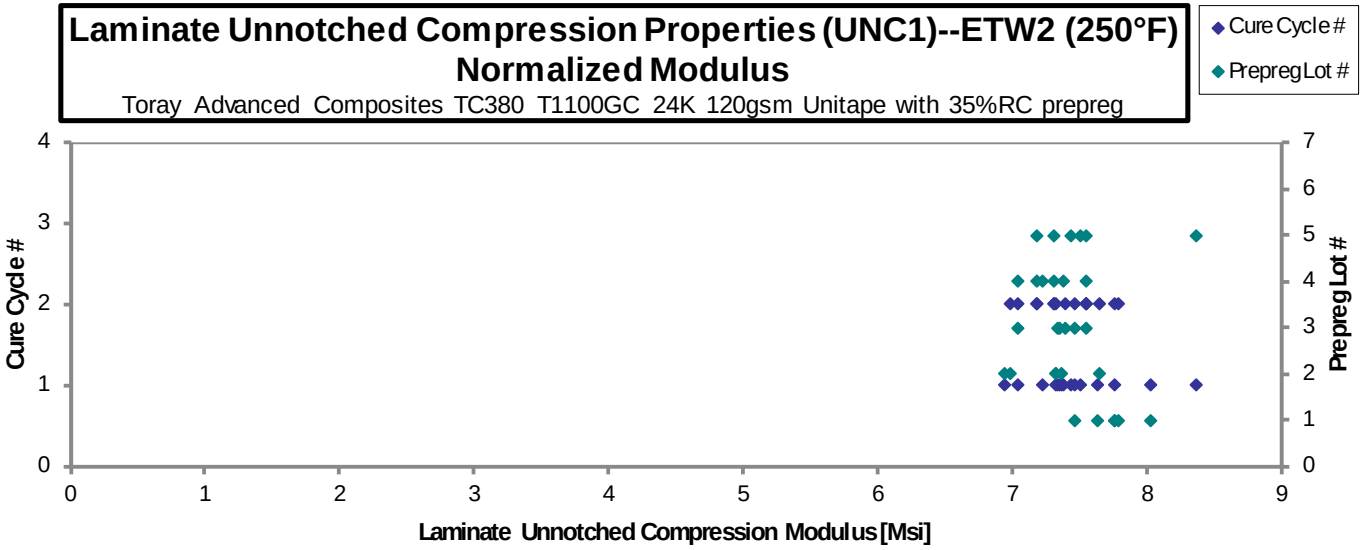
* Specimen was not gaged, only strength is tested.

** Strength not reported due to unacceptable failure mode.

	Strength	Modulus
Average	59.93	7.549
Standard Dev.	3.325	0.2925
Coeff. of Var. [%]	5.548	3.875
Min.	53.58	7.094
Max.	66.28	8.361
Number of Spec.	32	30

	t_{ply}	$Strength_{norm}$	$Modulus_{norm}$
$Average_{norm}$	0.004701	58.62	7.433
$Standard\ Dev._{norm}$		2.805	0.3046
$Coeff.\ of\ Var.\ [\%]_{norm}$		4.785	4.098
Min.	0.004486	50.88	6.942
Max.	0.004974	64.90	8.361
Number of Spec.	35	32	30


Laminate Unnotched Compression Properties (UNC1)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4
0
1
2
3
4
5
6
7


Laminate Unnotched Compression Properties (UNC1)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
7
8
9
0
1
2
3
4
0
1
2
3
4
5
6
7

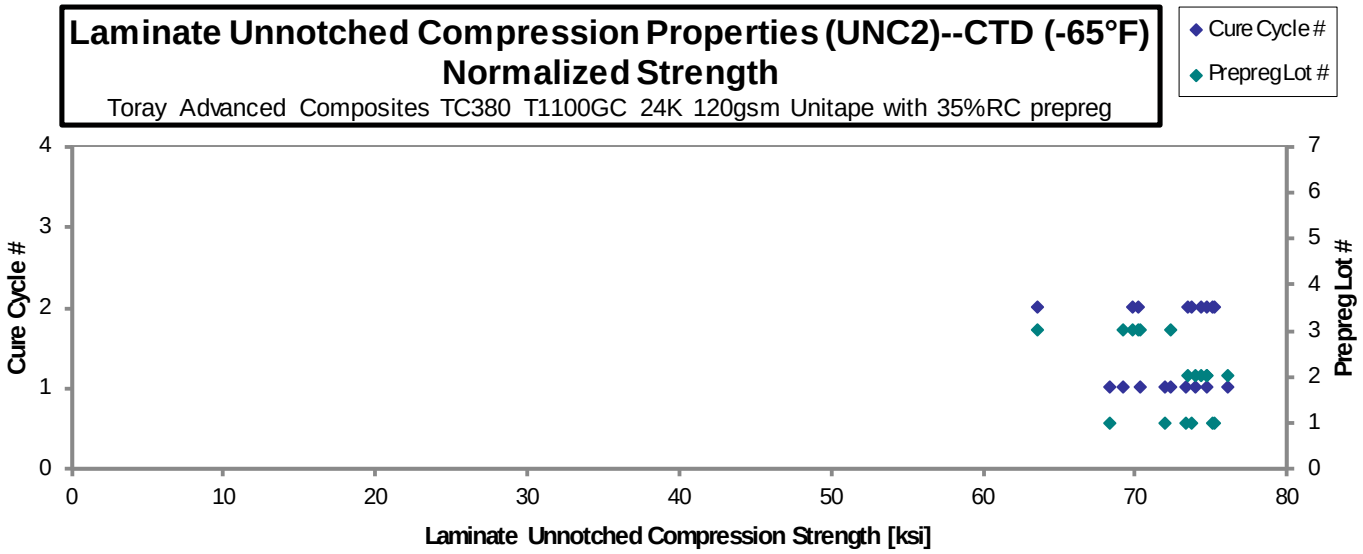
4.13 "10/80/10" Unnotched Compression 2 Properties (UNC2)

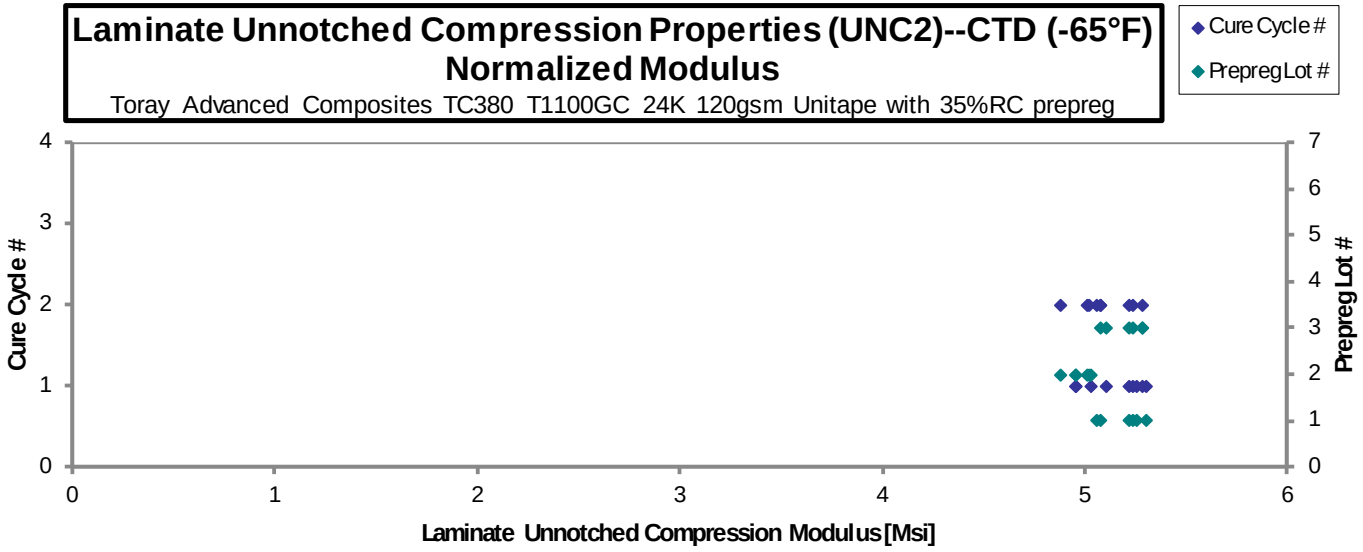
Laminate Unnotched Compression Properties (UNC2)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDXA111B	A	C1	1	1	69.89	5.417	0.09402	20	BGM	0.004701	68.45	5.305
TCDXA112B	A	C1	1	1	73.33	5.316	0.09435	20	BAB	0.004718	72.07	5.225
TCDXA113B	A	C1	1	1	74.49	5.340	0.09453	20	BGM	0.004727	73.35	5.259
TCDXA211B	A	C2	1	2	76.18	5.311	0.09468	20	BGM	0.004734	75.14	5.238
TCDXA212B	A	C2	1	2	75.99	5.127	0.09518	20	BGM	0.004759	75.34	5.083
TCDXA213B	A	C2	1	2	74.14	5.089	0.09550	20	BGM	0.004775	73.76	5.063
TCDXB111B	B	C1	2	1	73.20	4.926	0.09805	20	BGM	0.004903	74.76	5.032
TCDXB112B	B	C1	2	1	73.40	4.779	0.09963	20	BGM	0.004982	76.17	4.960
TCDXB113B	B	C1	2	1	70.79	4.743	0.1004	20	BGM	0.005022	74.06	4.962
TCDXB211B	B	C2	2	2	72.95	4.788	0.09787	20	BGM	0.004893	74.37	4.881
TCDXB212B	B	C2	2	2	70.68	4.827	0.09988	20	BGM	0.004994	73.54	5.023
TCDXB213B	B	C2	2	2	71.81	4.817	0.09992	20	BGM	0.004996	74.74	5.013
TCDXC111B	C	C1	3	1	68.76	5.069	0.09667	20	BGM	0.004833	69.24	5.104
TCDXC112B	C	C1	3	1	68.22	5.123	0.09900	20	BGM	0.004950	70.35	5.284
TCDXC113B	C	C1	3	1	69.34	5.021	0.1002	20	BGM	0.005008	72.35	5.239
TCDXC211B	C	C2	3	2	69.89	5.190	0.09653	20	BGM	0.004827	70.28	5.219
TCDXC212B	C	C2	3	2	68.82	5.206	0.09747	20	BGM	0.004873	69.87	5.286
TCDXC213B	C	C2	3	2	61.25	4.892	0.09970	20	BGM	0.004985	63.61	5.080

Average	**71.28**	**5.055**		**Average$_{norm}$**	**0.004871**	**72.30**	**5.125**
Standard Dev.	**3.520**	**0.2164**		**Standard Dev.$_{norm}$**		**3.162**	**0.1326**
Coeff. of Var. [%]	**4.938**	**4.282**		**Coeff. of Var. [%]$_{norm}$**		**4.373**	**2.588**
Min.	**61.25**	**4.743**		**Min.**	**0.004701**	**63.61**	**4.881**
Max.	**76.18**	**5.417**		**Max.**	**0.005022**	**76.17**	**5.305**
Number of Spec.	**18**	**18**		**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Compression Properties (UNC2)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
10
20
30
40
50
60
70
80
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC2)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
1
2
3
4
5
6
Laminate Unnotched Compression Modulus [Msi]

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

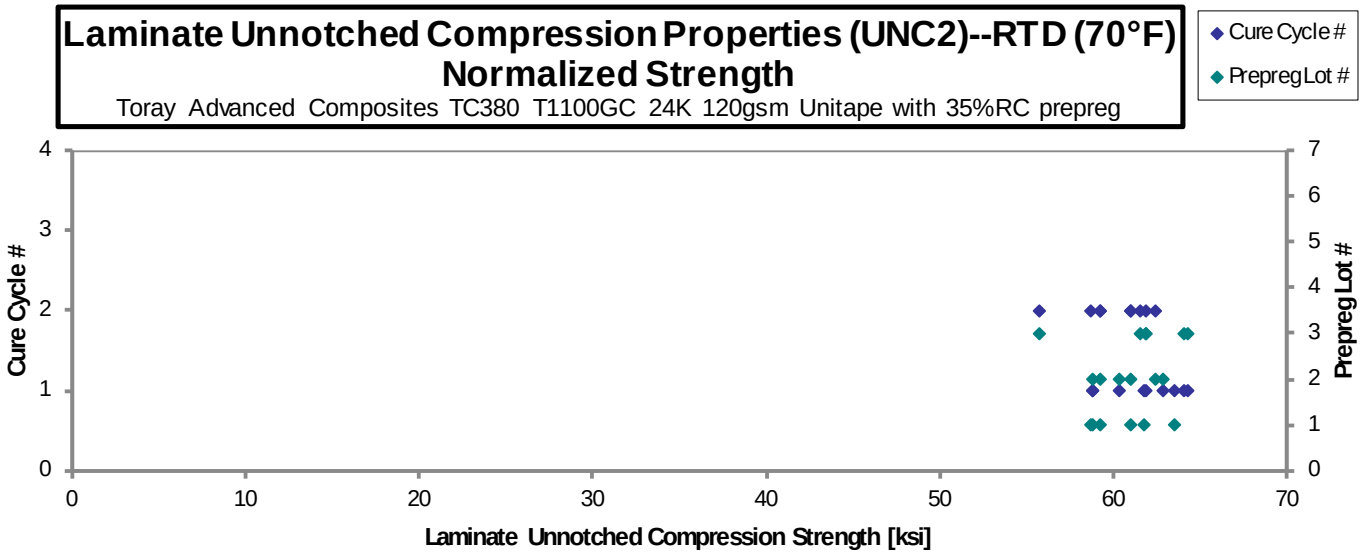
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

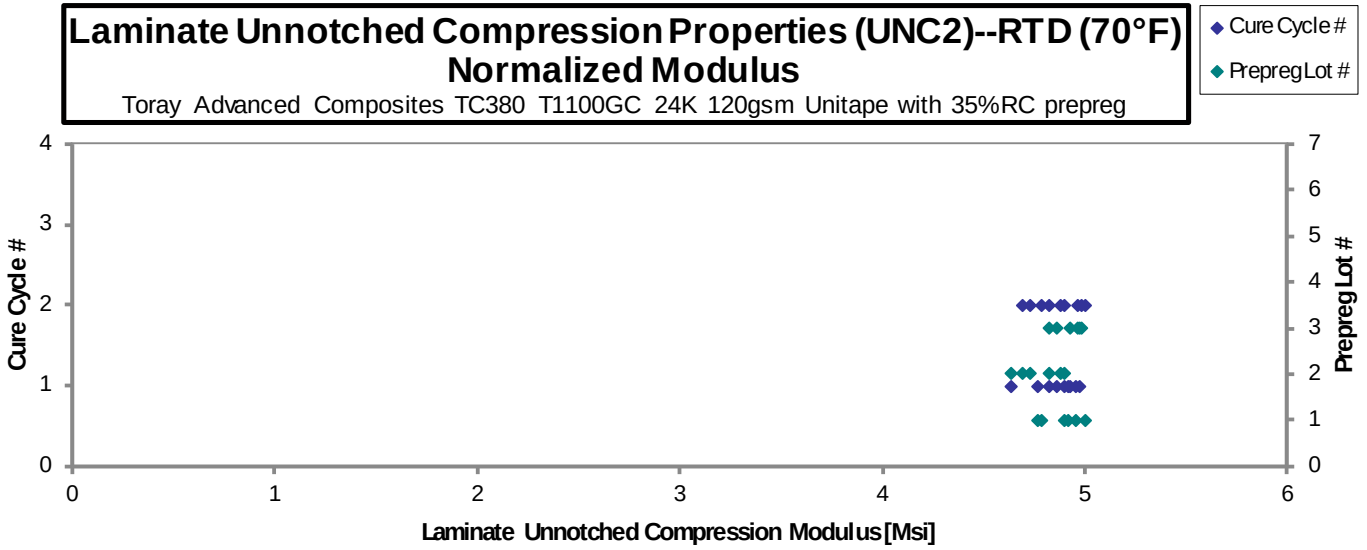
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDXA111A*	A	C1	1	1	62.12	5.043	0.09090	20	BGM	0.004545	58.82	4.775
TCDXA112A*	A	C1	1	1	64.23	5.159	0.09232	20	BGM	0.004616	61.76	4.961
TCDXA113A	A	C1	1	1	65.44	5.069	0.09318	20	BGM	0.004659	63.52	4.920
TCDXA211A	A	C2	1	2	63.26	5.334	0.09007	20	BGM	0.004503	59.35	5.004
TCDXA212A	A	C2	1	2	61.16	4.988	0.09222	20	BGM	0.004611	58.75	4.792
TCDXA213A	A	C2	1	2	62.73	5.035	0.09350	20	BAB	0.004675	61.10	4.904
TCDXB111A	B	C1	2	1	65.71	5.338	0.08815	20	BAB	0.004408	60.34	4.902
TCDXB112A	B	C1	2	1	62.17	4.907	0.09082	20	BGM	0.004541	58.82	4.642
TCDXB113A	B	C1	2	1	64.46	4.944	0.09375	20	BAB	0.004688	62.95	4.828
TCDXB211A	B	C2	2	2	64.13	5.120	0.08870	20	BGM	0.004435	59.25	4.730
TCDXB212A	B	C2	2	2	65.05	4.882	0.09225	20	BGM	0.004613	62.51	4.691
TCDXB213A	B	C2	2	2	62.14	4.976	0.09425	20	BGM	0.004713	61.00	4.885
TCDXC111A	C	C1	3	1	69.12	5.370	0.08900	20	BGM	0.004450	64.08	4.978
TCDXC112A	C	C1	3	1	67.51	5.102	0.09145	20	BGM	0.004573	64.31	4.860
TCDXC113A	C	C1	3	1	63.27	5.043	0.09390	20	BGM	0.004695	61.89	4.932
TCDXC211A	C	C2	3	2	66.36	5.339	0.08963	20	M(B,H)AB	0.004482	61.96	4.985
TCDXC212A	C	C2	3	2	58.46	5.203	0.09160	20	BGM	0.004580	55.78	4.964
TCDXC213A	C	C2	3	2	63.40	4.964	0.09327	20	BGM	0.004663	61.60	4.823

* Modulus are averaged values of 2 strain gages.

	Strength	Modulus		t_{ply}	$Strength_{norm}$	$Modulus_{norm}$
Average	**63.93**	**5.101**	**$Average_{norm}$**	**0.004580**	**60.99**	**4.865**
Standard Dev.	**2.455**	**0.1576**	**$Standard\ Dev._{norm}$**		**2.217**	**0.1060**
Coeff. of Var. [%]	**3.841**	**3.090**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.635**	**2.179**
Min.	**58.46**	**4.882**	**Min.**	**0.004408**	**55.78**	**4.642**
Max.	**69.12**	**5.370**	**Max.**	**0.004713**	**64.31**	**5.004**
Number of Spec.	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Compression Properties (UNC2)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4
0
1
2
3
4
5
6
7


Laminate Unnotched Compression Properties (UNC2)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
1
2
3
4
5
6
0
1
2
3
4
5
6
7

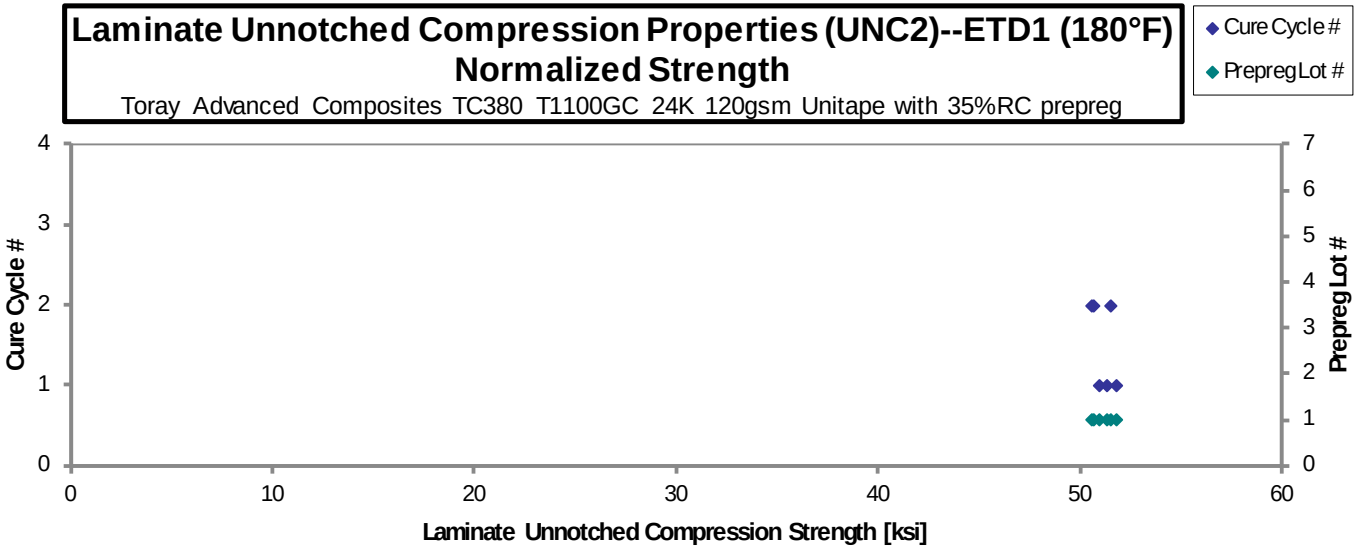
Laminate Unnotched Compression Properties (UNC2)--ETD1 (180°F)
Strength & Modulus

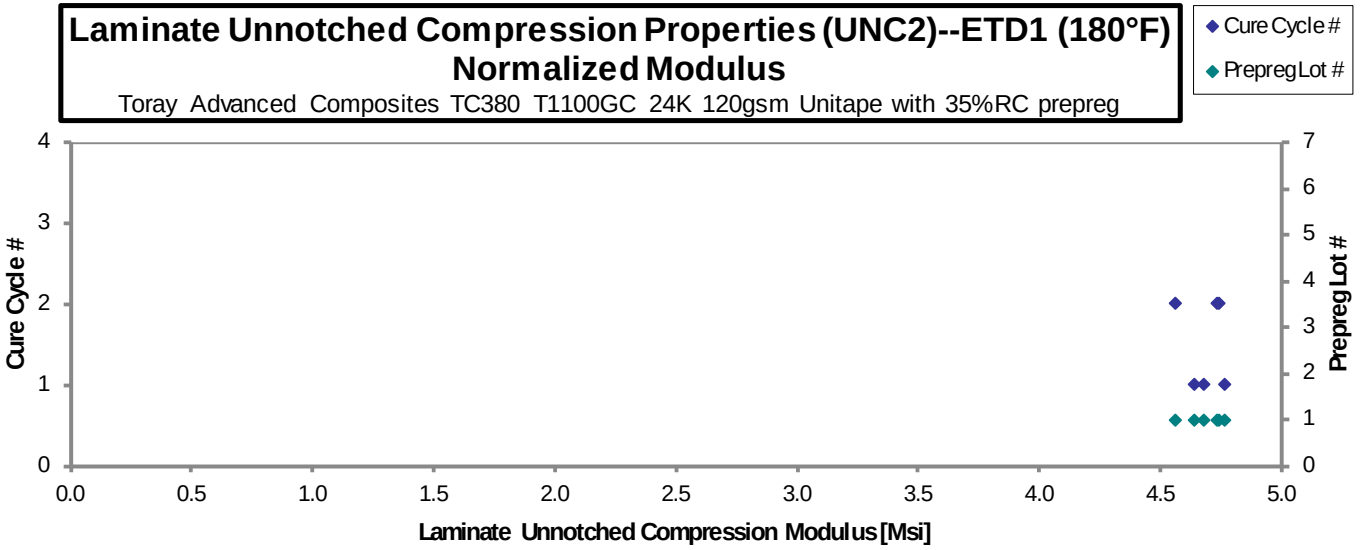
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDXA111C	A	C1	1	1	52.04	4.828	0.09463	20	M(B,H)GM	0.004732	51.30	4.759
TCDXA112C	A	C1	1	1	51.87	4.714	0.09435	20	BGM	0.004718	50.98	4.633
TCDXA113C	A	C1	1	1	52.33	4.733	0.09490	20	BGM	0.004745	51.73	4.679
TCDXA211C	A	C2	1	2	51.12	4.771	0.09518	20	BGM	0.004759	50.69	4.730
TCDXA212C	A	C2	1	2	51.00	4.600	0.09520	20	BGM	0.004760	50.57	4.561
TCDXA213C	A	C2	1	2	52.09	4.792	0.09490	20	BGM	0.004745	51.49	4.737

	Strength [ksi]	Modulus [Msi]		t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	**51.74**	**4.740**	**$Average_{norm}$**	**0.004743**	**51.13**	**4.683**
Standard Dev.	**0.5514**	**0.07971**	**Standard Dev.$_{norm}$**		**0.4603**	**0.07516**
Coeff. of Var. [%]	**1.066**	**1.682**	**Coeff. of Var. [%]$_{norm}$**		**0.9003**	**1.605**
Min.	**51.00**	**4.600**	**Min.**	**0.004718**	**50.57**	**4.561**
Max.	**52.33**	**4.828**	**Max.**	**0.004760**	**51.73**	**4.759**
Number of Spec.	**6**	**6**	**Number of Spec.**	**6**	**6**	**6**


Laminate Unnotched Compression Properties (UNC2)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
10
20
30
40
50
60
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC2)--ETD1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Laminate Unnotched Compression Modulus [Msi]

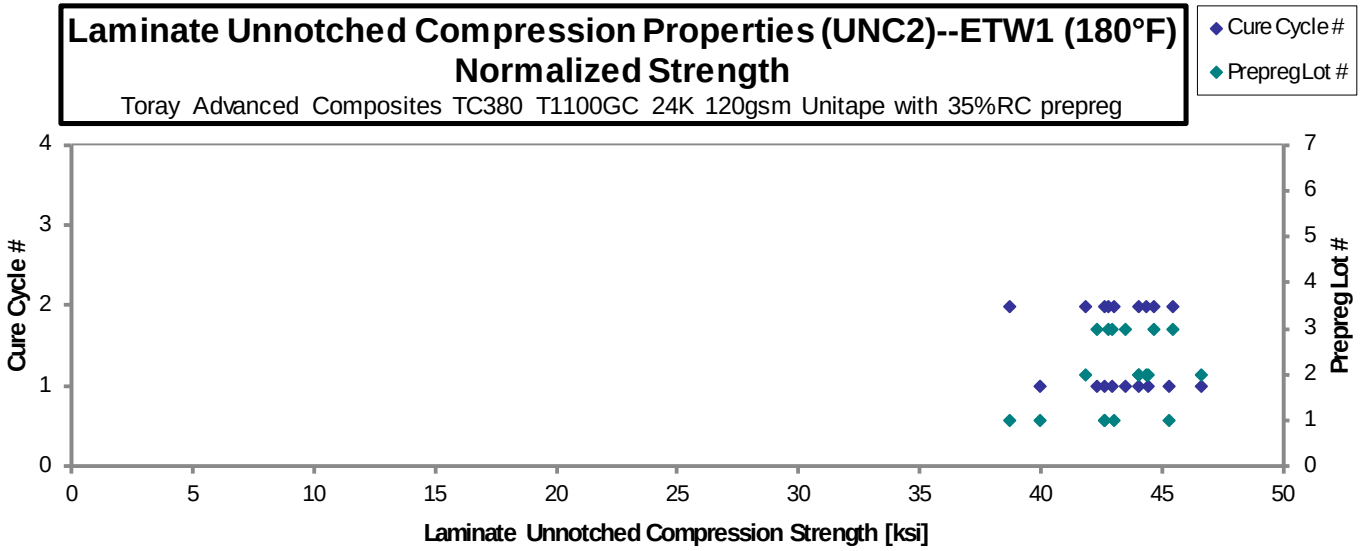
Laminate Unnotched Compression Properties (UNC2)--ETW1 (180°F)
Strength & Modulus

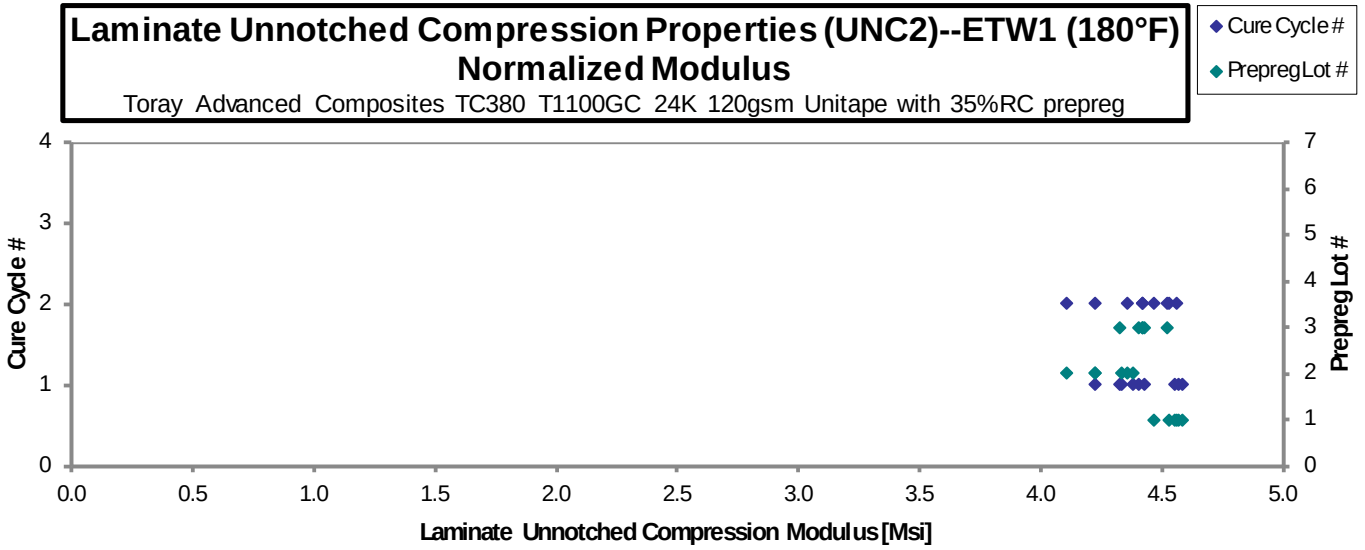
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDXA111D	A	C1	1	1	47.49	4.778	0.09150	20	BAB	0.004575	45.26	4.554
TCDXA112D	A	C1	1	1	41.39	4.727	0.09272	20	BGM	0.004636	39.98	4.566
TCDXA113D	A	C1	1	1	43.58	4.686	0.09383	20	BGM	0.004692	42.59	4.580
TCDXA211D	A	C2	1	2	43.64	4.591	0.09468	20	BAT	0.004734	43.05	4.528
TCDXA212D	A	C2	1	2	39.31	4.542	0.09445	20	BGM	0.004723	38.67	4.469
TCDXA213D	A	C2	1	2	43.55	4.661	0.09393	20	BGM	0.004697	42.61	4.561
TCDXB111D	B	C1	2	1	41.61	4.099	0.1015	20	BAB	0.005076	44.00	4.335
TCDXB112D	B	C1	2	1	44.68	4.203	0.1001	20	BGM	0.005006	46.60	4.383
TCDXB113D	B	C1	2	1	42.62	4.049	0.1002	20	M(B,H)GM	0.005008	44.47	4.224
TCDXB211D	B	C2	2	2	42.30	3.916	0.1007	20	BGM	0.005033	44.36	4.106
TCDXB212D	B	C2	2	2	42.51	4.209	0.09945	20	BAB	0.004973	44.04	4.361
TCDXB213D	B	C2	2	2	40.38	4.070	0.09955	20	BAT	0.004978	41.87	4.220
TCDXC111D	C	C1	3	1	41.59	4.263	0.09912	20	BGM	0.004956	42.94	4.402
TCDXC112D	C	C1	3	1	45.51	4.654	0.08930	20	BGM	0.004465	42.34	4.329
TCDXC113D	C	C1	3	1	45.30	4.607	0.09218	20	BAB	0.004609	43.49	4.424
TCDXC211D	C	C2	3	2	41.01	4.240	0.1001	20	M(B,H)GM	0.005006	42.76	4.422
TCDXC212D	C	C2	3	2	42.98	4.255	0.09977	20	BGM	0.004988	44.66	4.422
TCDXC213D	C	C2	3	2	43.59	4.337	0.1001	20	BAB	0.005004	45.45	4.521

Average	**42.95**	**4.383**	**Average$_{norm}$**	**0.004842**	**43.29**	**4.411**
Standard Dev.	**1.996**	**0.2723**	**Standard Dev.$_{norm}$**		**1.903**	**0.1340**
Coeff. of Var. [%]	**4.647**	**6.213**	**Coeff. of Var. [%]$_{norm}$**		**4.397**	**3.038**
Min.	**39.31**	**3.916**	**Min.**	**0.004465**	**38.67**	**4.106**
Max.	**47.49**	**4.778**	**Max.**	**0.005076**	**46.60**	**4.580**
Number of Spec.	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Laminate Unnotched Compression Properties (UNC2)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0 1 2 3 4
0 1 2 3 4 5 6 7
0 5 10 15 20 25 30 35 40 45 50
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC2)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0 1 2 3 4
0 1 2 3 4 5 6 7
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
Laminate Unnotched Compression Modulus [Msi]

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

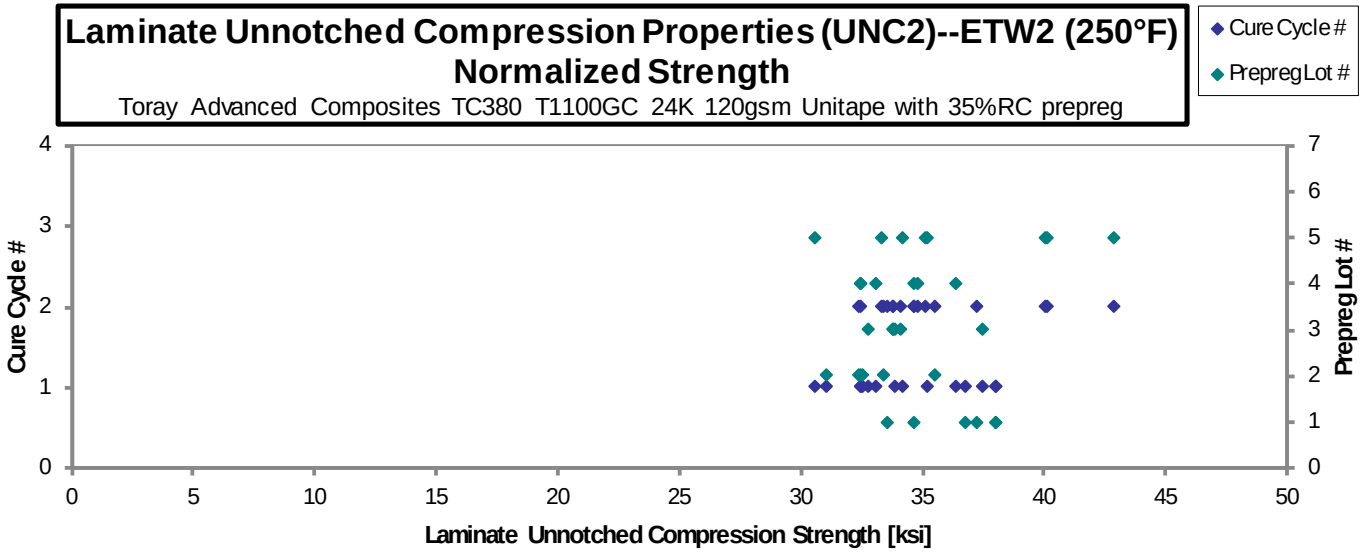
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

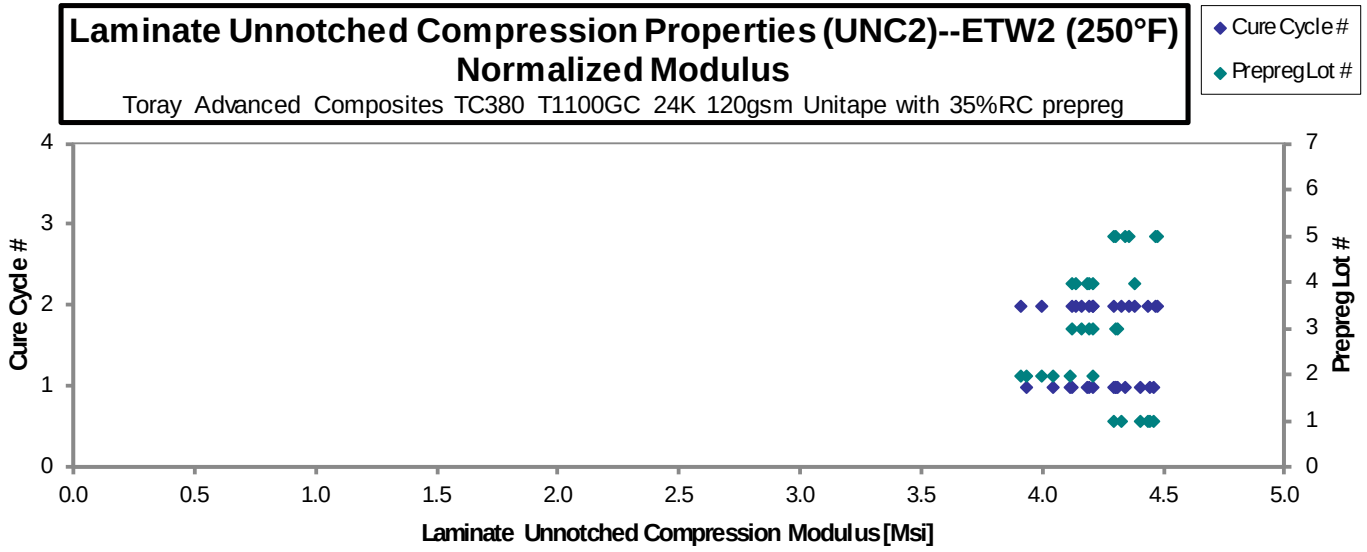
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDXA111E	A	C1	1	1	38.37	4.496	0.09523	20	BAT	0.004762	38.06	4.460
TCDXA112E	A	C1	1	1	37.07	4.479	0.09523	20	BGM	0.004762	36.77	4.443
TCDXA113E	A	C1	1	1	38.17	4.414	0.09573	20	BGM	0.004787	38.06	4.402
TCDXA211E	A	C2	1	2	37.17	4.630	0.08965	20	BAT	0.004483	34.71	4.324
TCDXA212E	A	C2	1	2	39.18	4.514	0.09138	20	BAB	0.004569	37.30	4.297
TCDXA213E	A	C2	1	2	34.73	4.595	0.09275	20	BGM, BAT	0.004638	33.56	4.439
TCDXB111E	B	C1	2	1	32.27	4.090	0.09660	20	BAB	0.004830	32.47	4.115
TCDXB112E	B	C1	2	1	33.05	4.104	0.09463	20	BAB	0.004732	32.58	4.045
TCDXB113E	B	C1	2	1	32.37	4.097	0.09213	20	BAB	0.004607	31.07	3.932
TCDXB211E	B	C2	2	2	35.07	4.155	0.09730	20	BGM	0.004865	35.54	4.211
TCDXB212E	B	C2	2	2	32.54	4.011	0.09572	20	BAB	0.004786	32.44	3.999
TCDXB213E	B	C2	2	2	34.43	4.030	0.09322	20	BAB	0.004661	33.43	3.913
TCDXC111E	C	C1	3	1	33.50	4.075	0.09722	20	BGM	0.004861	33.92	4.126
TCDXC112E	C	C1	3	1	36.41	4.189	0.09887	20	BGM	0.004943	37.50	4.314
TCDXC113E	C	C1	3	1	31.61	4.149	0.09950	20	BGM	0.004975	32.76	4.300
TCDXC211E	C	C2	3	2	33.87	4.169	0.09583	20	BAT	0.004792	33.81	4.162
TCDXC212E	C	C2	3	2	34.53	4.243	0.09482	20	BAT	0.004741	34.11	4.191
TCDXC213E	C	C2	3	2	35.09	4.365	0.09257	20	BAT	0.004628	33.83	4.209
TCDXD111E	D	C1	4	1	33.08	4.263	0.09435	20	BAB	0.004718	32.52	4.190
TCDXD112E	D	C1	4	1	37.47	4.327	0.09332	20	BAB	0.004666	36.42	4.206
TCDXD113E	D	C1	4	1	34.63	4.387	0.09173	20	BAB	0.004587	33.09	4.192
TCDXD211E	D	C2	4	2	37.68	4.759	0.08835	20	BAB	0.004418	34.68	4.380
TCDXD212E	D	C2	4	2	37.30	4.434	0.08960	20	BGM	0.004480	34.81	4.139
TCDXD213E	D	C2	4	2	33.67	4.271	0.09270	20	BAB	0.004635	32.51	4.124
TCDXE111E	E	C1	5	1	32.82	4.616	0.08943	20	BAB	0.004472	30.58	4.301
TCDXE112E	E	C1	5	1	35.53	4.462	0.09248	20	BAB	0.004624	34.23	4.298
TCDXE113E	E	C1	5	1	35.75	4.411	0.09457	20	BAB	0.004728	35.22	4.345
TCDXE211E	E	C2	5	2	35.87	4.813	0.08917	20	BGM	0.004458	33.31	4.471
TCDXE212E	E	C2	5	2	36.23	4.619	0.09307	20	TAB/ TIB	0.004653	35.13	4.478
TCDXE213E	E	C2	5	2	43.50	4.418	0.09473	20	BGM	0.004737	42.92	4.360
TCDXE214E*	E	C2	5	2	40.18		0.09602	20	BAB	0.004801	40.19	
TCDXE215E*	E	C2	5	2	39.92		0.09643	20	BAB	0.004822	40.10	

* Specimen was not gaged, only strength is tested.

Average	**35.72**	**4.353**		**$Average_{norm}$**	**0.004694**	**34.93**	**4.246**
Standard Dev.	**2.714**	**0.2206**		**$Standard\ Dev._{norm}$**		**2.777**	**0.1556**
Coeff. of Var. [%]	**7.597**	**5.067**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**7.950**	**3.665**
Min.	**31.61**	**4.011**		**Min.**	**0.004418**	**30.58**	**3.913**
Max.	**43.50**	**4.813**		**Max.**	**0.004975**	**42.92**	**4.478**
Number of Spec.	**32**	**30**		**Number of Spec.**	**32**	**32**	**30**


Laminate Unnotched Compression Properties (UNC2)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC2)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]

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

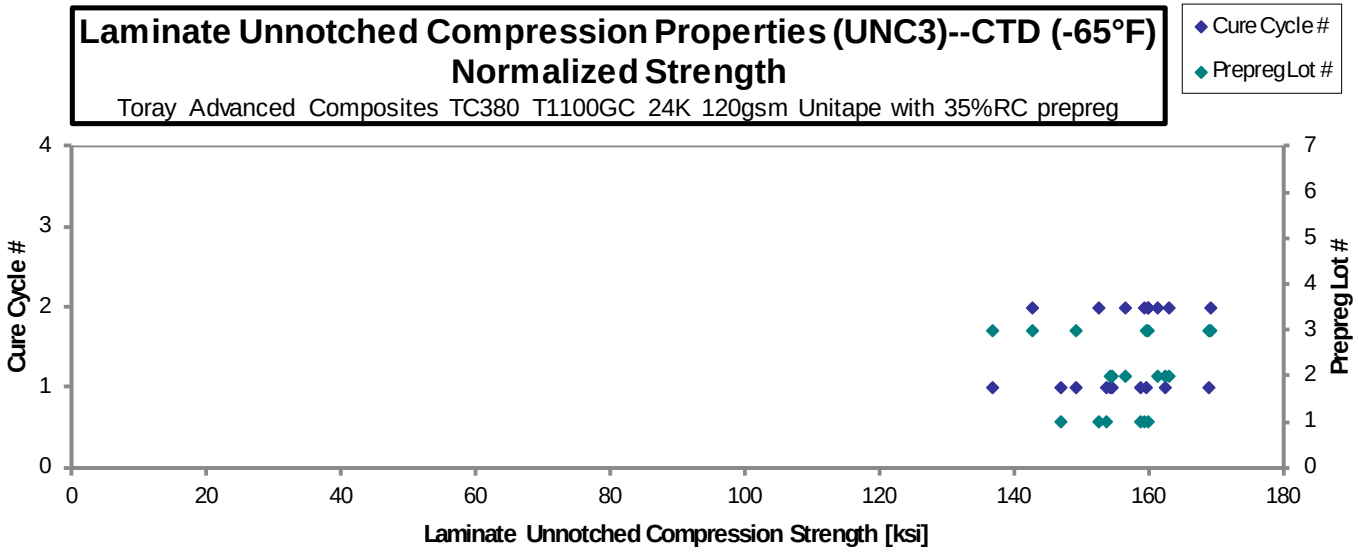
Laminate Unnotched Compression Properties (UNC3)--CTD (-65°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

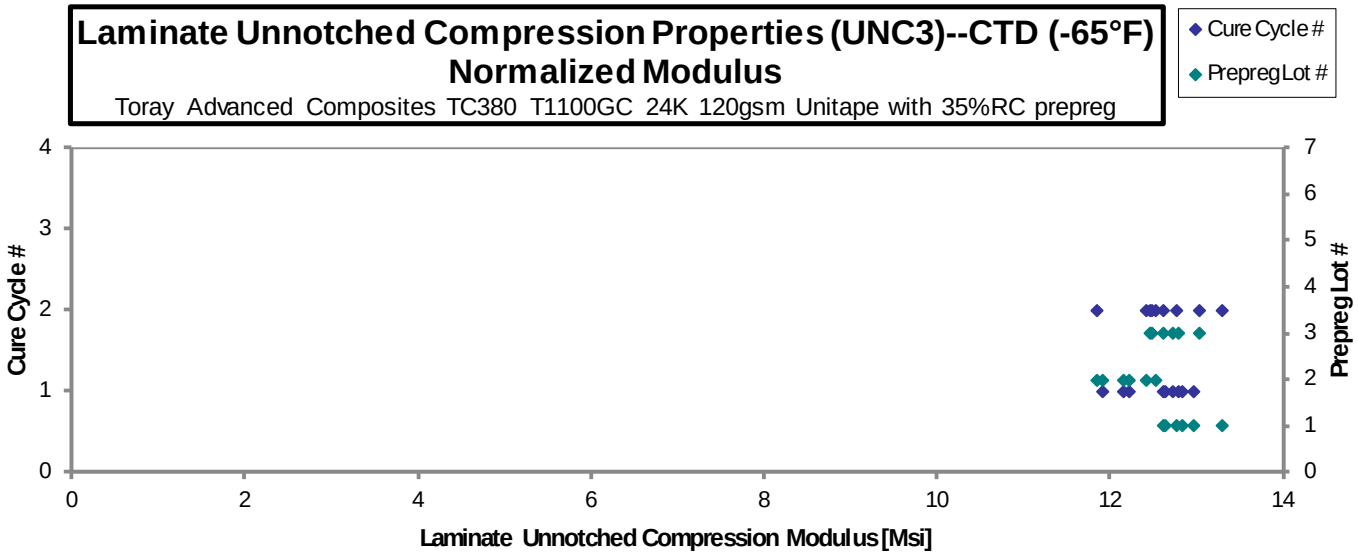
normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDYA111B	A	C1	1	1	154.1	12.86	0.09575	20	BGM	0.004788	153.7	12.83
TCDYA112B	A	C1	1	1	159.1	12.66	0.09577	20	BGM	0.004788	158.7	12.63
TCDYA113B	A	C1	1	1	147.0	12.98	0.09592	20	BGM	0.004796	146.8	12.97
TCDYA211B	A	C2	1	2	158.1	12.52	0.09680	20	BGM	0.004840	159.4	12.62
TCDYA212B	A	C2	1	2	159.3	13.24	0.09645	20	BAT	0.004823	160.0	13.30
TCDYA213B	A	C2	1	2	153.8	12.88	0.09518	20	BGM	0.004759	152.5	12.77
TCDYB111B	B	C1	2	1	152.0	12.03	0.09752	20	BAB	0.004876	154.4	12.22
TCDYB112B	B	C1	2	1	150.6	11.86	0.09848	20	BGM	0.004924	154.5	12.16
TCDYB113B	B	C1	2	1	156.6	11.47	0.09968	20	BAB	0.004984	162.6	11.91
TCDYB211B	B	C2	2	2	162.1	12.49	0.09555	20	BGM	0.004778	161.3	12.43
TCDYB212B	B	C2	2	2	155.9	12.48	0.09643	20	BGM	0.004822	156.6	12.54
TCDYB213B	B	C2	2	2	161.1	11.71	0.09713	20	BGM	0.004857	163.0	11.85
TCDYC111B	C	C1	3	1	148.6	12.67	0.09638	20	TAB/TIB	0.004819	149.2	12.72
TCDYC112B	C	C1	3	1	135.2	12.46	0.09723	20	M(B,H)AB	0.004862	136.9	12.62
TCDYC113B	C	C1	3	1	165.4	12.52	0.09815	20	BAB, TAB/TIB	0.004908	169.1	12.80
TCDYC114B*	C	C1	3	1	156.0		0.09827	20	BGM	0.004913	159.7	
TCDYC211B	C	C2	3	2	142.8	12.46	0.09590	20	BGM	0.004795	142.6	12.45
TCDYC212B	C	C2	3	2	166.6	12.83	0.09748	20	BAB	0.004874	169.2	13.02
TCDYC213B	C	C2	3	2	156.5	12.22	0.09805	20	BGM	0.004903	159.8	12.48

* Specimen was not gaged, only strength is tested.

Average	**154.8**	**12.46**		**$Average_{norm}$**	**0.004848**	**156.3**	**12.57**
Standard Dev.	**7.669**	**0.4595**		**$Standard\ Dev._{norm}$**		**8.243**	**0.3739**
Coeff. of Var. [%]	**4.955**	**3.687**		**Coeff. of Var. [%]$_{norm}$**		**5.273**	**2.974**
Min.	**135.2**	**11.47**		**Min.**	**0.004759**	**136.9**	**11.85**
Max.	**166.6**	**13.24**		**Max.**	**0.004984**	**169.2**	**13.30**
Number of Spec.	**19**	**18**		**Number of Spec.**	**19**	**19**	**18**


Laminate Unnotched Compression Properties (UNC3)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
160
180
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC3)--CTD (-65°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12
14
Laminate Unnotched Compression Modulus [Msi]

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

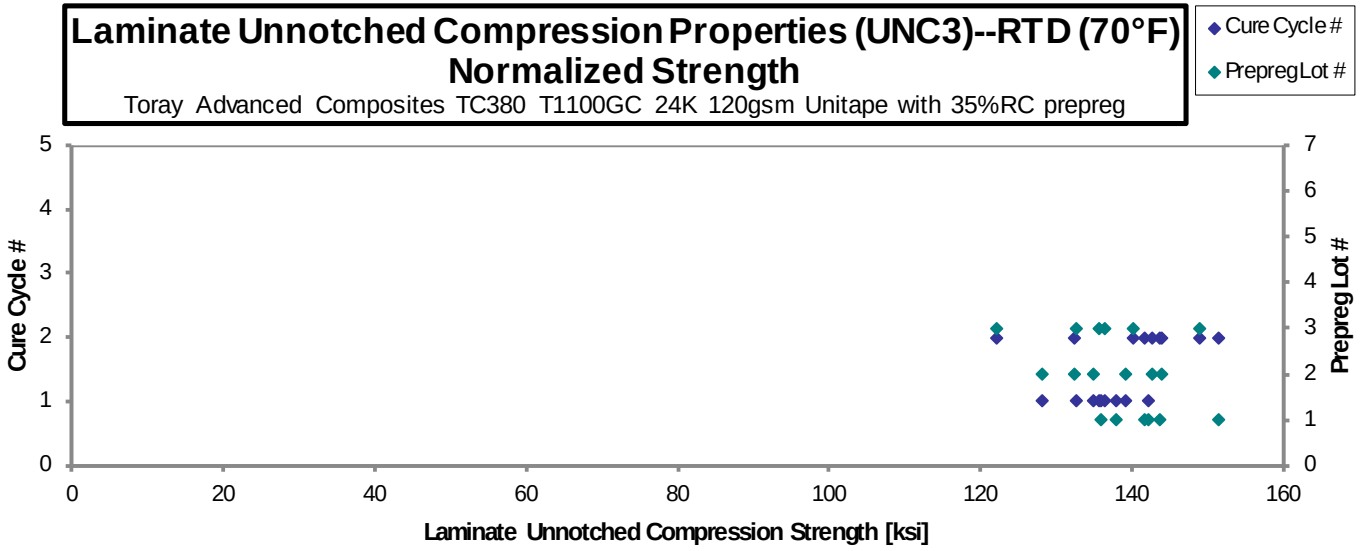
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

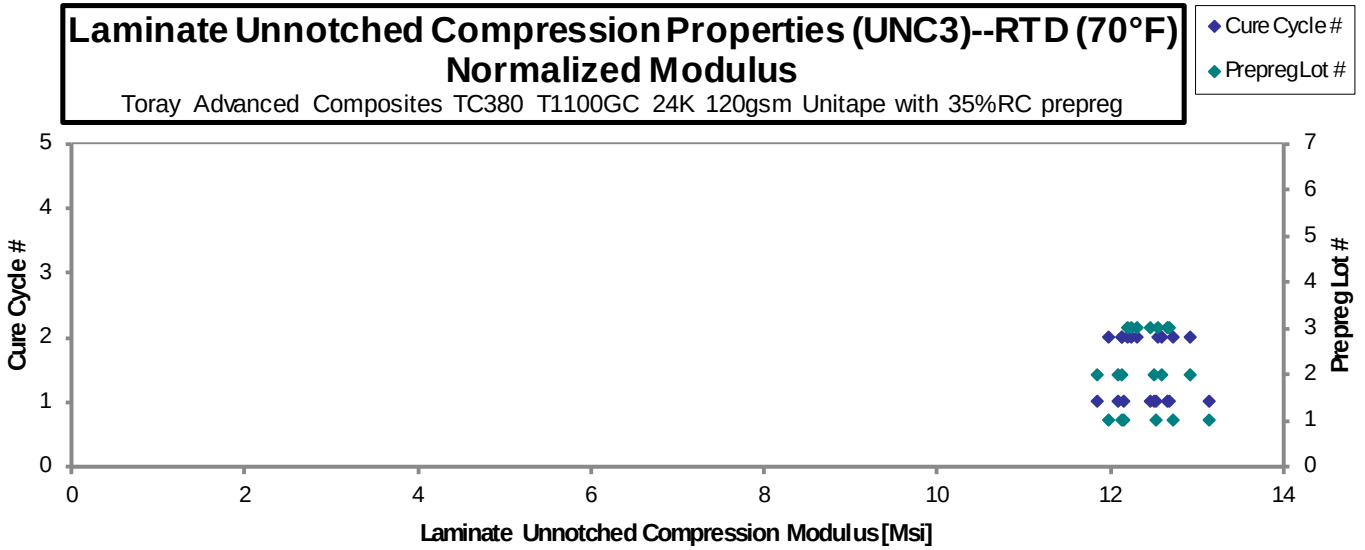
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDYA111A*/**	A	C1	1	1		12.89	0.09058	20	CIT, CIB	0.004529		12.16
TCDYA112A*	A	C1	1	1	140.0	12.91	0.09313	20	BGM	0.004657	135.8	12.52
TCDYA113A	A	C1	1	1	144.7	13.37	0.09432	20	BAT	0.004716	142.2	13.13
TCDYA114A***	A	C1	1	1	138.7		0.09548	20	BGM	0.004774	137.9	
TCDYA211A	A	C2	1	2	151.8	12.65	0.09087	20	M(B,H)AB	0.004543	143.7	11.97
TCDYA212A	A	C2	1	2	147.3	12.62	0.09233	20	BGM	0.004617	141.6	12.13
TCDYA213A	A	C2	1	2	154.4	12.96	0.09418	20	BAB	0.004709	151.5	12.72
TCDYB111A	B	C1	2	1	138.6	13.08	0.08867	20	BGM	0.004433	128.1	12.08
TCDYB112A**	B	C1	2	1		13.08	0.09175	20	CIB	0.004588		12.50
TCDYB113A	B	C1	2	1	137.7	12.10	0.09407	20	HAT/HIT	0.004703	134.9	11.85
TCDYB114A***	B	C1	2	1	139.2		0.09595	20	BGM	0.004798	139.1	
TCDYB211A**	B	C2	2	2		13.27	0.08780	20	CIB	0.004390		12.14
TCDYB212A	B	C2	2	2	141.5	13.83	0.08973	20	BAB, HIB	0.004487	132.3	12.93
TCDYB213A	B	C2	2	2	147.4	13.00	0.09293	20	BAB	0.004647	142.6	12.59
TCDYB214A***	B	C2	2	2	146.3		0.09448	20	BGM	0.004724	144.0	
TCDYC111A**	C	C1	3	1		13.91	0.08748	20	CIT	0.004374		12.67
TCDYC112A	C	C1	3	1	145.4	13.48	0.09010	20	BAT	0.004505	136.4	12.65
TCDYC113A	C	C1	3	1	137.0	12.88	0.09288	20	BGM	0.004644	132.6	12.46
TCDYC114A***	C	C1	3	1	137.9		0.09452	20	BAT	0.004726	135.7	
TCDYC211A	C	C2	3	2	129.5	12.93	0.09057	20	BGM	0.004528	122.2	12.20
TCDYC212A**	C	C2	3	2		12.81	0.09212	20	CIT	0.004606		12.30
TCDYC213A**	C	C2	3	2		12.81	0.09402	20	CIT	0.004701		12.55
TCDYC214A***	C	C2	3	2	141.4		0.09510	20	BAT	0.004755	140.0	
TCDYC214B	C	C2	3	2	144.9	11.92	0.09858	20	BAB, HIB	0.004929	148.8	12.25

* Modulus are averaged values of 2 strain gages.
** Strength not reported due to unacceptable failure mode.
*** Specimen was not gaged, only strength is tested.
TCDYC214B: Specimen was taken from CTD and tested as RTD condition.

Average	**142.4**	**12.97**		**Average$_{norm}$**	**0.004628**	**138.3**	**12.41**
Standard Dev.	**5.945**	**0.4891**		**Standard Dev.$_{norm}$**		**7.100**	**0.3335**
Coeff. of Var. [%]	**4.174**	**3.770**		**Coeff. of Var. [%]$_{norm}$**		**5.133**	**2.687**
Min.	**129.5**	**11.92**		**Min.**	**0.004374**	**122.2**	**11.85**
Max.	**154.4**	**13.91**		**Max.**	**0.004929**	**151.5**	**13.13**
Number of Spec.	**18**	**19**		**Number of Spec.**	**24**	**18**	**19**


Laminate Unnotched Compression Properties (UNC3)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0 1 2 3 4 5
0 1 2 3 4 5 6 7
0 20 40 60 80 100 120 140 160
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC3)--RTD (70°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0 1 2 3 4 5
0 1 2 3 4 5 6 7
0 2 4 6 8 10 12 14
Laminate Unnotched Compression Modulus [Msi]

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

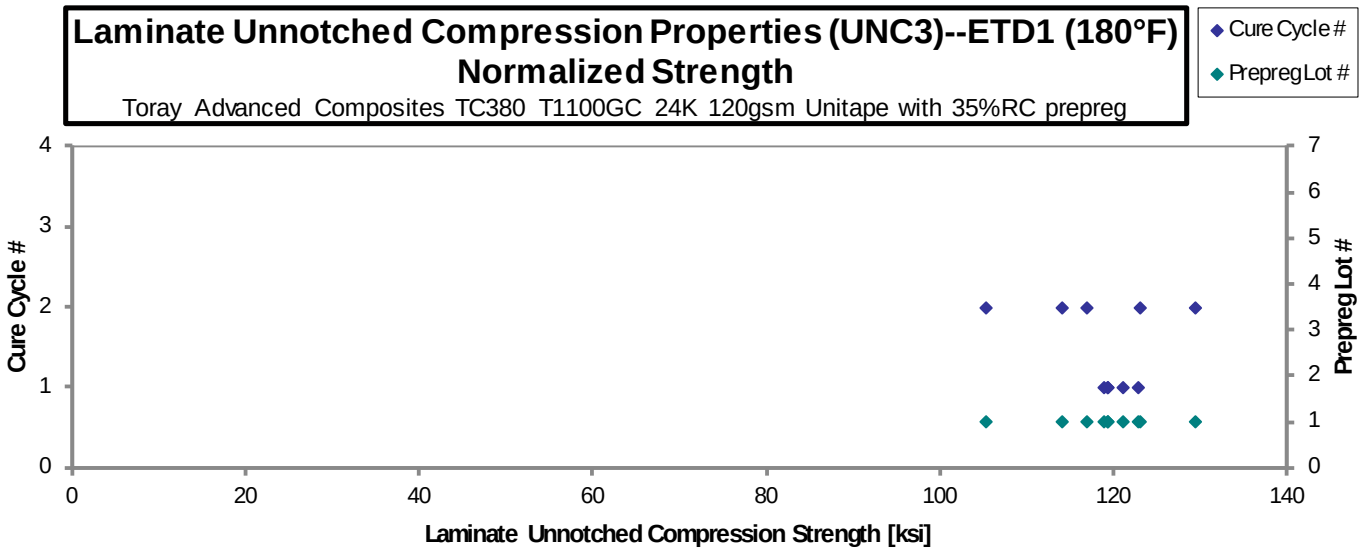
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

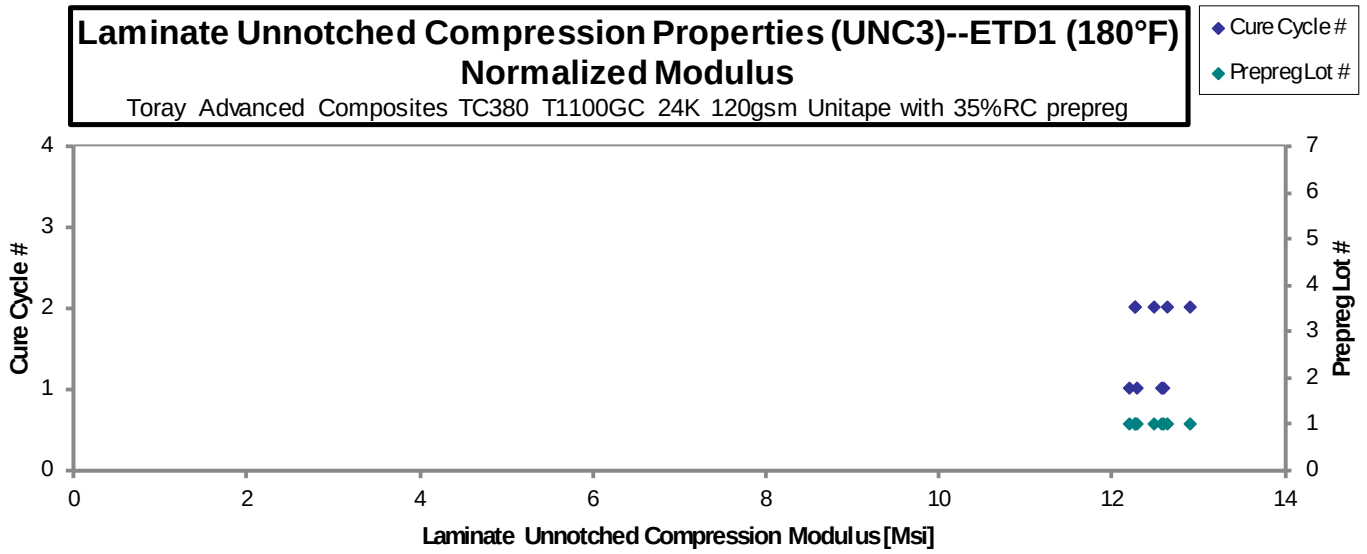
normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDYA111C	A	C1	1	1	122.0	12.28	0.09535	20	CIT	0.004768	121.1	12.19
TCDYA112C	A	C1	1	1	118.7	12.24	0.09627	20	HAT. HIT	0.004813	119.1	12.28
TCDYA113C	A	C1	1	1	119.8	12.63	0.09577	20	BAB, HIB	0.004788	119.5	12.60
TCDYA114C*	A	C1	1	1	122.9		0.09598	20	BAB	0.004799	122.9	
TCDYA114B	A	C1	1	1	118.6	12.49	0.09662	20	BAT	0.004831	119.4	12.57
TCDYA211C	A	C2	1	2	118.3	12.38	0.09508	20	HAT, HIT	0.004754	117.1	12.26
TCDYA212C**	A	C2	1	2		12.24	0.09612	20	CIB	0.004806		12.25
TCDYA213C	A	C2	1	2	123.3	12.66	0.09590	20	M(B,H)AT	0.004795	123.2	12.64
TCDYA214C*	A	C2	1	2	129.3		0.09612	20	BAT, HIT	0.004806	129.5	
TCDYA214A	A	C2	1	2	105.8	12.52	0.09570	20	BAT, HIT	0.004785	105.4	12.48
TCDYA214B	A	C2	1	2	115.4	13.03	0.09502	20	BGM, HIB	0.004751	114.2	12.90

* Specimen was not gaged, only strength is tested.
** Strength not reported due to unacceptable failure mode.
TCDYA214A: Specimen was taken from RTD and tested as ETD1 condition.
TCDYA114B and TCDYA214B: Specimen was taken from CTD and tested as ETD1 condition.

Average	**119.4**	**12.50**	**Average$_{norm}$**	**0.004791**	**119.1**	**12.46**
Standard Dev.	**6.119**	**0.2553**	**Standard Dev.$_{norm}$**		**6.302**	**0.2350**
Coeff. of Var. [%]	**5.124**	**2.043**	**Coeff. of Var. [%]$_{norm}$**		**5.289**	**1.885**
Min.	**105.8**	**12.24**	**Min.**	**0.004751**	**105.4**	**12.19**
Max.	**129.3**	**13.03**	**Max.**	**0.004831**	**129.5**	**12.90**
Number of Spec.	**10**	**9**	**Number of Spec.**	**11**	**10**	**9**


Laminate Unnotched Compression Properties (UNC3)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
Laminate Unnotched Compression Strength [ksi]


Laminate Unnotched Compression Properties (UNC3)--ETD1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12
14
Laminate Unnotched Compression Modulus [Msi]

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

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

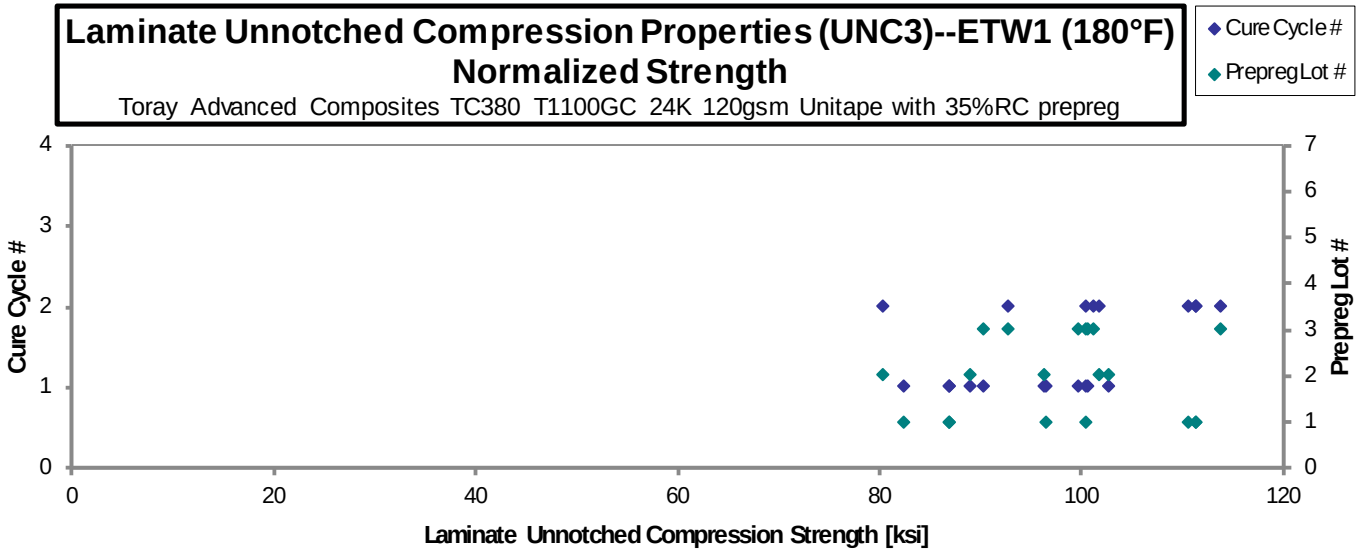
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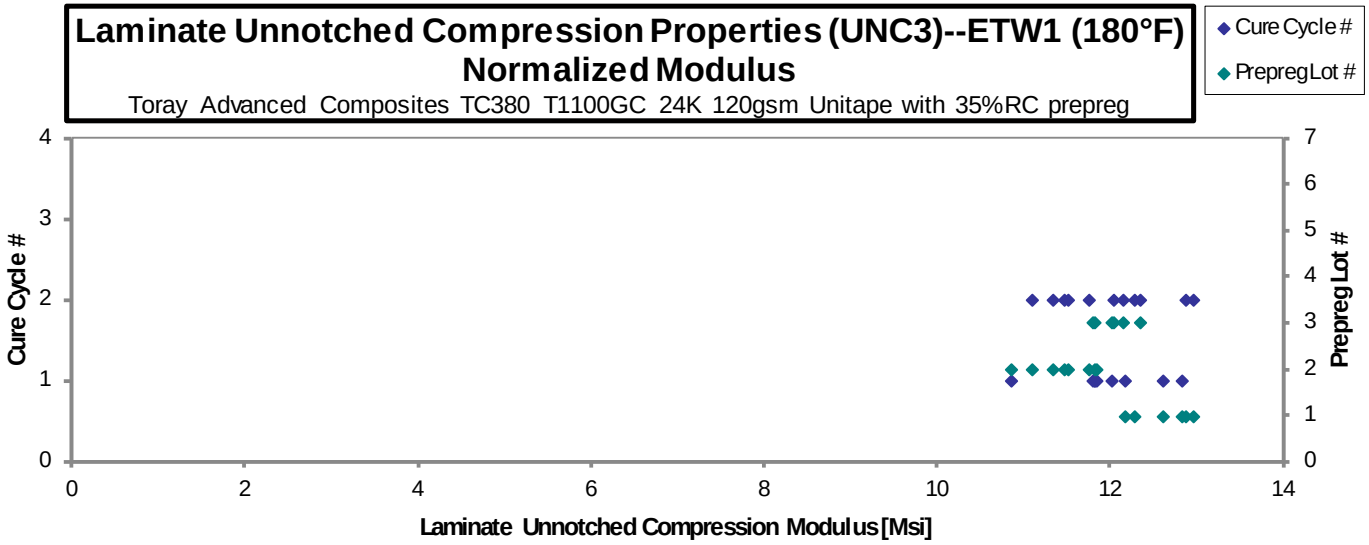
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDYA111D	A	C1	1	1	100.2	12.15	0.09617	20	BGM	0.004808	100.4	12.17
TCDYA112D	A	C1	1	1	82.44	12.87	0.09582	20	HAB, HIB	0.004791	82.28	12.84
TCDYA113D	A	C1	1	1	88.02	12.78	0.09475	20	HAB, HIB	0.004738	86.88	12.61
TCDYA114D*	A	C1	1	1	89.02		0.09363	20	HAB, HIB	0.004682	86.83	
TCDYA115D*	A	C1	1	1	101.5		0.09125	20	BAT	0.004563	96.46	
TCDYA211D	A	C2	1	2	111.1	12.93	0.09555	20	HAT, HIT	0.004778	110.6	12.87
TCDYA212D	A	C2	1	2	112.4	12.40	0.09512	20	BAB	0.004756	111.4	12.29
TCDYA213D	A	C2	1	2	113.4	13.21	0.09422	20	BAB, HIB	0.004711	111.3	12.96
TCDYB111D	B	C1	2	1	85.64	10.47	0.09960	20	BAB	0.004980	88.85	10.86
TCDYB112D	B	C1	2	1	98.63	11.38	0.09990	20	BAT	0.004995	102.6	11.84
TCDYB113D**	B	C1	2	1		11.43	0.09933	20	HIB	0.004967		11.82
TCDYB114D*	B	C1	2	1	93.35		0.09908	20	HAT, HIT	0.004954	96.35	
TCDYB211D**	B	C2	2	2		11.17	0.09737	20	HIT	0.004868		11.33
TCDYB212D**	B	C2	2	2		11.29	0.09767	20	HIT	0.004883		11.48
TCDYB213D**	B	C2	2	2		11.62	0.09708	20	HIB	0.004854		11.75
TCDYB214D	B	C2	2	2	100.0	11.33	0.09755	20	BAB	0.004878	101.6	11.51
TCDYB215D	B	C2	2	2	80.21	11.10	0.09600	20	BAB	0.004800	80.21	11.10
TCDYC111D	C	C1	3	1	87.97	11.52	0.09853	20	BAT	0.004927	90.29	11.82
TCDYC112D	C	C1	3	1	97.36	11.53	0.09827	20	BAB	0.004913	99.66	11.80
TCDYC113D	C	C1	3	1	109.4	13.09	0.08823	20	M(B,H)AT	0.004412	100.6	12.03
TCDYC211D	C	C2	3	2	111.3	11.89	0.09817	20	BAB, HIB	0.004908	113.8	12.16
TCDYC212D	C	C2	3	2	90.34	11.76	0.09843	20	HAT, HIT	0.004922	92.63	12.05
TCDYC213D	C	C2	3	2	98.87	12.08	0.09820	20	BAT, HIT	0.004910	101.1	12.36
TCDYC214D*	C	C2	3	2	98.04		0.09822	20	HAT, HIT	0.004911	100.3	

* Specimen was not gaged, only strength is tested.

** Strength not reported due to unacceptable failure mode.

	Strength [ksi]	Modulus [Msi]			$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	**97.46**	**11.90**		**$Average_{norm}$**	**97.71**	**11.98**
Standard Dev.	**10.29**	**0.7624**		**Standard Dev.$_{norm}$**	**9.773**	**0.5753**
Coeff. of Var. [%]	**10.56**	**6.407**		**Coeff. of Var. [%]$_{norm}$**	**10.00**	**4.801**
Min.	**80.21**	**10.47**		**Min.**	**80.21**	**10.86**
Max.	**113.4**	**13.21**		**Max.**	**113.8**	**12.96**
Number of Spec.	**20**	**20**		**Number of Spec.**	**20**	**20**


Laminate Unnotched Compression Properties (UNC3)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
0
1
2
3
4
5
6
7


Laminate Unnotched Compression Properties (UNC3)--ETW1 (180°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
2
4
6
8
10
12
14
0
1
2
3
4
0
1
2
3
4
5
6
7

Laminate Unnotched Compression Properties (UNC3)--ETW2 (250°F)
Strength & Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

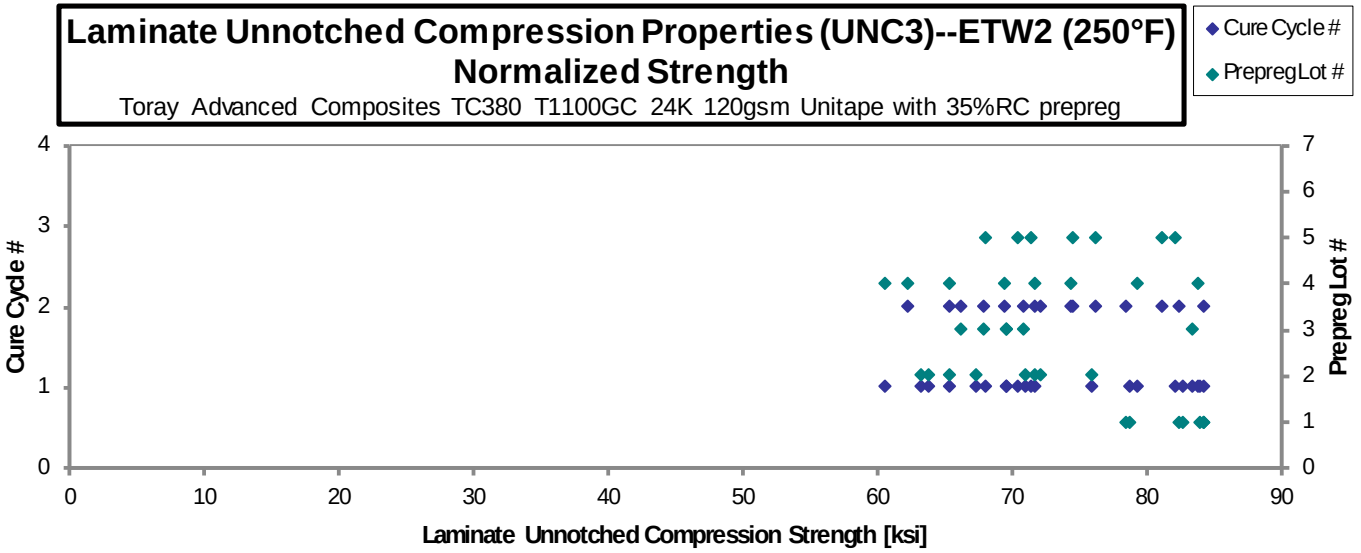
normalizing t_{ply} [in]: 0.004800

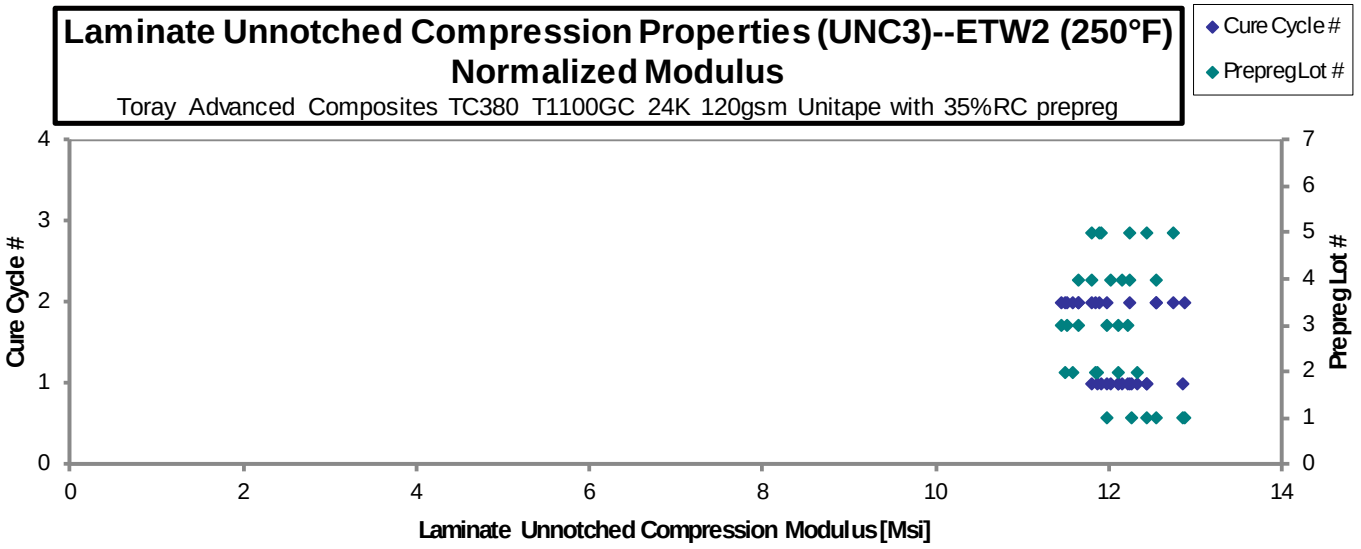
Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TCDYA111E	A	C1	1	1	87.32	12.96	0.09082	20	BAT, HIT	0.004541	82.60	12.26
TCDYA112E	A	C1	1	1	81.83	12.93	0.09225	20	HAT, HIT	0.004613	78.63	12.43
TCDYA113E*	A	C1	1	1		13.04	0.09458	20	HIT	0.004729		12.85
TCDYA114E**	A	C1	1	1	84.36		0.09573	20	BAT, HIT	0.004787	84.13	
TCDYA115E**	A	C1	1	1	83.59		0.09637	20	HAB, HIB	0.004818	83.91	
TCDYA211E*	A	C2	1	2		12.65	0.09082	20	HIT	0.004541		11.97
TCDYA212E	A	C2	1	2	87.30	13.35	0.09258	20	HAT, HIT	0.004629	84.20	12.88
TCDYA213E	A	C2	1	2	85.64	13.04	0.09237	20	BAT	0.004618	82.40	12.55
TCDYA214E**	A	C2	1	2	79.03		0.09525	20	HAT, HIT	0.004763	78.41	
TCDYB111E	B	C1	2	1	76.80	12.48	0.09483	20	BAB	0.004742	75.86	12.33
TCDYB112E	B	C1	2	1	70.54	12.04	0.09645	20	HAB/HIB	0.004823	70.87	12.10
TCDYB113E	B	C1	2	1	69.77	12.30	0.09260	20	HAB, HIB	0.004630	67.30	11.87
TCDYB114E**	B	C1	2	1	68.23		0.08970	20	HAB, HIB	0.004485	63.75	
TCDYB115E**	B	C1	2	1	69.32		0.08747	20	HAB, HIB	0.004373	63.16	
TCDYB211E	B	C2	2	2	72.17	11.67	0.09533	20	HGM	0.004767	71.67	11.59
TCDYB212E	B	C2	2	2	74.19	12.18	0.09323	20	HAT	0.004662	72.06	11.83
TCDYB213E	B	C2	2	2	68.64	12.08	0.09137	20	HAB	0.004568	65.32	11.49
TCDYC111E	C	C1	3	1	67.23	11.58	0.09932	20	HAB/HIB	0.004966	69.56	11.98
TCDYC112E*	C	C1	3	1		11.56	0.10055	20	HIB	0.005028		12.11
TCDYC113E	C	C1	3	1	65.94	11.59	0.10122	20	HAB/HIB	0.005061	69.53	12.22
TCDYC114E**	C	C1	3	1	78.61		0.10167	20	BAB, BIB	0.005083	83.25	
TCDYC211E	C	C2	3	2	71.38	11.54	0.09520	20	M(B,H)AT	0.004760	70.78	11.44
TCDYC212E	C	C2	3	2	67.17	11.85	0.09442	20	HAT	0.004721	66.06	11.65
TCDYC213E*	C	C2	3	2		11.97	0.09238	20	HIB	0.004619		11.52
TCDYC214E**	C	C2	3	2	71.83		0.09070	20	HAB, HIB	0.004535	67.86	
TCDYD111E	D	C1	4	1	78.91	13.24	0.08708	20	HAB	0.004354	71.58	12.01
TCDYD112E	D	C1	4	1	64.41	12.92	0.09020	20	HAB	0.004510	60.52	12.14
TCDYD113E	D	C1	4	1	82.16	12.70	0.09258	20	HAB	0.004629	79.23	12.25
TCDYD114E**	D	C1	4	1	66.01		0.09483	20	BAB	0.004742	65.21	
TCDYD115E**	D	C1	4	1	84.01		0.09567	20	BAB	0.004783	83.72	
TCDYD211E	D	C2	4	2	68.49	12.99	0.08722	20	HAB	0.004361	62.22	11.80
TCDYD212E	D	C2	4	2	74.45	12.50	0.08945	20	HAB	0.004473	69.37	11.65
TCDYD213E	D	C2	4	2	76.72	12.96	0.09290	20	HAB	0.004645	74.25	12.54
TCDYE111E	E	C1	5	1	72.64	13.29	0.08980	20	M(B,H)AB	0.004490	67.95	12.43
TCDYE112E	E	C1	5	1	73.92	12.22	0.09265	20	BAB	0.004633	71.35	11.80
TCDYE113E	E	C1	5	1	82.84	12.04	0.09502	20	BAB	0.004751	81.99	11.91
TCDYE114E**	E	C1	5	1	70.06		0.09630	20	HAB	0.004815	70.28	
TCDYE211E	E	C2	5	2	80.48	12.94	0.09075	20	HAB	0.004538	76.08	12.23
TCDYE212E	E	C2	5	2	76.37	12.19	0.09355	20	HAB	0.004678	74.42	11.88
TCDYE213E*	E	C2	5	2		12.71	0.09635	20	HIB	0.004818		12.75
TCDYE214E**	E	C2	5	2	80.21		0.09710	20	M(B,H)AB	0.004855	81.13	

* Strength not reported due to unacceptable failure mode.

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

Average	**75.35**	**12.45**	**Average$_{norm}$**	**0.004681**	**73.35**	**12.08**
Standard Dev.	**6.744**	**0.5736**	**Standard Dev.$_{norm}$**		**7.172**	**0.3968**
Coeff. of Var. [%]	**8.950**	**4.607**	**Coeff. of Var. [%]$_{norm}$**		**9.778**	**3.284**
Min.	**64.41**	**11.54**	**Min.**	**0.004354**	**60.52**	**11.44**
Max.	**87.32**	**13.35**	**Max.**	**0.005083**	**84.20**	**12.88**
Number of Spec.	**36**	**30**	**Number of Spec.**	**41**	**36**	**30**


Laminate Unnotched Compression Properties (UNC3)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Strength [ksi]
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4
0
1
2
3
4
5
6
7


Laminate Unnotched Compression Properties (UNC3)--ETW2 (250°F)
Normalized Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Unnotched Compression Modulus [Msi]
0
2
4
6
8
10
12
14
0
1
2
3
4
0
1
2
3
4
5
6
7

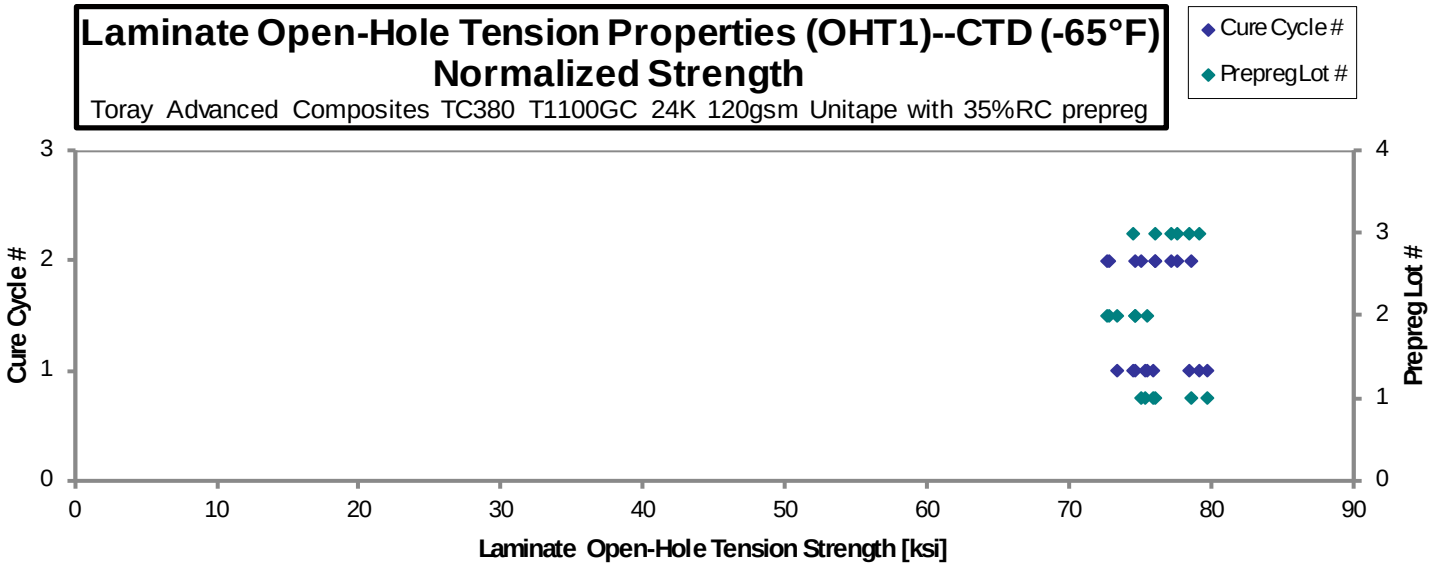
4.15 "25/50/25" Open-Hole Tension 1 Properties (OHT1)

Laminate Open-Hole Tension Properties (OHT1)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

	Strength		$Strength_{norm}$	t_{ply}
Average	**73.46**	**Average$_{norm}$**	**75.88**	**0.004963**
Standard Dev.	**3.278**	**Standard Dev.$_{norm}$**	**2.114**	
Coeff. of Var. [%]	**4.462**	**Coeff. of Var. [%]$_{norm}$**	**2.786**	
Min.	**68.30**	**Min.**	**72.57**	**0.004782**
Max.	**78.76**	**Max.**	**79.62**	**0.005149**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Open-Hole Tension Properties (OHT1)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4

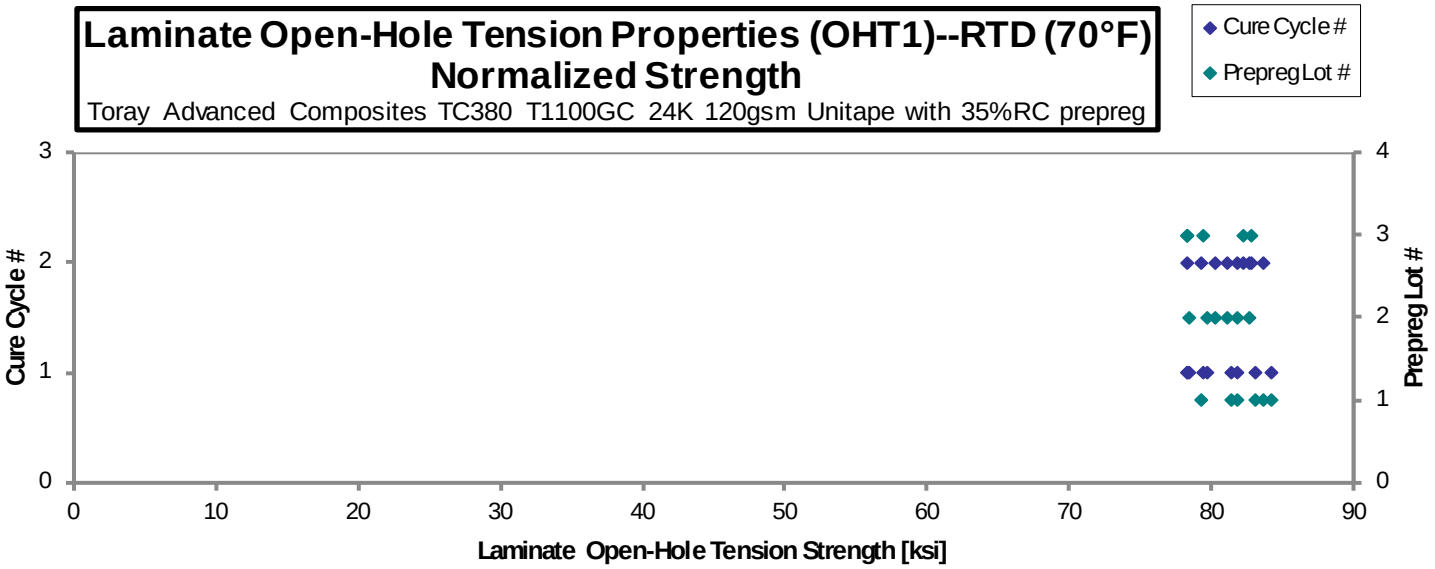
Laminate Open-Hole Tension Properties (OHT1)--RTD (70°F)□
Strength□

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

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDDA111A	A	C1	1	1	86.41	0.1124	24	AGM	0.004681	84.27
TCDDA112A	A	C1	1	1	79.73	0.1177	24	AGM	0.004904	81.46
TCDDA113A	A	C1	1	1	80.59	0.1189	24	AGM	0.004952	83.14
TCDDA211A	A	C2	1	2	81.54	0.1121	24	AGM	0.004671	79.34
TCDDA212A	A	C2	1	2	82.42	0.1170	24	AGM	0.004876	83.72
TCDDA213A	A	C2	1	2	80.68	0.1169	24	AGM	0.004870	81.85
TCDDB111A	B	C1	2	1	84.74	0.1112	24	AGM	0.004634	81.81
TCDDB112A	B	C1	2	1	76.39	0.1202	24	AGM	0.005010	79.73
TCDDB113A	B	C1	2	1	72.58	0.1246	24	AGM	0.005193	78.52
TCDDB211A	B	C2	2	2	81.77	0.1132	24	AGM	0.004715	80.33
TCDDB212A	B	C2	2	2	76.89	0.1216	24	AGM	0.005066	81.15
TCDDB213A	B	C2	2	2	76.64	0.1244	24	AGM	0.005182	82.73
TCDDC111A	C	C1	3	1	82.00	0.1117	24	AGM	0.004656	79.53
TCDDC112A	C	C1	3	1	76.53	0.1179	24	M(A,L)GM	0.004911	78.30
TCDDC113A	C	C1	3	1	74.71	0.1207	24	M(A,L)GM	0.005028	78.26
TCDDC211A	C	C2	3	2	83.90	0.1129	24	M(A,L)GM	0.004705	82.23
TCDDC212A	C	C2	3	2	80.27	0.1188	24	M(A,L)GM	0.004951	82.79
TCDDC213A	C	C2	3	2	74.38	0.1212	24	AGM	0.005051	78.28

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**79.56**	**$Average_{norm}$**	**0.004892**	**80.97**
Standard Dev.	**3.853**	**$Standard\ Dev._{norm}$**		**1.990**
Coeff. of Var. [%]	**4.843**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.458**
Min.	**72.58**	**Min.**	**0.004634**	**78.26**
Max.	**86.41**	**Max.**	**0.005193**	**84.27**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Open-Hole Tension Properties (OHT1)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4

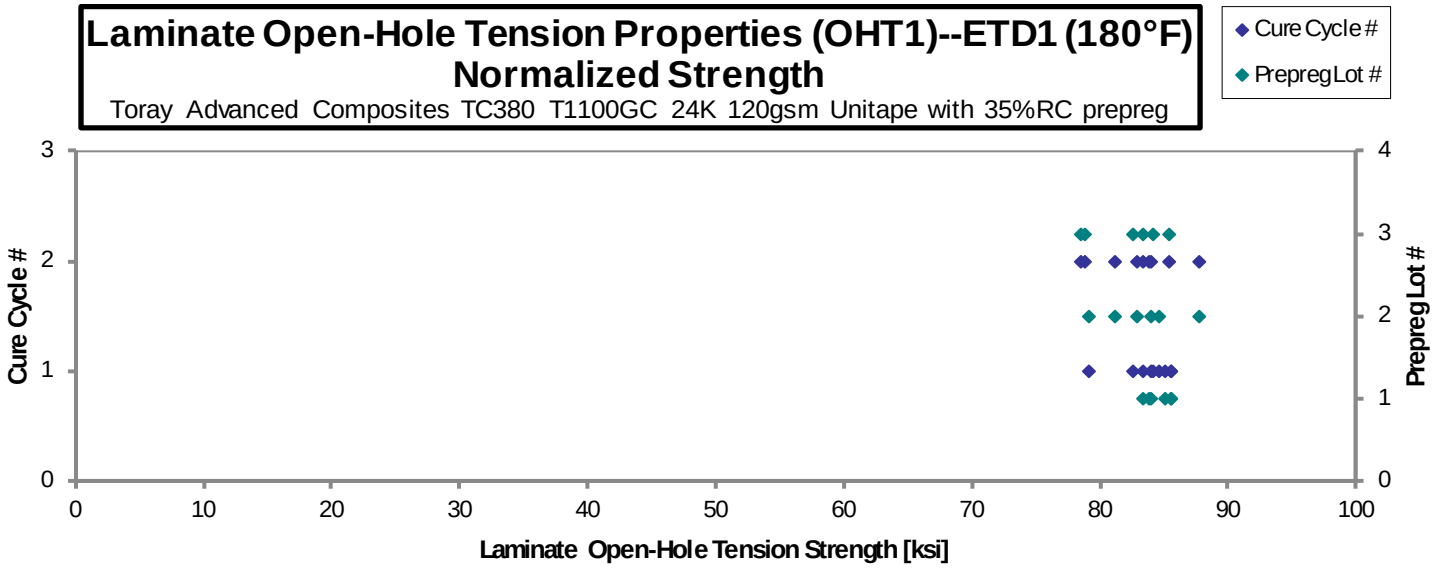
Laminate Open-Hole Tension Properties (OHT1)--ETD1 (180°F)□
Strength□

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**81.61**	**Average$_{norm}$**	**0.004911**	**83.39**
Standard Dev.	**3.956**	**Standard Dev.$_{norm}$**		**2.496**
Coeff. of Var. [%]	**4.847**	**Coeff. of Var. [%]$_{norm}$**		**2.993**
Min.	**73.28**	**Min.**	**0.004613**	**78.60**
Max.	**87.71**	**Max.**	**0.005210**	**87.82**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Open-Hole Tension Properties (OHT1)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Tension Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100

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

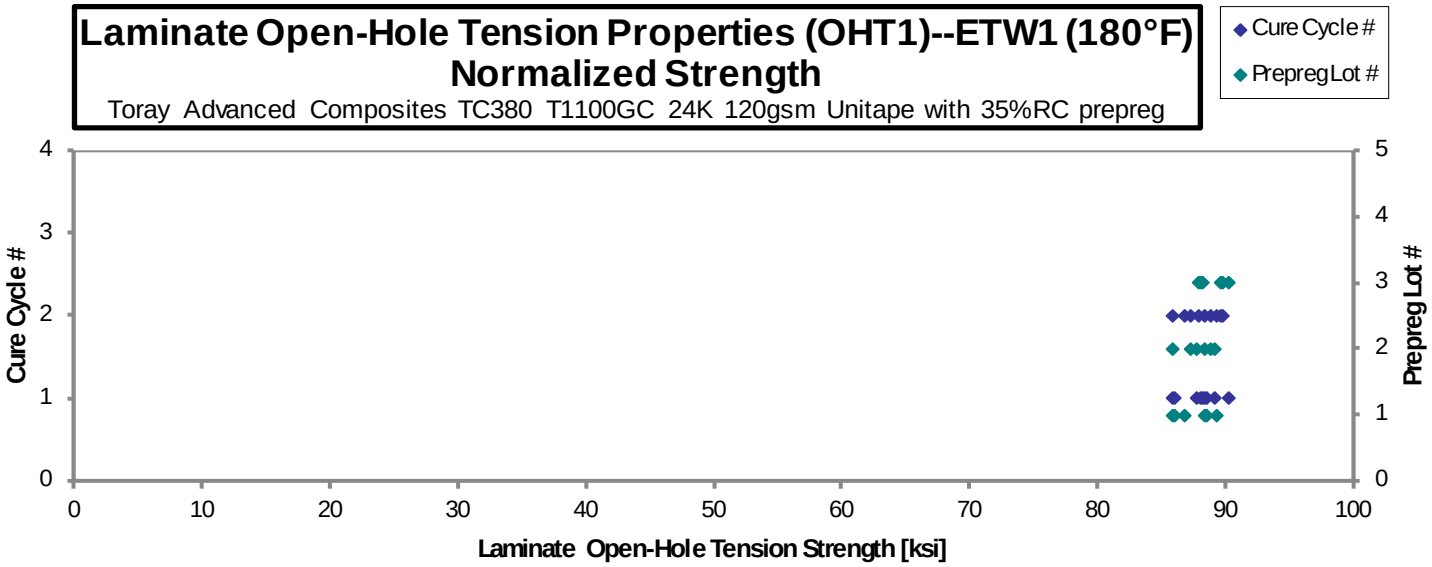
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	**0.004964**	**88.15**
$Standard\ Dev._{norm}$		**1.317**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**1.494**
Min.	**0.004821**	**85.92**
Max.	**0.005153**	**90.20**
Number of Spec.	**18**	**18**


Laminate Open-Hole Tension Properties (OHT1)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
10
20
30
40
50
60
70
80
90
100
Laminate Open-Hole Tension Strength [ksi]

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

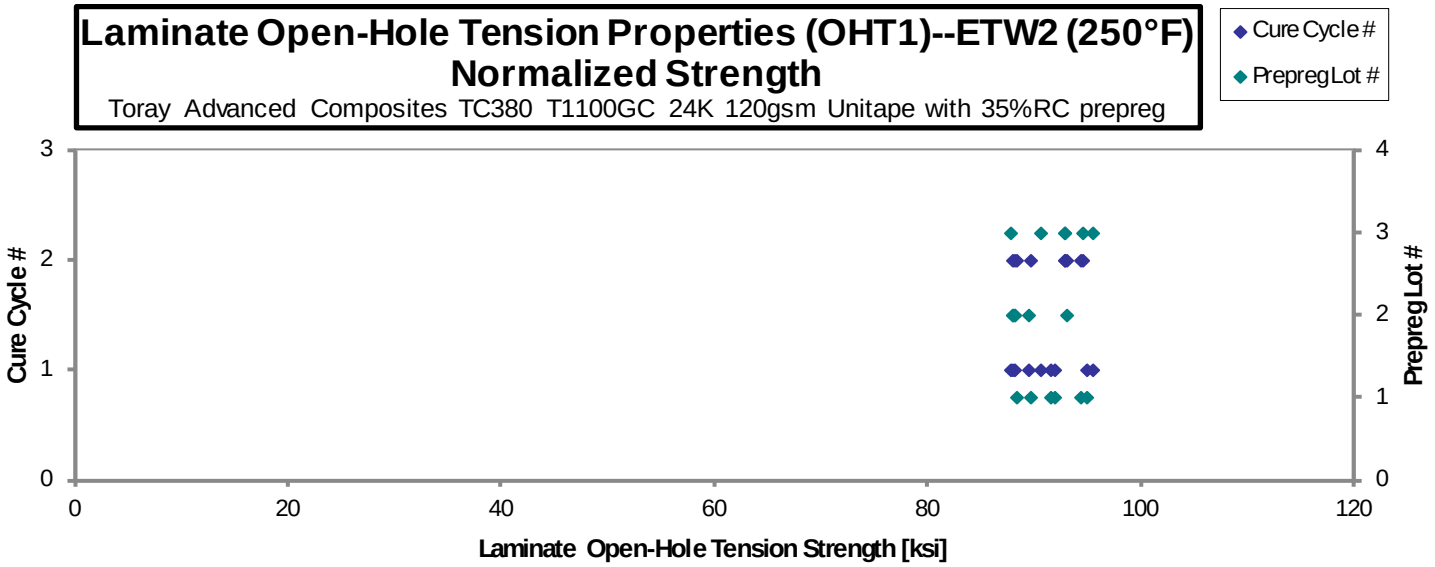
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	**0.004963**	**91.07**
Standard $Dev._{norm}$		**2.745**
Coeff. of Var. $[\%]_{norm}$		**3.015**
Min.	**0.004789**	**87.67**
Max.	**0.005151**	**95.41**
Number of Spec.	**18**	**18**


Laminate Open-Hole Tension Properties (OHT1)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
Laminate Open-Hole Tension Strength [ksi]

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

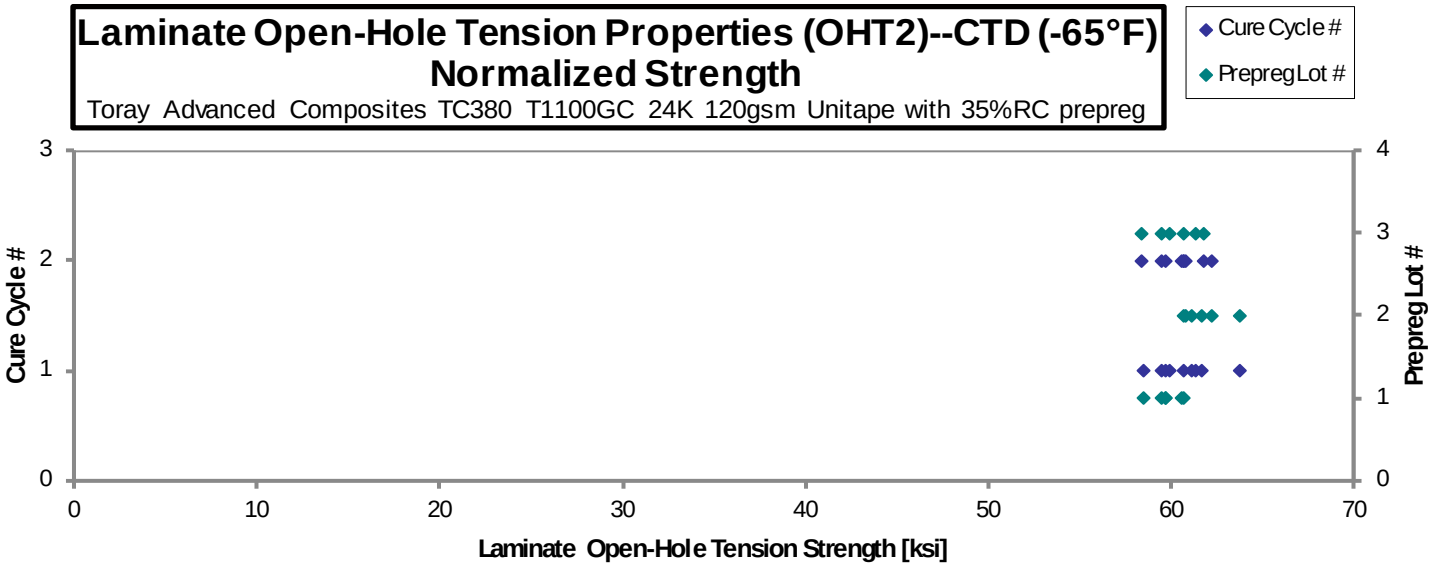
Laminate Open-Hole Tension Properties (OHT2)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	0.004930	60.58
$Standard\ Dev._{norm}$		1.315
$Coeff.\ of\ Var.\ [\%]_{norm}$		2.171
Min.	0.004734	58.41
Max.	0.005042	63.74
Number of Spec.	18	18


Laminate Open-Hole Tension Properties (OHT2)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
70
Laminate Open-Hole Tension Strength [ksi]

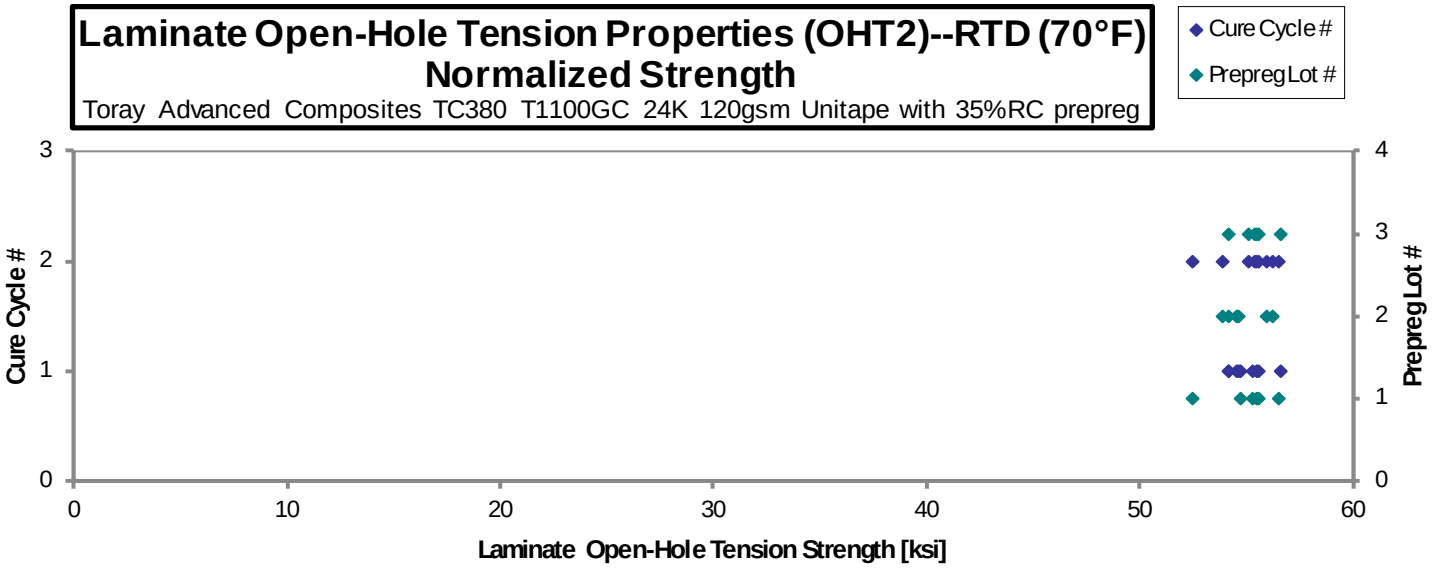
Laminate Open-Hole Tension Properties (OHT2)--RTD (70°F)□
Strength□

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**53.86**	**$Average_{norm}$**	**0.004914**	**55.09**
Standard Dev.	**1.659**	**$Standard\ Dev._{norm}$**		**1.023**
Coeff. of Var. [%]	**3.081**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.857**
Min.	**50.66**	**Min.**	**0.004698**	**52.51**
Max.	**56.61**	**Max.**	**0.005166**	**56.62**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Open-Hole Tension Properties (OHT2)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
Laminate Open-Hole Tension Strength [ksi]

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

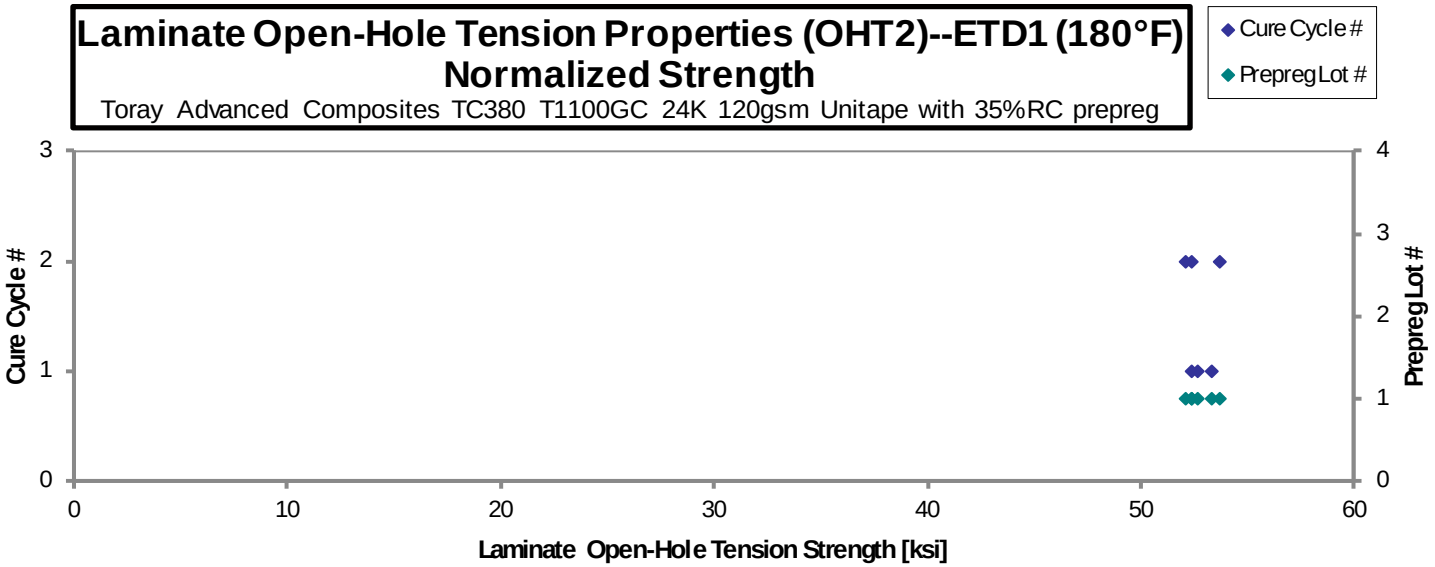
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDEA111C	A	C1	1	1	51.75	0.09892	20	M(A,D)GM	0.004946	53.32
TCDEA112C	A	C1	1	1	51.02	0.09860	20	M(A,D)GM	0.004930	52.40
TCDEA113C	A	C1	1	1	53.45	0.09465	20	M(A,D)GM	0.004733	52.70
TCDEA211C	A	C2	1	2	51.86	0.09692	20	M(A,D)GM	0.004846	52.35
TCDEA212C	A	C2	1	2	53.46	0.09648	20	M(A,D)GM	0.004824	53.72
TCDEA213C	A	C2	1	2	54.11	0.09253	20	M(A,D)GM	0.004627	52.16

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

$Average_{norm}$	**0.004818**	**52.78**
$Standard\ Dev._{norm}$		**0.6183**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**1.172**
Min.	**0.004627**	**52.16**
Max.	**0.004946**	**53.72**
Number of Spec.	**6**	**6**


Laminate Open-Hole Tension Properties (OHT2)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
Laminate Open-Hole Tension Strength [ksi]

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

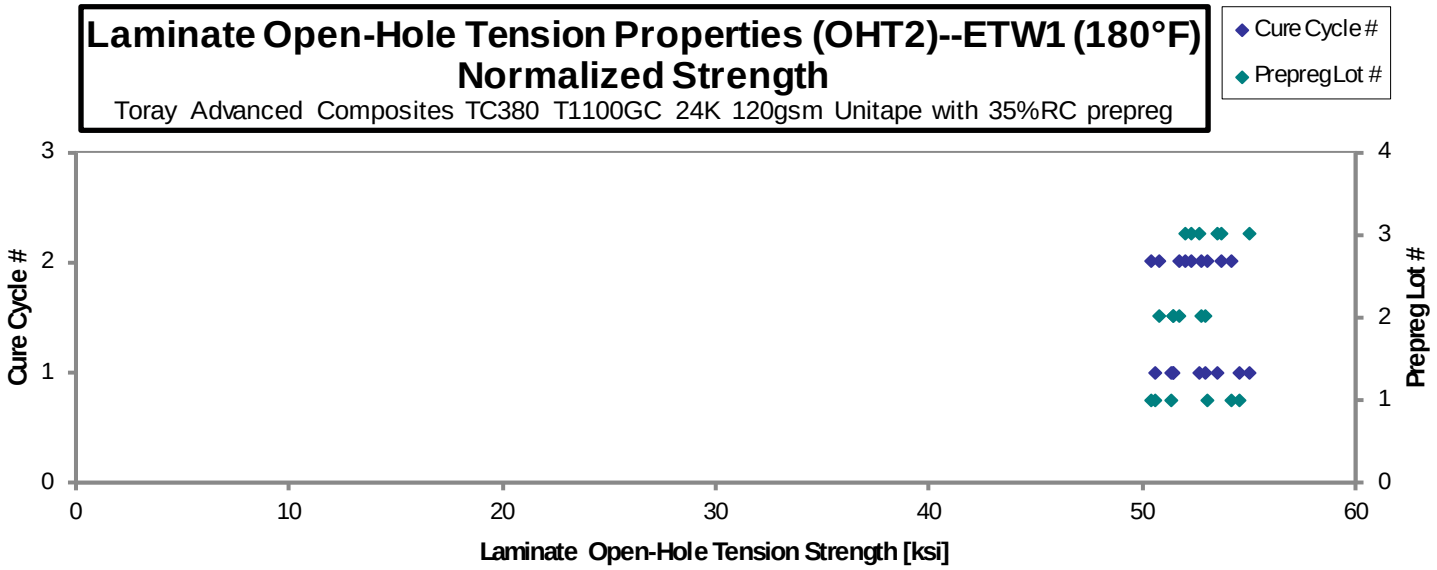
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

$Average_{norm}$	**0.004893**	**52.50**
$Standard\ Dev._{norm}$		**1.365**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**2.600**
Min.	**0.004607**	**50.40**
Max.	**0.005134**	**55.03**
Number of Spec.	**18**	**18**


Laminate Open-Hole Tension Properties (OHT2)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
Laminate Open-Hole Tension Strength [ksi]

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

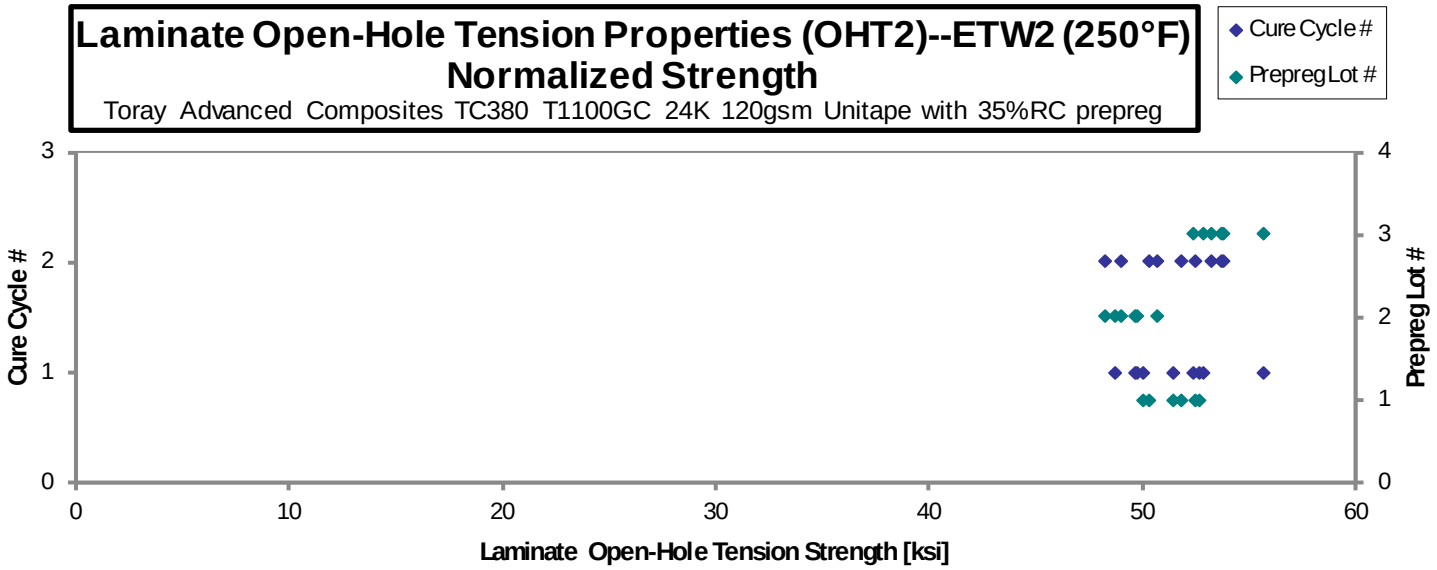
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Open-Hole Tension Properties (OHT2)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
Laminate Open-Hole Tension Strength [ksi]

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

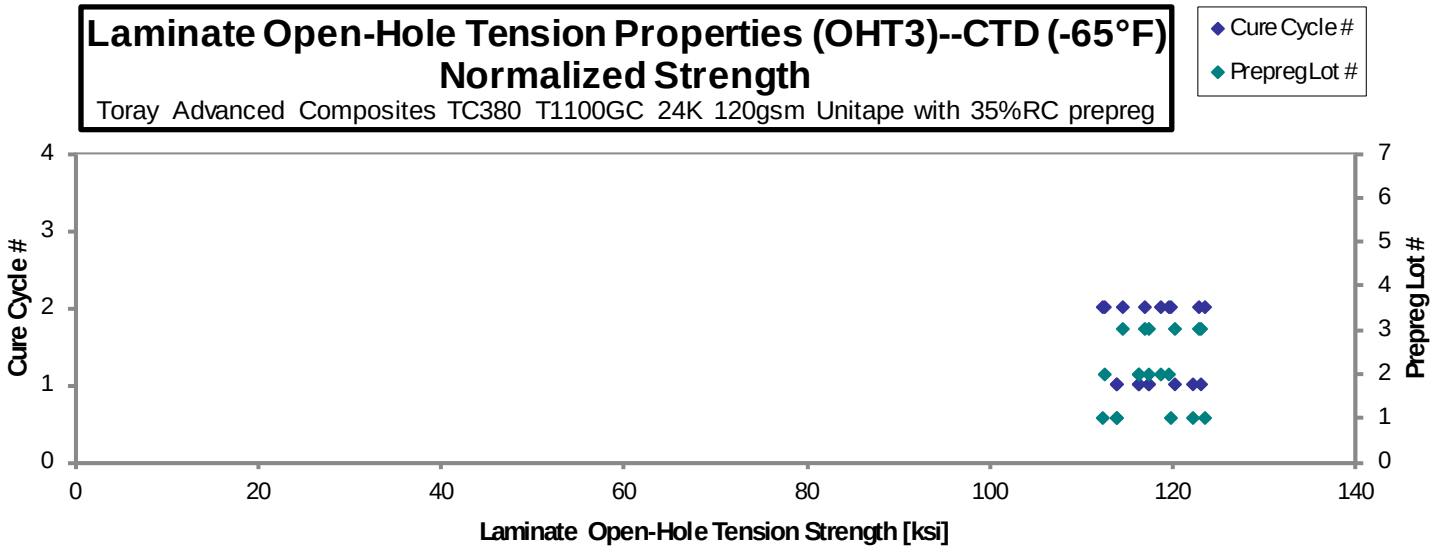
Laminate Open-Hole Tension Properties (OHT3)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDFA111B	A	C1	1	1	112.4	0.09743	20	M(A,L)GM	0.004872	114.0
TCDFA112B	A	C1	1	1	120.5	0.09740	20	M(A,L)GM	0.004870	122.3
TCDFA113B	A	C1	1	1	113.0	0.09687	20	M(A,L)GM	0.004843	114.1
TCDFA211B	A	C2	1	2	112.5	0.09590	20	M(A,L)GM	0.004795	112.3
TCDFA212B	A	C2	1	2	123.5	0.09603	20	M(A,L)GM	0.004802	123.6
TCDFA213B	A	C2	1	2	119.9	0.09598	20	M(A,L)GM	0.004799	119.8
TCDFB111B	B	C1	2	1	112.0	0.1007	20	M(A,L)GM	0.005033	117.4
TCDFB112B	B	C1	2	1	111.1	0.1006	20	M(A,L)GM	0.005029	116.4
TCDFB113B	B	C1	2	1	110.5	0.1010	20	M(A,L)GM	0.005052	116.3
TCDFB211B	B	C2	2	2	112.9	0.1011	20	M(A,L)GM	0.005053	118.8
TCDFB212B	B	C2	2	2	113.9	0.1008	20	M(A,L)GM	0.005041	119.6
TCDFB213B	B	C2	2	2	106.5	0.1016	20	M(A,L)GM	0.005078	112.7
TCDFC111B	C	C1	3	1	119.1	0.09922	20	M(A,L)GM	0.004961	123.1
TCDFC112B	C	C1	3	1	114.6	0.09842	20	M(A,L)GM	0.004921	117.5
TCDFC113B	C	C1	3	1	117.3	0.09847	20	M(A,L)GM	0.004923	120.3
TCDFC211B	C	C2	3	2	109.5	0.1004	20	LGM	0.005021	114.6
TCDFC212B	C	C2	3	2	112.3	0.1001	20	LGM	0.005003	117.0
TCDFC213B	C	C2	3	2	116.9	0.1010	20	LGM	0.005052	123.0

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

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


Laminate Open-Hole Tension Properties (OHT3)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
Laminate Open-Hole Tension Strength [ksi]

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

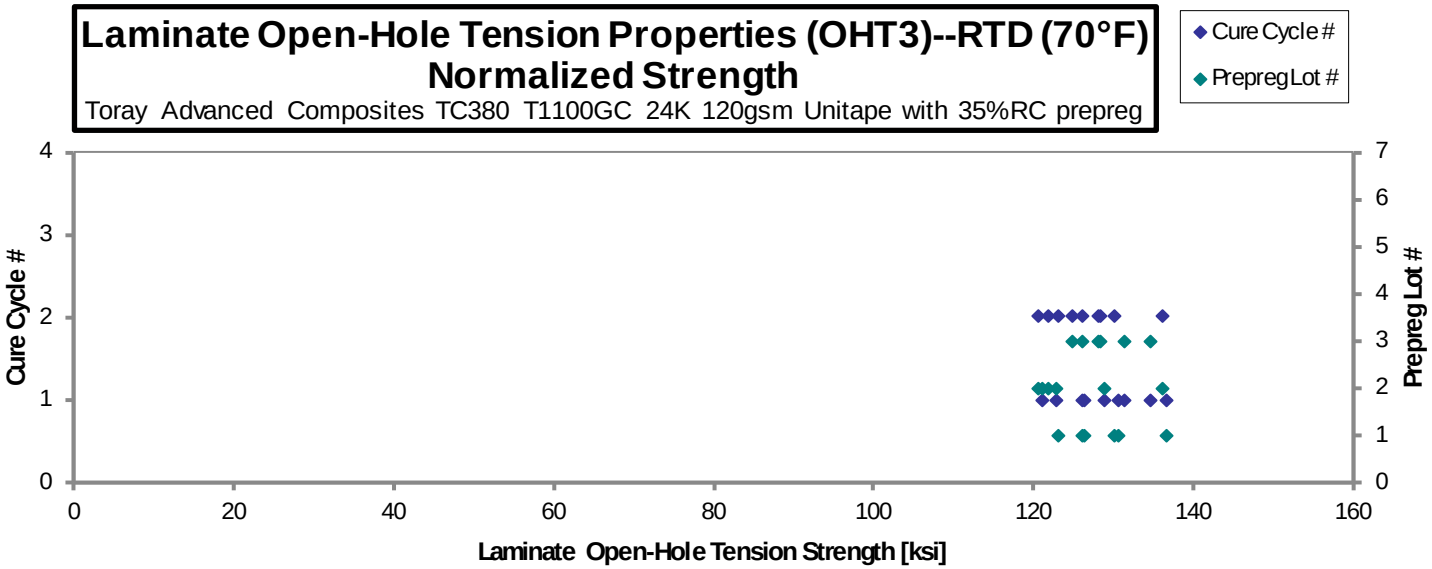
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDFA111A	A	C1	1	1	128.7	0.09437	20	M(A,L)GM	0.004718	126.5
TCDFA112A	A	C1	1	1	133.6	0.09822	20	M(A,L)GM	0.004911	136.7
TCDFA113A	A	C1	1	1	127.7	0.09822	20	M(A,L)GM	0.004911	130.7
TCDFA211A	A	C2	1	2	133.6	0.09355	20	M(A,L)GM	0.004678	130.2
TCDFA212A	A	C2	1	2	124.7	0.09700	20	M(A,L)GM	0.004850	126.0
TCDFA213A	A	C2	1	2	120.9	0.09772	20	M(A,L)GM	0.004886	123.1
TCDFB111A	B	C1	2	1	128.9	0.09595	20	M(A,L)GM	0.004798	128.8
TCDFB112A	B	C1	2	1	113.7	0.1022	20	M(A,L)GM	0.005108	121.0
TCDFB113A	B	C1	2	1	114.6	0.1030	20	M(A,L)GM	0.005152	123.0
TCDFB211A	B	C2	2	2	121.5	0.09623	20	M(A,L)GM	0.004812	121.8
TCDFB212A	B	C2	2	2	114.0	0.1016	20	M(A,L)GM	0.005080	120.6
TCDFB213A	B	C2	2	2	126.4	0.1033	20	M(A,L)GM	0.005165	136.0
TCDFC111A	C	C1	3	1	134.2	0.09403	20	M(A,L)GM	0.004702	131.4
TCDFC112A	C	C1	3	1	129.9	0.09950	20	M(A,L)GM	0.004975	134.7
TCDFC113A	C	C1	3	1	120.4	0.1006	20	M(A,L)GM	0.005028	126.1
TCDFC211A	C	C2	3	2	130.1	0.09463	20	M(A,L)GM	0.004732	128.3
TCDFC212A	C	C2	3	2	122.3	0.1006	20	M(A,L)GM	0.005031	128.2
TCDFC213A	C	C2	3	2	117.5	0.1020	20	M(A,L)GM	0.005098	124.8

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

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


Laminate Open-Hole Tension Properties (OHT3)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
160
Laminate Open-Hole Tension Strength [ksi]

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

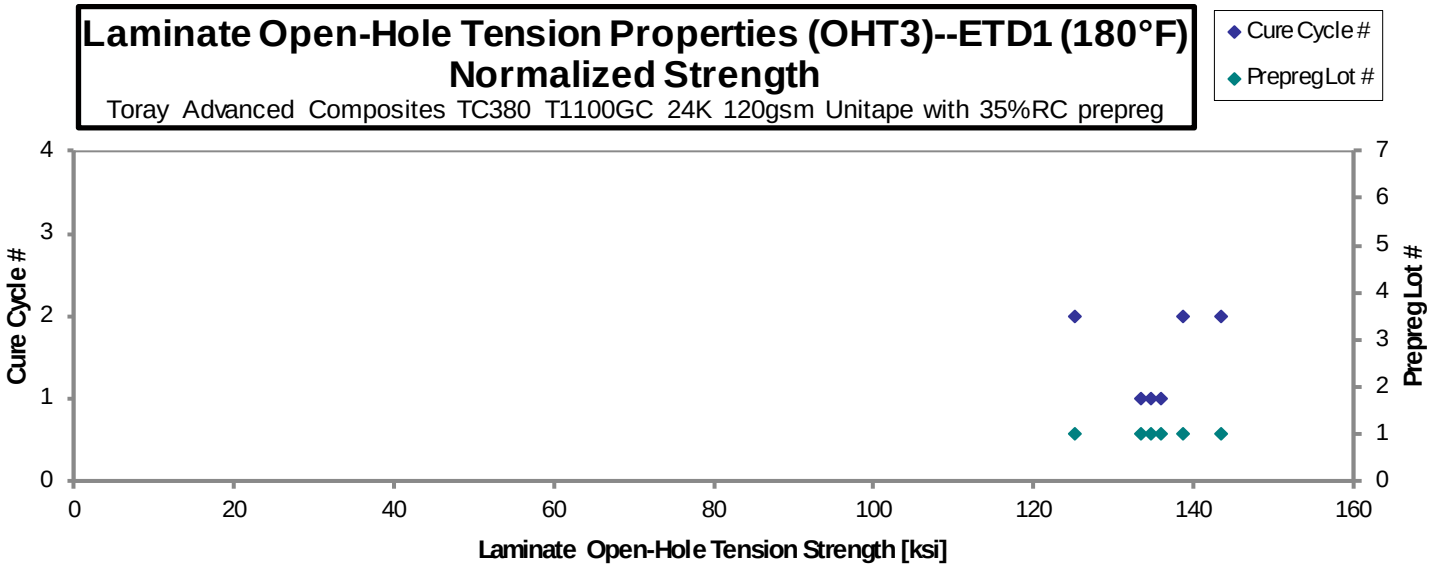
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDFA111C	A	C1	1	1	131.3	0.09843	20	M(A,D)GM	0.004922	134.6
TCDFA112C	A	C1	1	1	130.3	0.09822	20	M(A,D)GM	0.004911	133.3
TCDFA113C	A	C1	1	1	137.7	0.09480	20	M(A,D)GM	0.004740	136.0
TCDFA211C	A	C2	1	2	123.3	0.09743	20	M(A,D,L)GM	0.004872	125.2
TCDFA212C	A	C2	1	2	136.6	0.09742	20	M(A,D,L)GM	0.004871	138.6
TCDFA213C	A	C2	1	2	147.6	0.09328	20	M(A,D,L)GM	0.004664	143.4

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

$Average_{norm}$	**0.004830**	**135.2**
$Standard\ Dev._{norm}$		**6.084**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**4.501**
Min.	**0.004664**	**125.2**
Max.	**0.004922**	**143.4**
Number of Spec.	**6**	**6**


Laminate Open-Hole Tension Properties (OHT3)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Tension Strength [ksi]
0
1
2
3
4
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
160

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

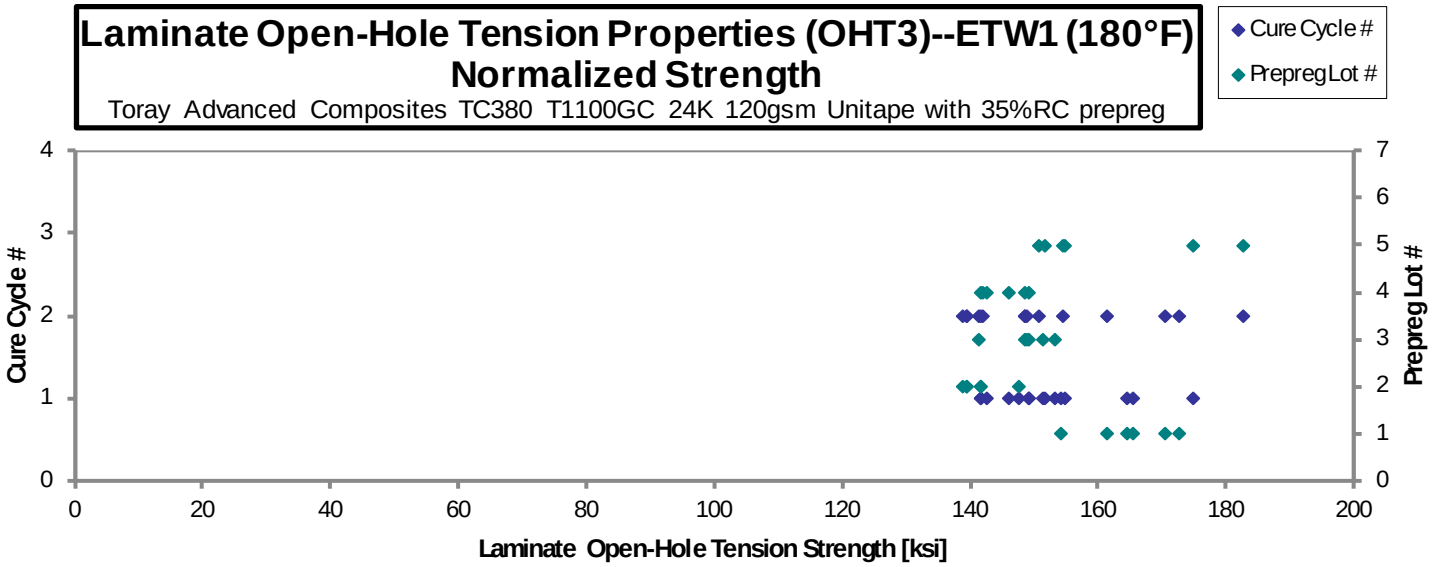
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDFA111D	A	C1	1	1	161.0	0.09803	20	M(A,L)GM	0.004902	164.4
TCDFA112D	A	C1	1	1	161.9	0.09815	20	M(A,L)GM	0.004908	165.5
TCDFA113D	A	C1	1	1	152.8	0.09673	20	M(A,L)GM	0.004837	153.9
TCDFA211D	A	C2	1	2	160.5	0.09657	20	M(A,L)GM	0.004828	161.4
TCDFA212D	A	C2	1	2	170.5	0.09598	20	M(A,L)GM	0.004799	170.5
TCDFA213D	A	C2	1	2	174.6	0.09480	20	M(A,L)GM	0.004740	172.4
TCDFB111D	B	C1	2	1	137.0	0.1034	20	AGM, LWB	0.005169	147.5
TCDFB112D	B	C1	2	1	143.7	0.09452	20	AGM	0.004726	141.5
TCDFB113D	B	C1	2	1	134.2	0.1013	20	M(A,L)GM	0.005064	141.6
TCDFB211D	B	C2	2	2	129.6	0.1033	20	M(A,L)GM	0.005164	139.5
TCDFB212D	B	C2	2	2	141.8	0.09428	20	M(A,L)GM	0.004714	139.3
TCDFB213D	B	C2	2	2	131.5	0.1013	20	M(A,L)GM	0.005065	138.8
TCDFC111D	C	C1	3	1	145.7	0.09967	20	AGM	0.004983	151.3
TCDFC112D	C	C1	3	1	151.8	0.09420	20	AGM	0.004710	149.0
TCDFC113D	C	C1	3	1	149.6	0.09822	20	AGM	0.004911	153.0
TCDFC211D	C	C2	3	2	133.3	0.1017	20	M(A,L)GM	0.005086	141.2
TCDFC212D	C	C2	3	2	151.4	0.09428	20	M(A,L)GM	0.004714	148.7
TCDFC213D	C	C2	3	2	143.8	0.09902	20	M(A,L)GM	0.004951	148.3
TCDFD111D	D	C1	4	1	158.3	0.09045	20	AGM	0.004523	149.1
TCDFD112D	D	C1	4	1	144.2	0.09710	20	AGM	0.004855	145.9
TCDFD113D	D	C1	4	1	139.0	0.09845	20	AGM	0.004923	142.6
TCDFD211D	D	C2	4	2	156.9	0.09075	20	AGM	0.004538	148.4
TCDFD212D	D	C2	4	2	141.2	0.09630	20	AGM	0.004815	141.6
TCDFD213D	D	C2	4	2	138.7	0.09813	20	AGM	0.004907	141.8
TCDFE111D	E	C1	5	1	156.6	0.09482	20	AGM	0.004741	154.6
TCDFE112D	E	C1	5	1	169.3	0.09918	20	AGM	0.004959	174.9
TCDFE113D	E	C1	5	1	145.2	0.1001	20	AGM	0.005007	151.4
TCDFE211D	E	C2	5	2	186.8	0.09385	20	AGM	0.004693	182.6
TCDFE212D	E	C2	5	2	150.0	0.09880	20	AGM	0.004940	154.3
TCDFE213D	E	C2	5	2	145.1	0.09975	20	AGM	0.004988	150.7

Average	**150.2**	
Standard Dev.	**13.55**	
Coeff. of Var. [%]	**9.019**	
Min.	**129.6**	
Max.	**186.8**	
Number of Spec.	**30**	

$Average_{norm}$	**0.004872**	**152.2**
$Standard\ Dev._{norm}$		**11.61**
Coeff. of Var. [%]$_{norm}$		**7.626**
Min.	**0.004523**	**138.8**
Max.	**0.005169**	**182.6**
Number of Spec.	**30**	**30**


Laminate Open-Hole Tension Properties (OHT3)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Tension Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3
4
0
1
2
3
4
5
6
7

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

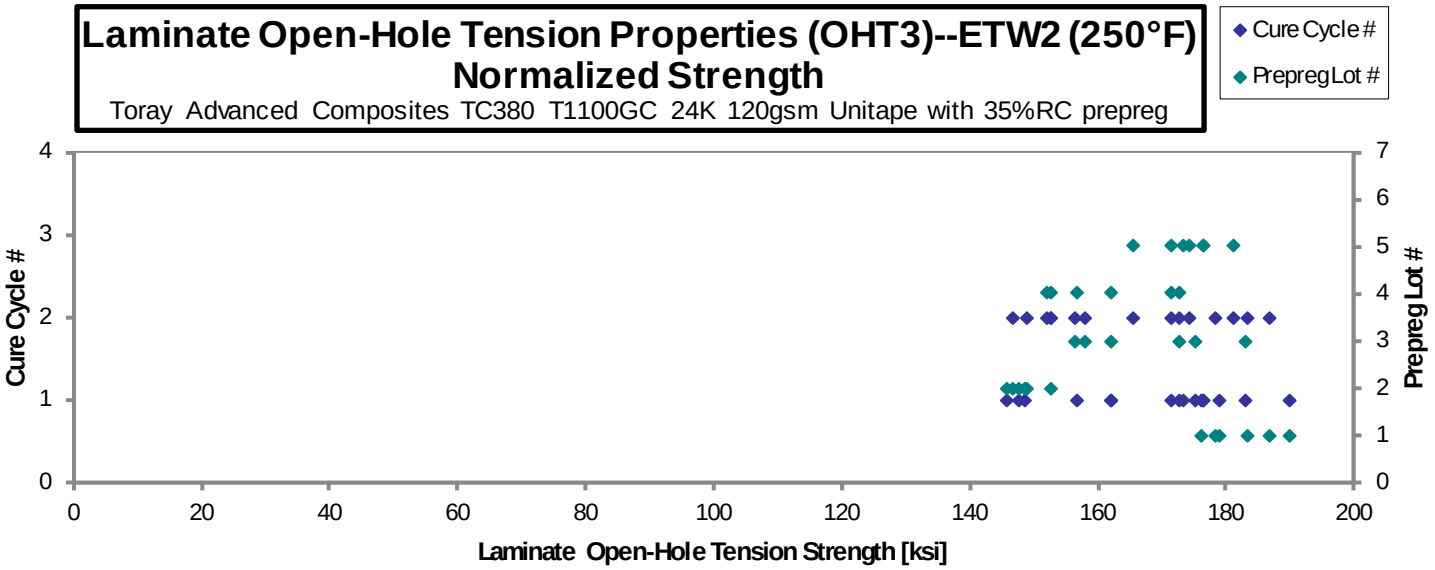
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDFA111E	A	C1	1	1	176.2	0.09610	20	M(A,D,L)GM, M(A,L)GB	0.004805	176.4
TCDFA112E	A	C1	1	1	177.4	0.09685	20	M(A,D)GM	0.004843	179.0
TCDFA113E	A	C1	1	1	186.8	0.09763	20	M(A,D)GM, M(A,L)GB	0.004882	190.0
TCDFA211E	A	C2	1	2	186.9	0.09602	20	M(A,D,L)GM, M(A,L)GB, M(A,L)GT	0.004801	186.9
TCDFA212E	A	C2	1	2	178.0	0.09635	20	M(A,D,L)GM, M(A,L)GB, M(A,L)GT	0.004818	178.6
TCDFA213E	A	C2	1	2	181.9	0.09678	20	M(A,D,L)GM, M(A,L)GB, M(A,L)GT	0.004839	183.4
TCDFB111E	B	C1	2	1	140.4	0.1011	20	M(A,D,L)GM	0.005056	147.9
TCDFB112E	B	C1	2	1	143.8	0.09935	20	M(A,D,L)GM	0.004968	148.8
TCDFB113E	B	C1	2	1	140.3	0.09973	20	M(A,D,L)GM	0.004987	145.8
TCDFB211E	B	C2	2	2	141.9	0.1008	20	M(A,D)GM	0.005041	149.0
TCDFB212E	B	C2	2	2	140.8	0.1002	20	M(A,D)GM	0.005010	146.9
TCDFB213E	B	C2	2	2	146.7	0.09993	20	M(A,D)GM	0.004997	152.7
TCDFC111E	C	C1	3	1	178.6	0.09847	20	M(A,D)GM	0.004923	183.2
TCDFC112E	C	C1	3	1	159.5	0.09757	20	M(A,D)GM	0.004878	162.1
TCDFC113E	C	C1	3	1	172.2	0.09777	20	M(A,D)GM	0.004888	175.4
TCDFC211E	C	C2	3	2	154.1	0.09843	20	M(A,D)GM, LWB	0.004922	158.0
TCDFC212E	C	C2	3	2	153.1	0.09818	20	M(A,D)GM, M(A,L)AB	0.004909	156.6
TCDFC213E	C	C2	3	2	167.6	0.09905	20	M(A,D)GM, M(A,L)AB	0.004953	172.9
TCDFD111E	D	C1	4	1	173.1	0.09580	20	AGM	0.004790	172.7
TCDFD112E	D	C1	4	1	162.7	0.09565	20	AGM	0.004783	162.1
TCDFD113E	D	C1	4	1	155.6	0.09680	20	AGM	0.004840	156.9
TCDFD211E	D	C2	4	2	172.2	0.09560	20	AGM	0.004780	171.5
TCDFD212E	D	C2	4	2	151.9	0.09618	20	AGM	0.004809	152.2
TCDFD213E	D	C2	4	2	150.7	0.09727	20	AGM	0.004863	152.7
TCDFE111E	E	C1	5	1	171.6	0.09873	20	AGM, LIT	0.004937	176.5
TCDFE112E	E	C1	5	1	167.7	0.09927	20	AGM	0.004963	173.4
TCDFE113E	E	C1	5	1	170.3	0.09960	20	AGM	0.004980	176.7
TCDFE114E	E	C1	5	1	162.5	0.1013	20	AGM	0.005065	171.5
TCDFE211E	E	C2	5	2	179.2	0.09710	20	AGM	0.004855	181.2
TCDFE212E	E	C2	5	2	171.7	0.09745	20	AGM	0.004873	174.3
TCDFE213E	E	C2	5	2	161.5	0.09840	20	AGM	0.004920	165.5

Average	**163.8**	
Standard Dev.	**14.41**	
Coeff. of Var. [%]	**8.798**	
Min.	**140.3**	
Max.	**186.9**	
Number of Spec.	**31**	

$Average_{norm}$	**0.004902**	**167.1**
Standard $Dev._{norm}$		**13.32**
Coeff. of Var. $[\%]_{norm}$		**7.973**
Min.	**0.004780**	**145.8**
Max.	**0.005065**	**190.0**
Number of Spec.	**31**	**31**


Laminate Open-Hole Tension Properties (OHT3)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Tension Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3
4
0
1
2
3
4
5
6
7

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

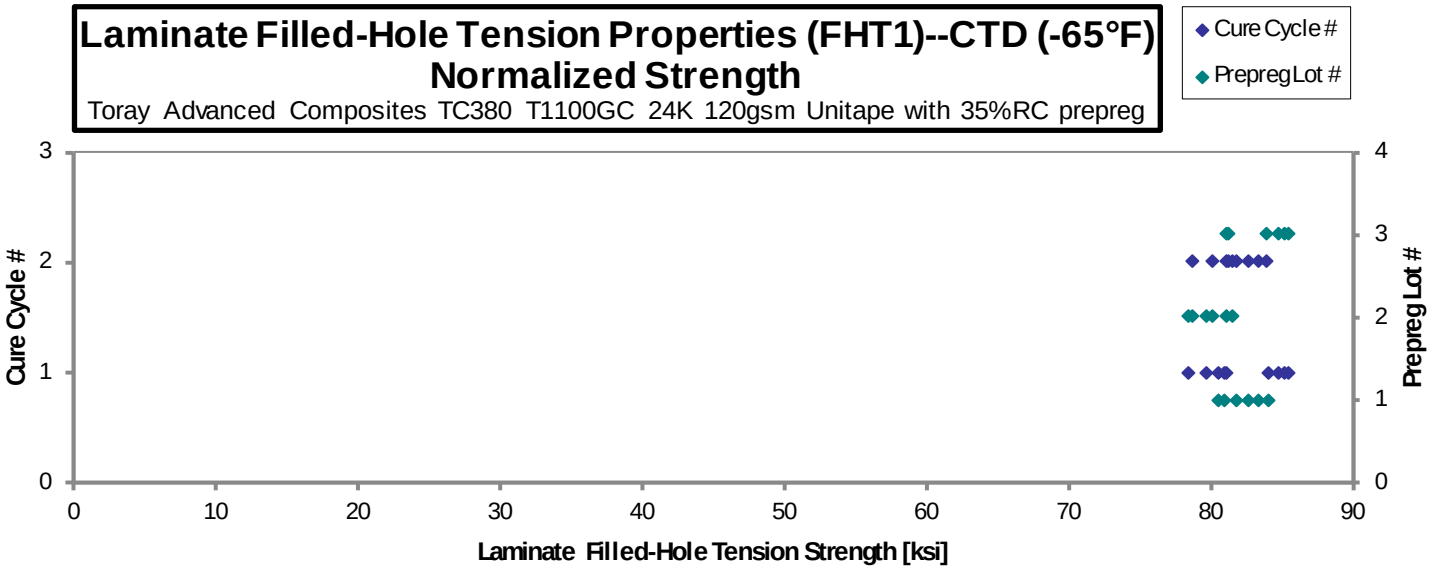
Laminate Filled-Hole Tension Properties (FHT1)--CTD (-65°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Filled-Hole Tension Properties (FHT1)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4

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

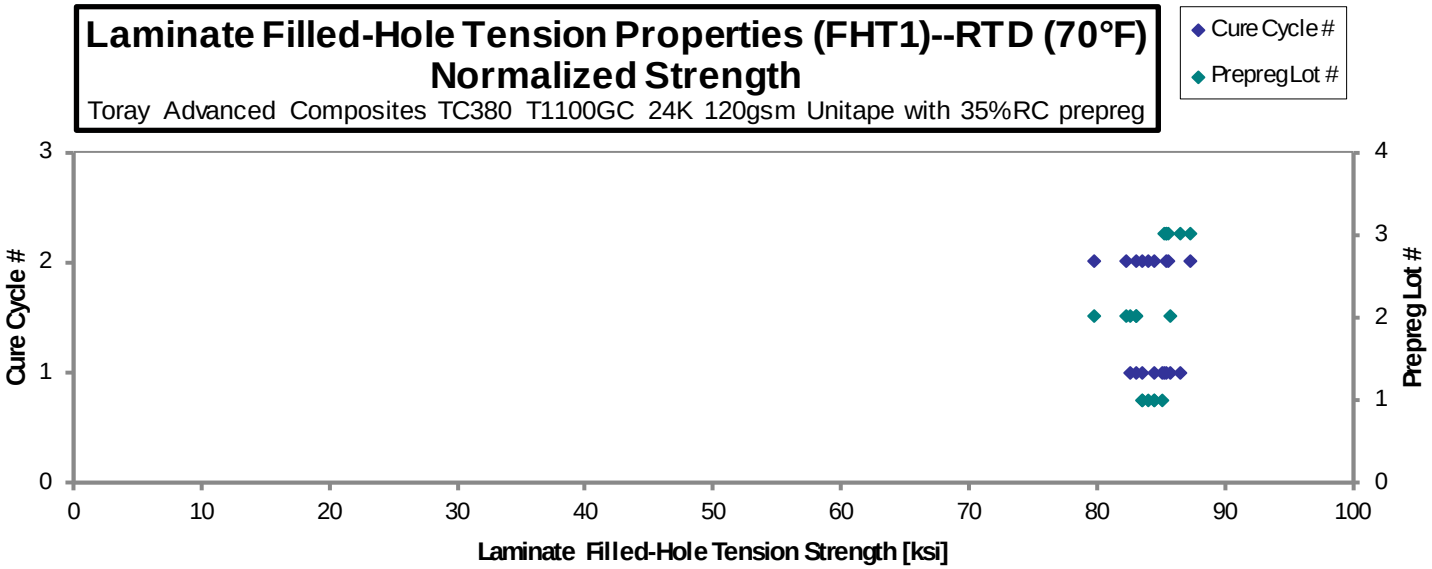
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Filled-Hole Tension Properties (FHT1)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
80
90
100
0
1
2
3
4

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

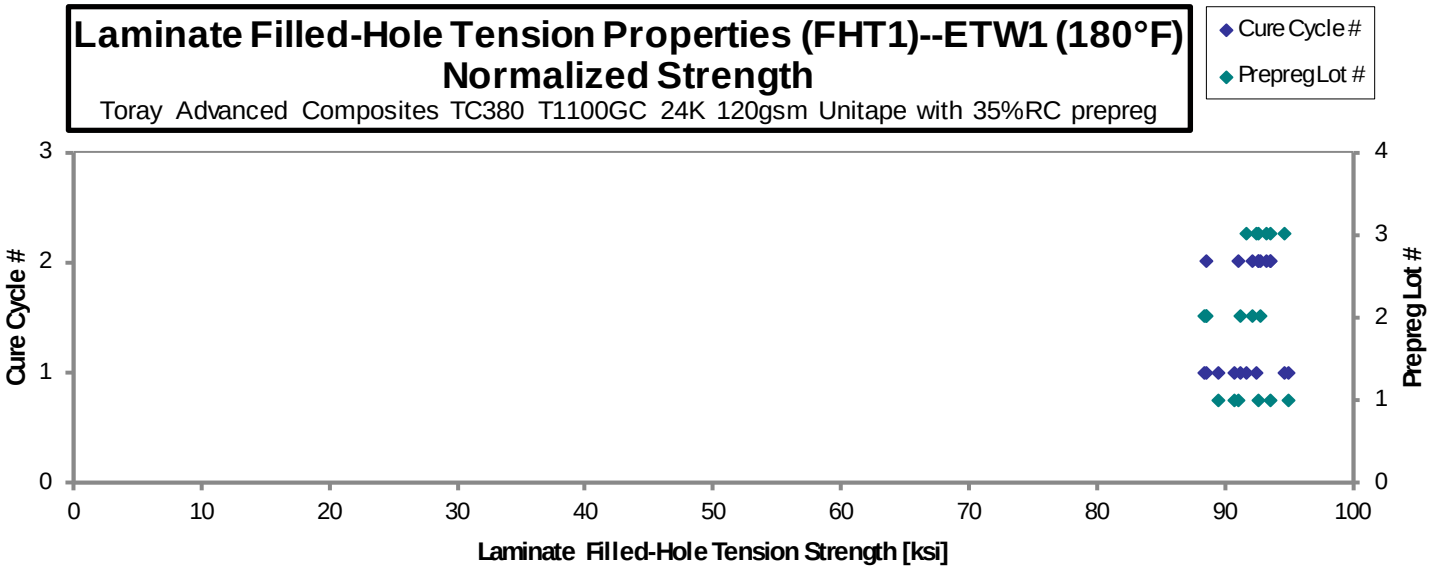
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

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

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

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


Laminate Filled-Hole Tension Properties (FHT1)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100
Laminate Filled-Hole Tension Strength [ksi]

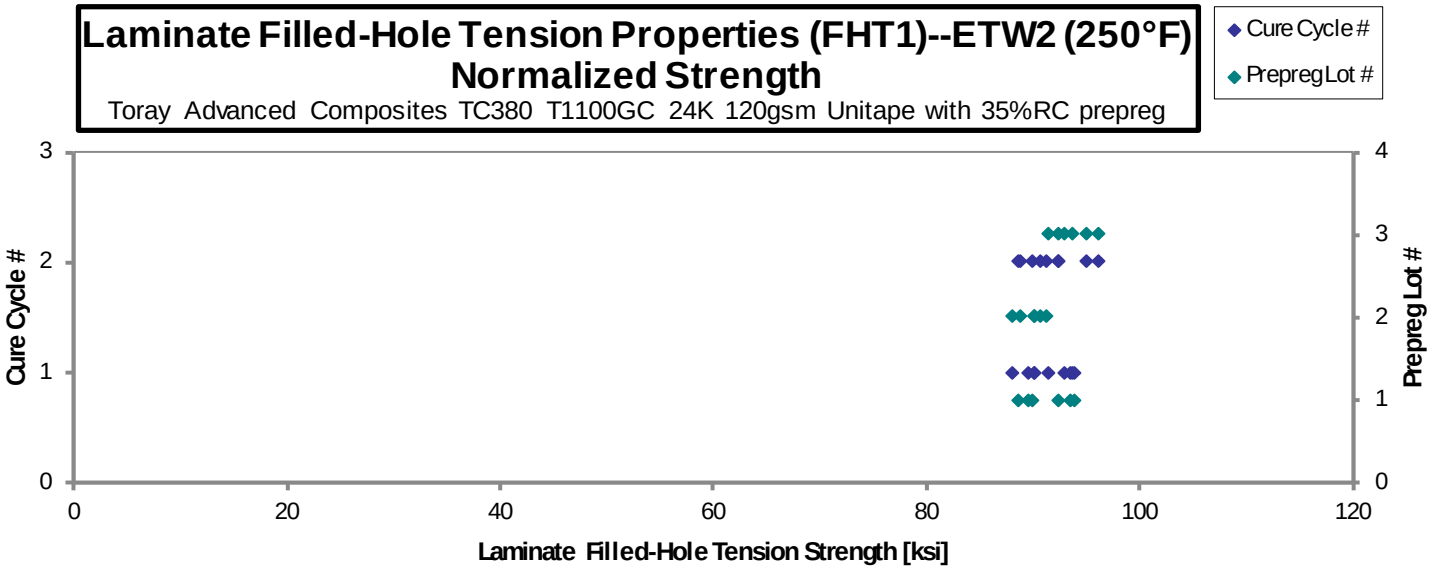
Laminate Filled-Hole Tension Properties (FHT1)--ETW2 (250°F)□
Strength□

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

normalizing t_{ply} [in]
0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**89.52**	**$Average_{norm}$**	**0.004911**	**91.56**
Standard Dev.	**3.086**	**$Standard\ Dev._{norm}$**		**2.302**
Coeff. of Var. [%]	**3.448**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.514**
Min.	**84.68**	**Min.**	**0.004751**	**88.09**
Max.	**94.73**	**Max.**	**0.005034**	**96.07**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Filled-Hole Tension Properties (FHT1)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
Laminate Filled-Hole Tension Strength [ksi]

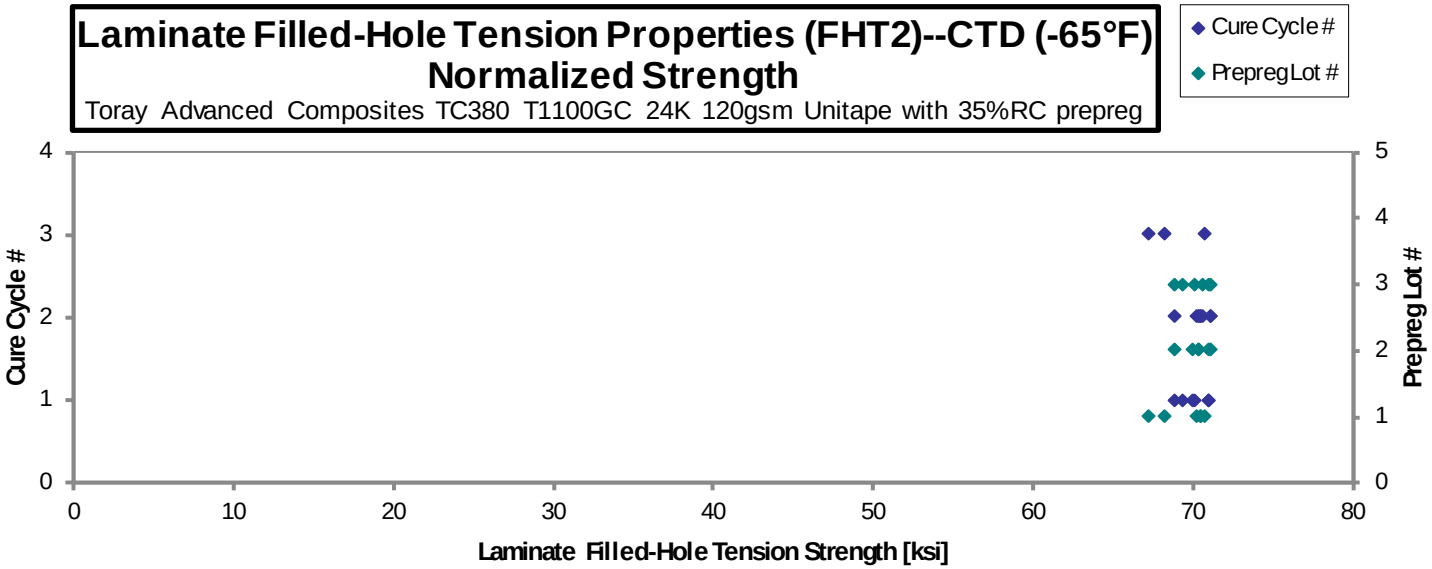
4.19 "10/80/10" Filled-Hole Tension 2 Properties (FHT2)

Laminate Filled-Hole Tension Properties (FHT2)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

	Strength		$Strength_{norm}$
Average	68.50	$Average_{norm}$	0.004906	69.97
Standard Dev.	1.771	$Standard\ Dev._{norm}$		1.097
Coeff. of Var. [%]	2.586	$Coeff.\ of\ Var.\ [\%]_{norm}$		1.567
Min.	65.98	Min.	0.004647	67.24
Max.	73.03	Max.	0.005022	71.12
Number of Spec.	18	Number of Spec.	18	18


Laminate Filled-Hole Tension Properties (FHT2)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
80
0
1
2
3
4
5

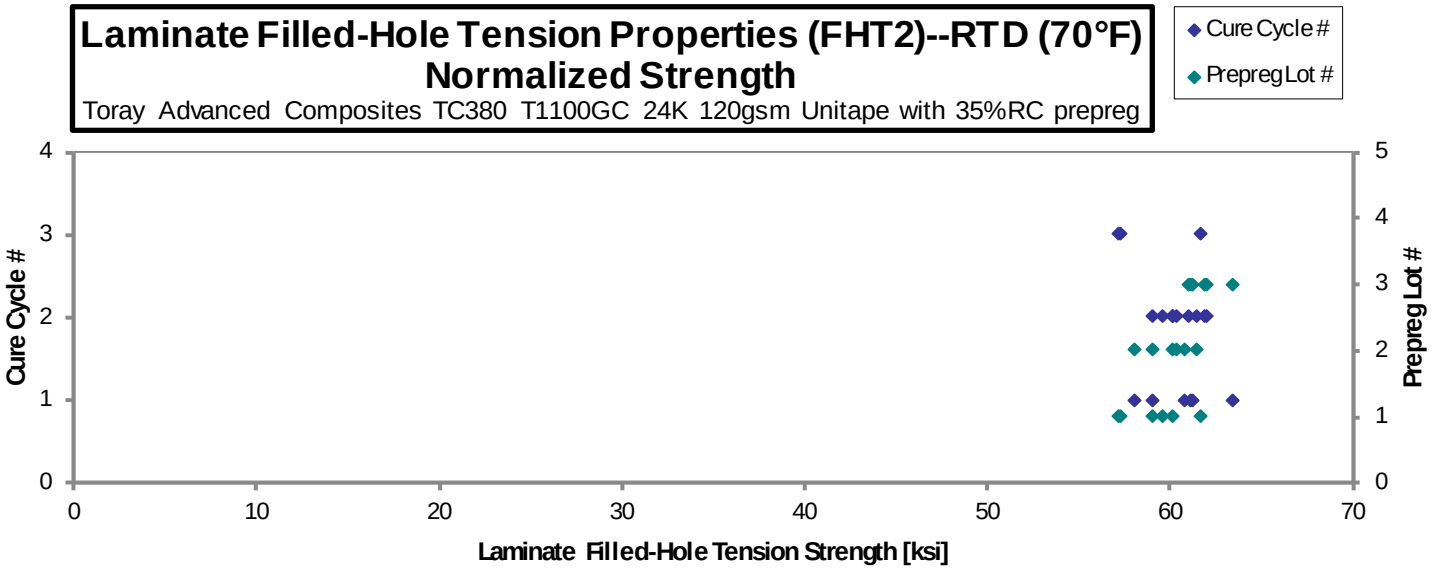
Laminate Filled-Hole Tension Properties (FHT2)--RTD (70°F)
Strength

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

normalizing t_{ply} [in]
0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**59.45**	**$Average_{norm}$**	**0.004870**	**60.28**
Standard Dev.	**1.853**	**$Standard\ Dev._{norm}$**		**1.685**
Coeff. of Var. [%]	**3.116**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.795**
Min.	**55.69**	**Min.**	**0.004634**	**57.19**
Max.	**62.58**	**Max.**	**0.005110**	**63.44**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Filled-Hole Tension Properties (FHT2)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4
5

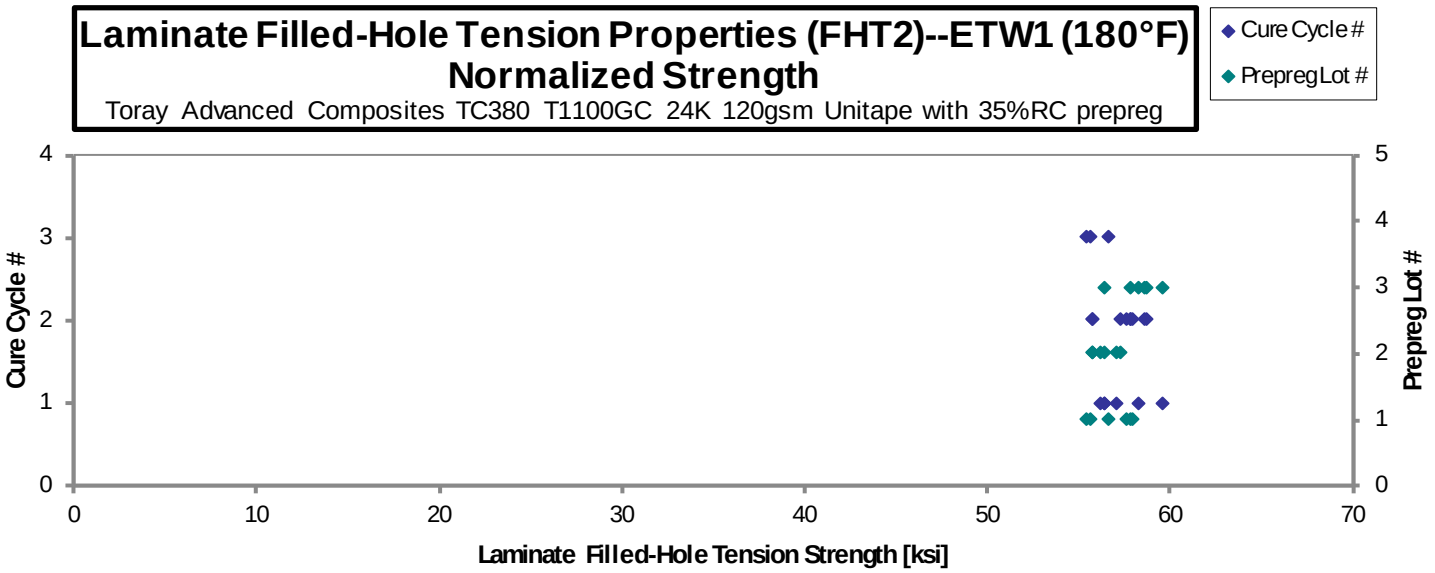
Laminate Filled-Hole Tension Properties (FHT2)--ETW1 (180°F)□
Strength□

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

normalizing t_{ply} [in]
0.004800

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

	Strength		$Strength_{norm}$
Average	**56.72**	**$Average_{norm}$**	**0.004840**	**57.14**
Standard Dev.	**1.836**	**$Standard\ Dev._{norm}$**		**1.204**
Coeff. of Var. [%]	**3.237**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.107**
Min.	**53.70**	**Min.**	**0.004568**	**55.41**
Max.	**59.65**	**Max.**	**0.005098**	**59.55**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Filled-Hole Tension Properties (FHT2)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4
5

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

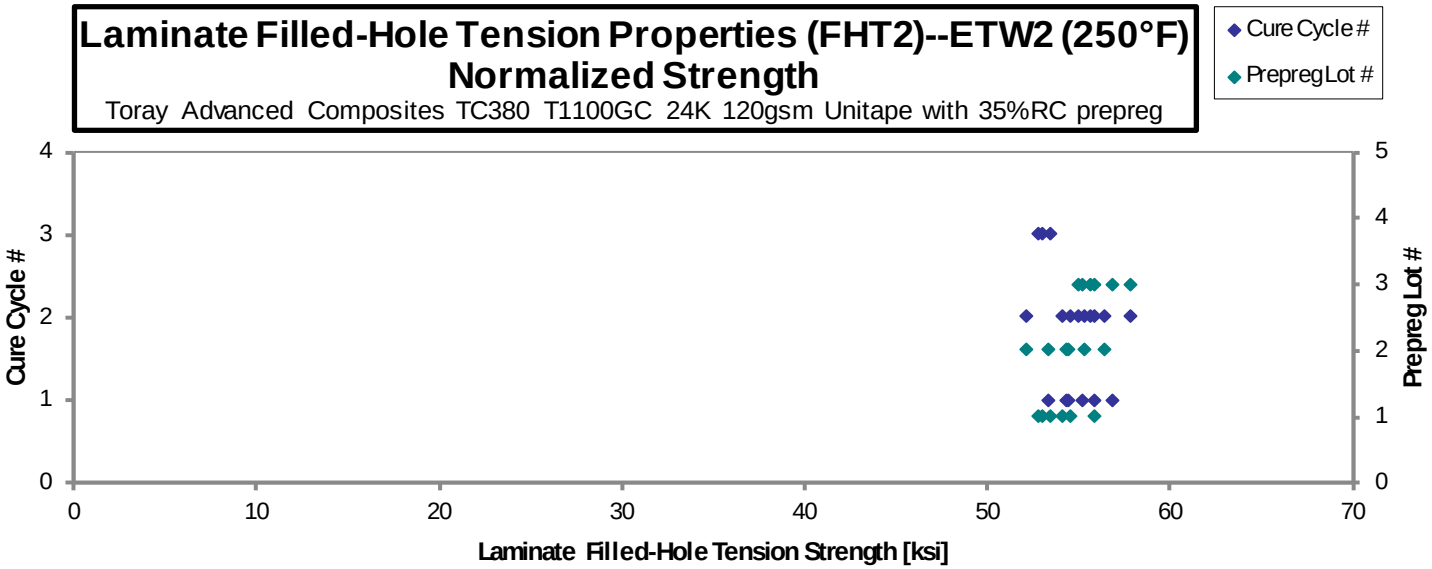
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	**0.004862**	**54.75**
Standard $Dev._{norm}$		**1.505**
Coeff. of $Var._{norm}$ [%]		**2.749**
Min.	**0.004596**	**52.08**
Max.	**0.004988**	**57.79**
Number of Spec.	**18**	**18**


Laminate Filled-Hole Tension Properties (FHT2)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Tension Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4
5

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

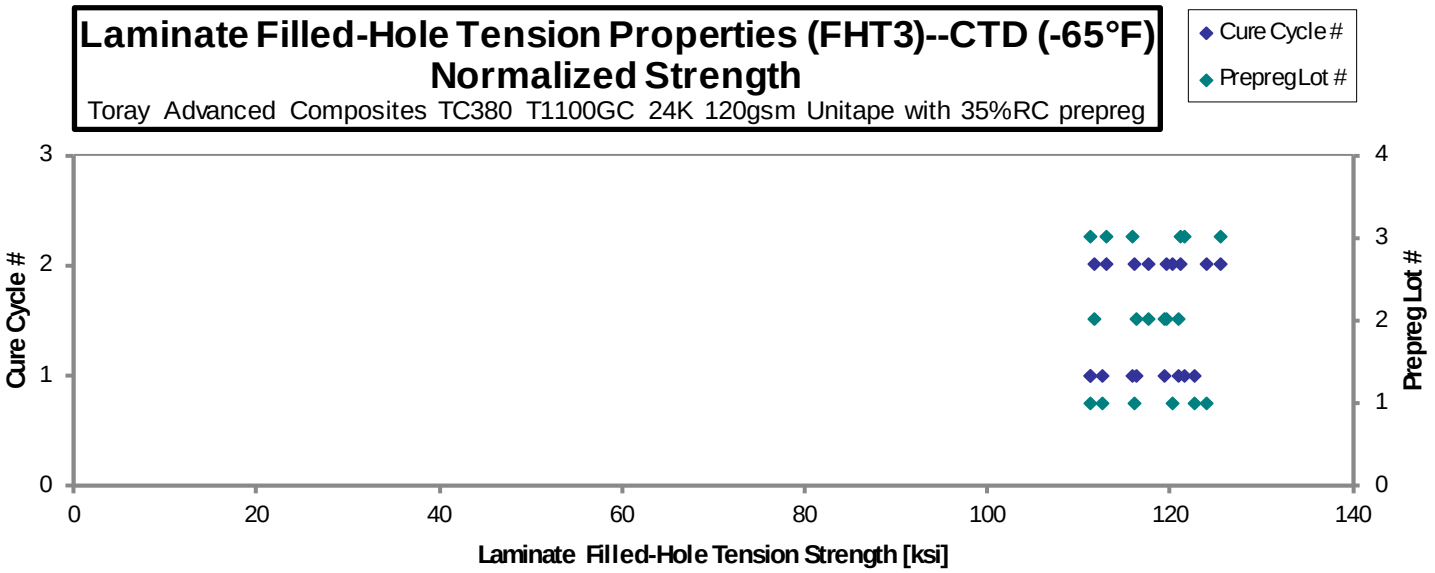
Laminate Filled-Hole Tension Properties (FHT3)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Filled-Hole Tension Properties (FHT3)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
Laminate Filled-Hole Tension Strength [ksi]

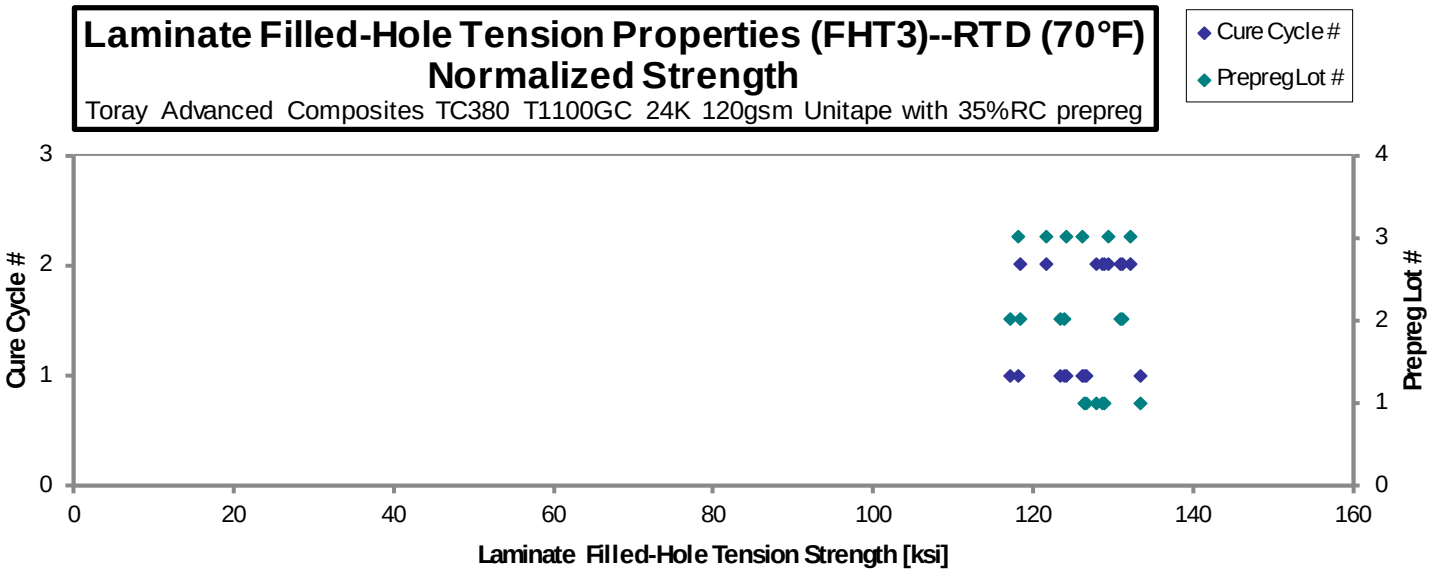
Laminate Filled-Hole Tension Properties (FHT3)--RTD (70°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Filled-Hole Tension Properties (FHT3)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
160
Laminate Filled-Hole Tension Strength [ksi]

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

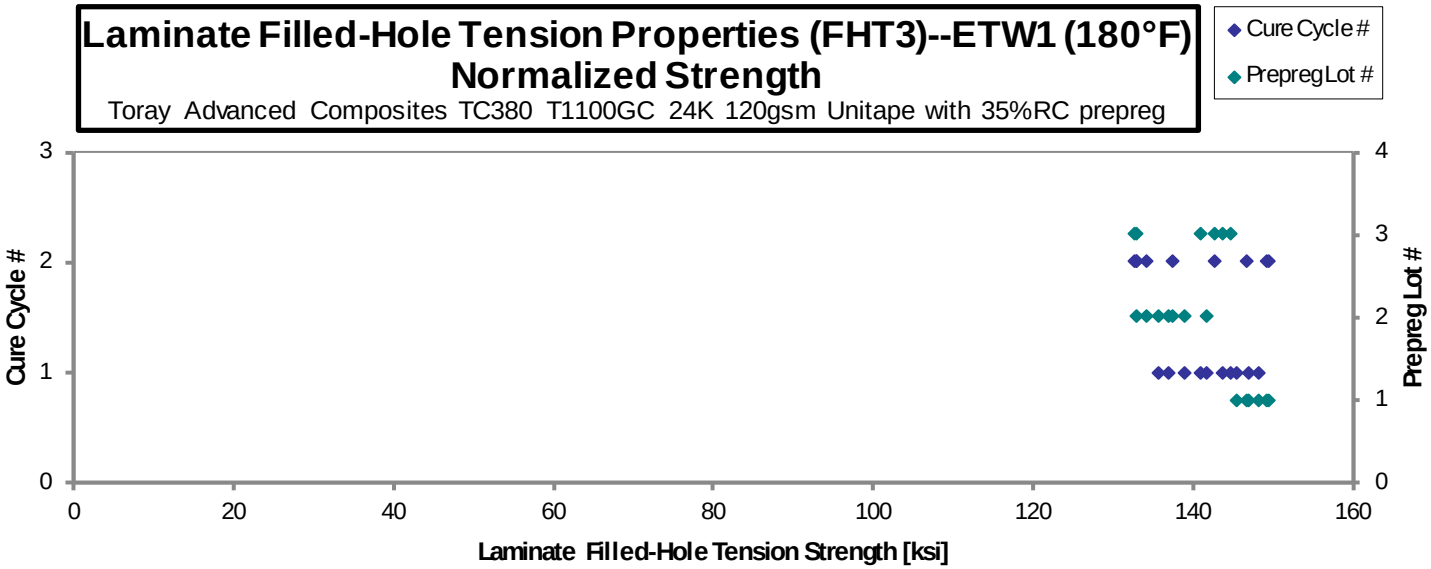
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Filled-Hole Tension Properties (FHT3)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Tension Strength [ksi]
0
20
40
60
80
100
120
140
160
0
1
2
3
4

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

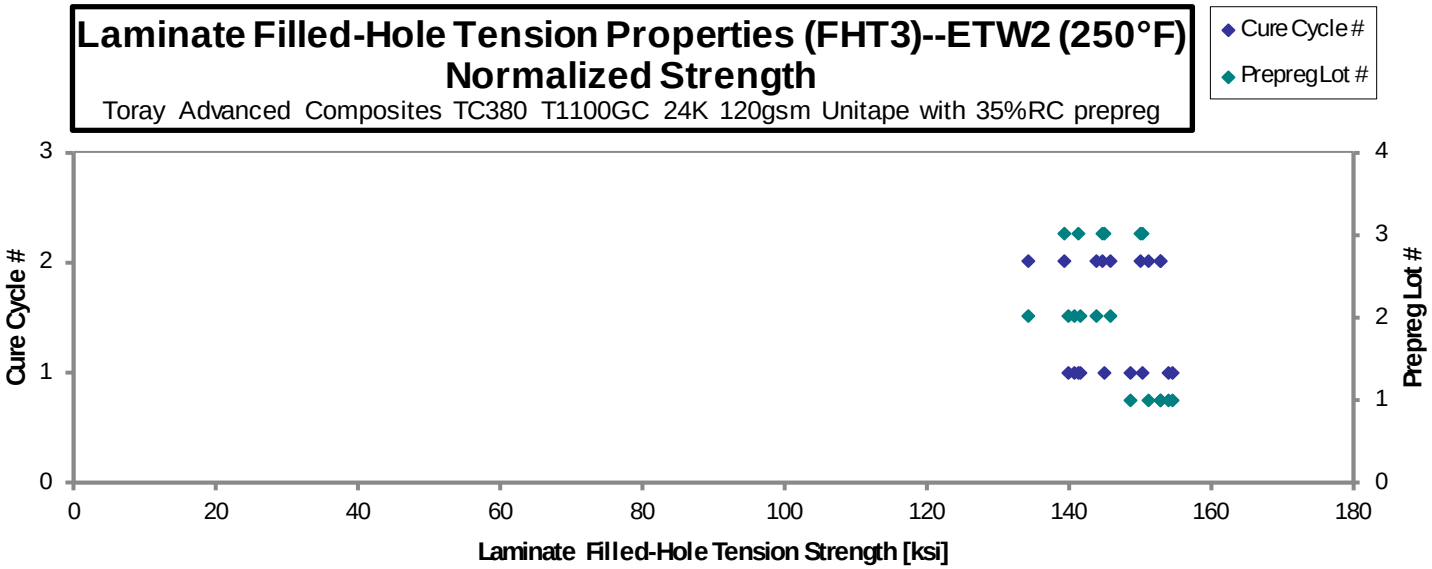
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Filled-Hole Tension Properties (FHT3)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
160
180
Laminate Filled-Hole Tension Strength [ksi]

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

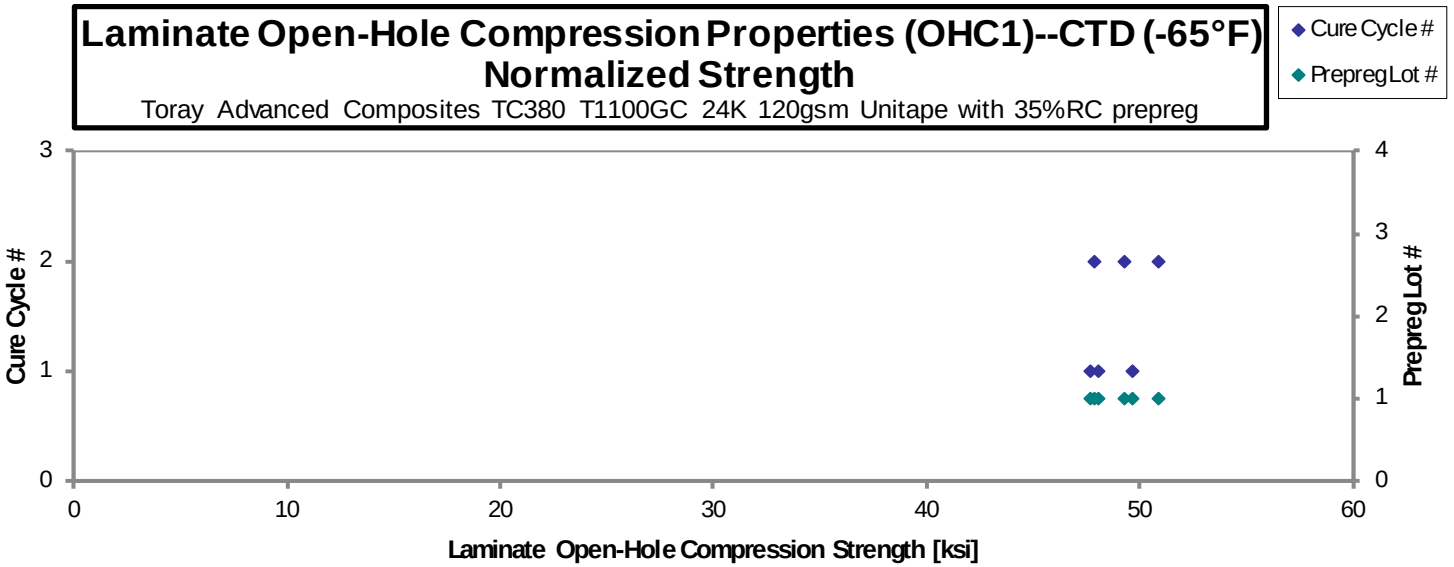
Laminate Open-Hole Compression Properties (OHC1)--CTD (-65°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDGA111B	A	C1	1	1	47.92	0.1155	24	M(A,L)GM	0.004812	48.04
TCDGA112B	A	C1	1	1	49.66	0.1153	24	M(A,L)GM	0.004802	49.68
TCDGA113B	A	C1	1	1	47.68	0.1153	24	M(A,L)GM	0.004802	47.70
TCDGA211B	A	C2	1	2	50.99	0.1150	24	LGM	0.004790	50.89
TCDGA212B	A	C2	1	2	47.89	0.1151	24	M(A,L)GM	0.004794	47.83
TCDGA213B	A	C2	1	2	49.24	0.1152	24	M(A,L)GM	0.004799	49.22

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

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


Laminate Open-Hole Compression Properties (OHC1)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
10
20
30
40
50
60
0
1
2
3
4

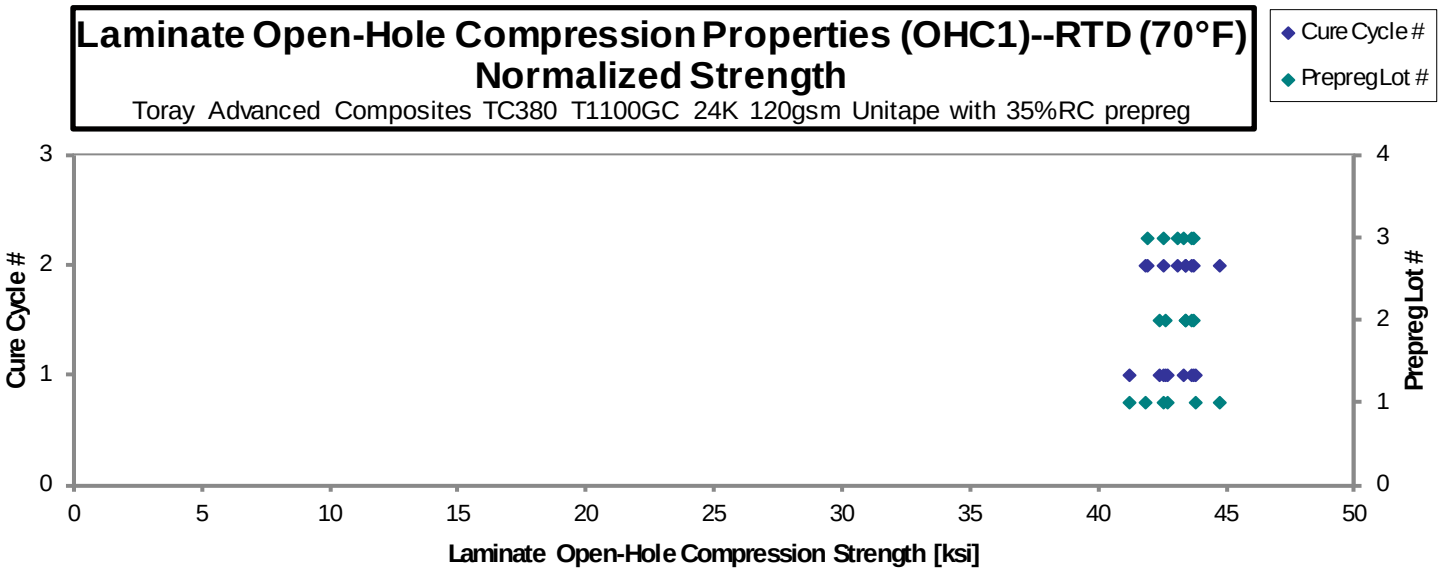
Laminate Open-Hole Compression Properties (OHC1)--RTD (70°F)□
Strength□

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**42.29**	**Average$_{norm}$**	**0.004888**	**43.04**
Standard Dev.	**1.010**	**Standard Dev.$_{norm}$**		**0.8586**
Coeff. of Var. [%]	**2.387**	**Coeff. of Var. [%]$_{norm}$**		**1.995**
Min.	**40.85**	**Min.**	**0.004674**	**41.25**
Max.	**44.19**	**Max.**	**0.005128**	**44.77**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Open-Hole Compression Properties (OHC1)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45
50

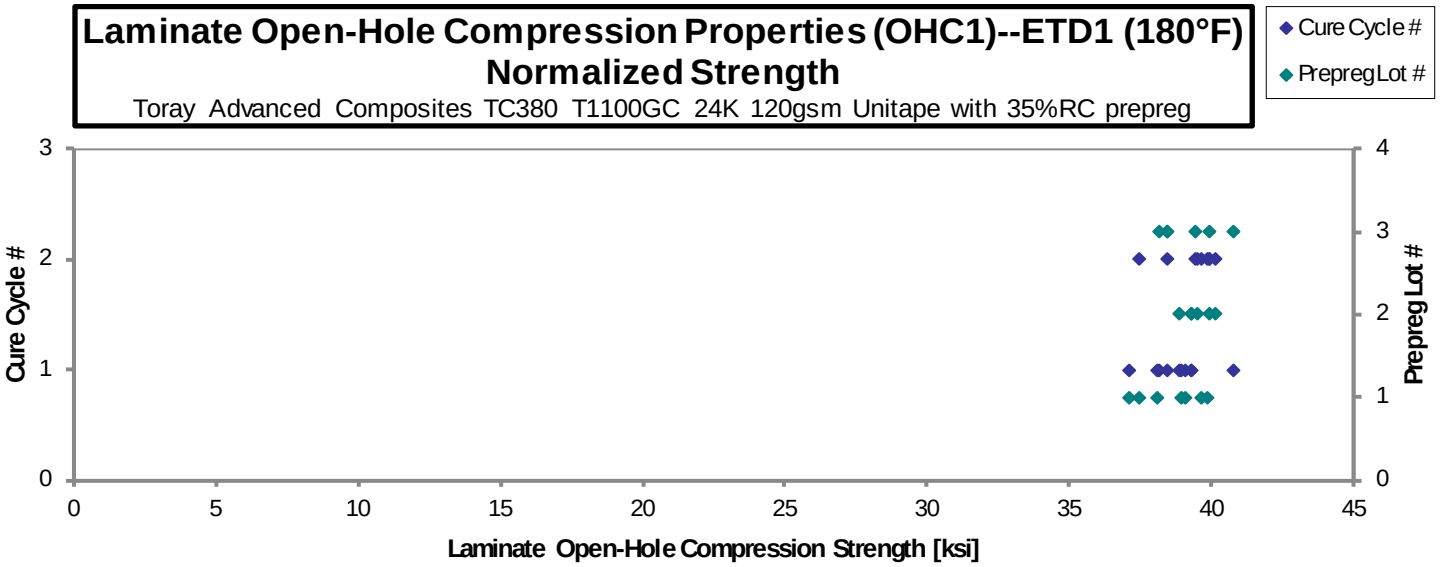
Laminate Open-Hole Compression Properties (OHC1)--ETD1 (180°F) Strength

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]	$Strength_{norm}$ [ksi]	Avg. t_{ply} [in]
Average	38.10	39.09	0.004926
Standard Dev.	0.7749	0.9375	
Coeff. of Var. [%]	2.034	2.398	
Min.	36.55	37.12	0.004662
Max.	39.30	40.76	0.005075
Number of Spec.	19	19	19


Laminate Open-Hole Compression Properties (OHC1)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45

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

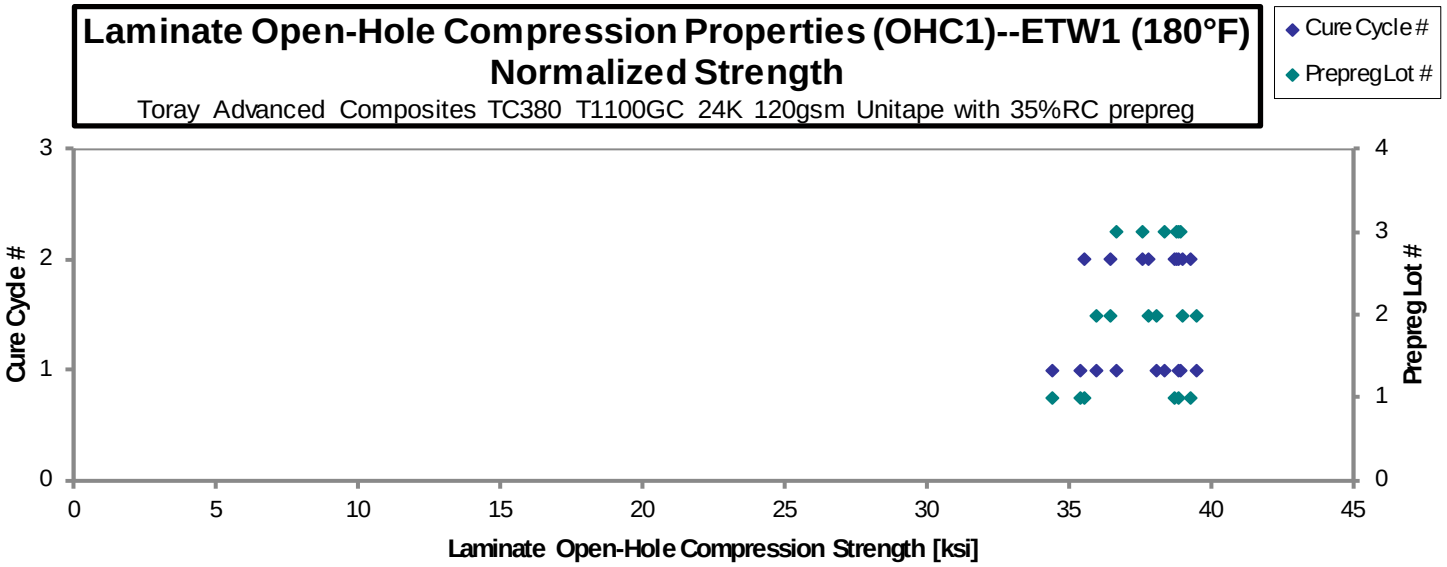
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	**0.004885**	**37.67**
Standard $Dev._{norm}$		**1.541**
Coeff. of $Var._{norm}$ [%]		**4.090**
Min.	**0.004665**	**34.44**
Max.	**0.005139**	**39.48**
Number of Spec.	**18**	**18**


Laminate Open-Hole Compression Properties (OHC1)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45
Laminate Open-Hole Compression Strength [ksi]

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

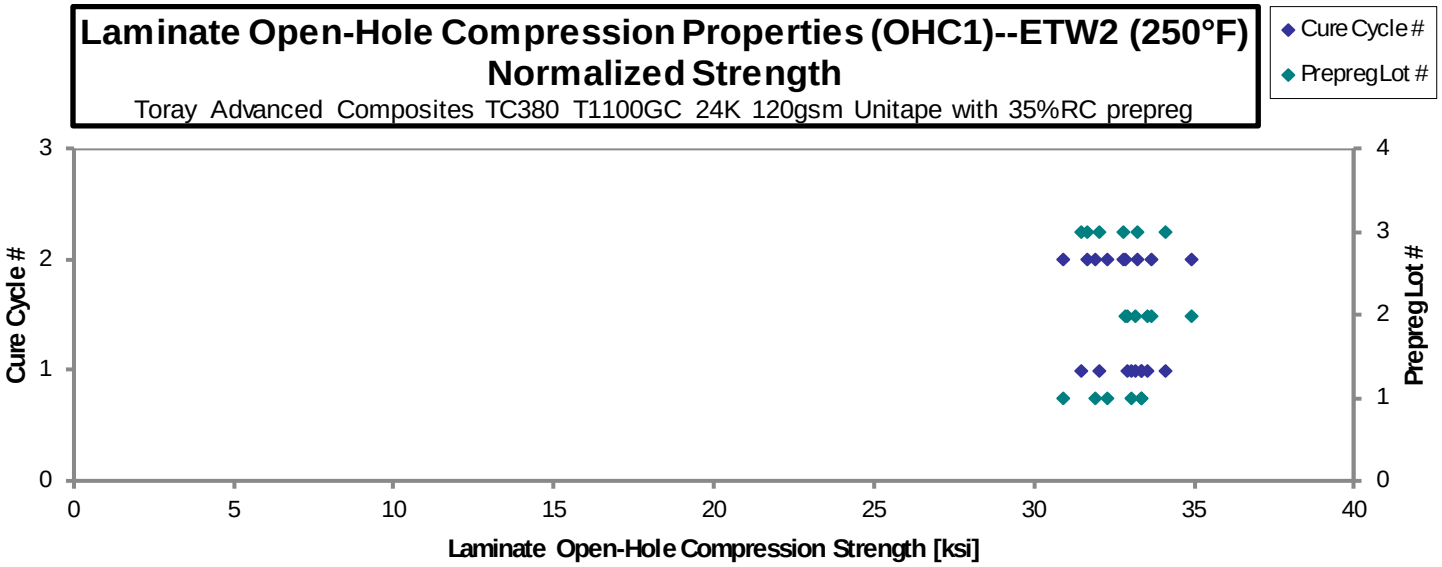
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Open-Hole Compression Properties (OHC1)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
5
10
15
20
25
30
35
40
Laminate Open-Hole Compression Strength [ksi]

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

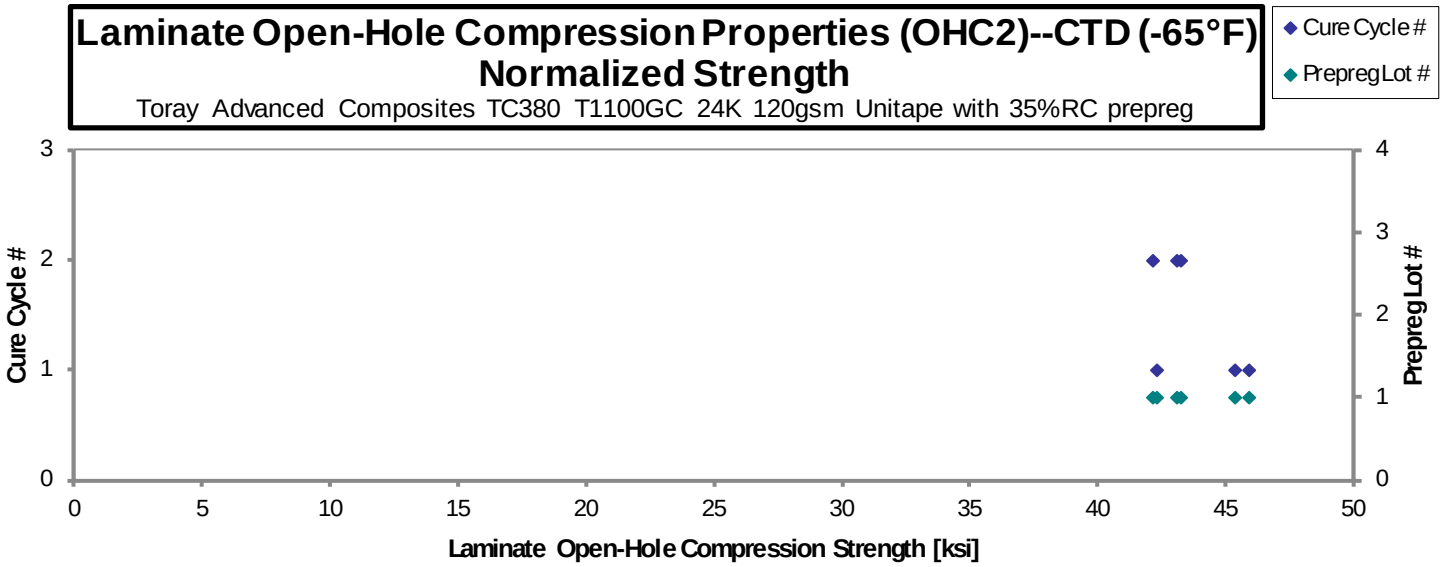
Laminate Open-Hole Compression Properties (OHC2)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDHA111B	A	C1	1	1	42.53	0.09555	20	M(A,L)GM	0.004778	42.33
TCDHA112B	A	C1	1	1	46.24	0.09530	20	M(A,L)GM	0.004765	45.90
TCDHA113B	A	C1	1	1	45.67	0.09538	20	M(A,L)GM	0.004769	45.38
TCDHA211B	A	C2	1	2	43.34	0.09548	20	M(A,L)GM	0.004774	43.11
TCDHA212B	A	C2	1	2	43.62	0.09523	20	M(A,L)GM	0.004762	43.27
TCDHA213B	A	C2	1	2	42.24	0.09573	20	M(A,L)GM	0.004787	42.12

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

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


Laminate Open-Hole Compression Properties (OHC2)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45
50
Laminate Open-Hole Compression Strength [ksi]

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

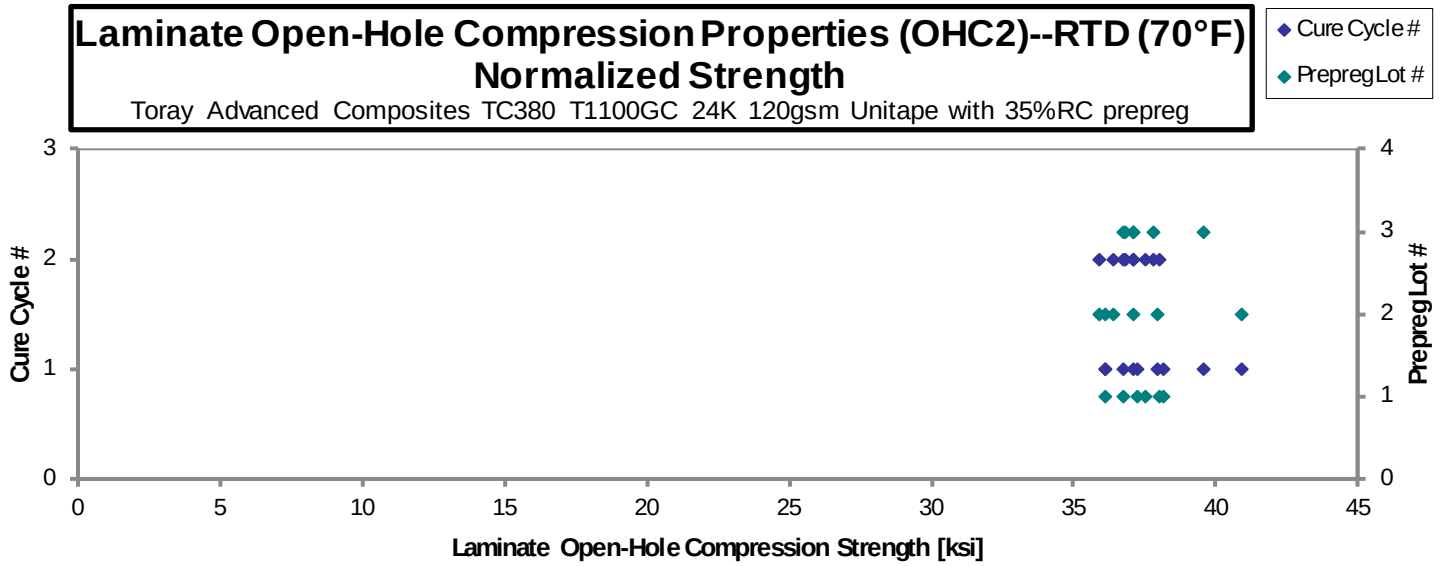
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Open-Hole Compression Properties (OHC2)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45

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

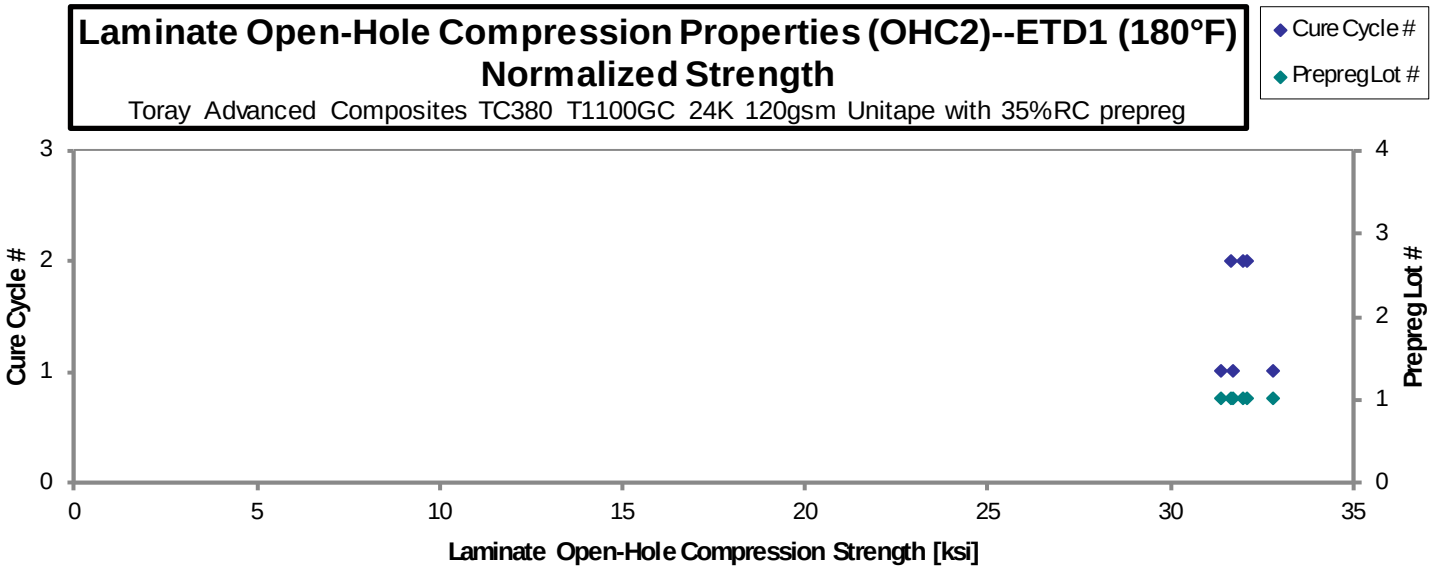
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDHA111C	A	C1	1	1	32.00	0.09835	20	M(A,L)GM	0.004918	32.78
TCDHA112C	A	C1	1	1	30.92	0.09740	20	M(A,L)GM	0.004870	31.37
TCDHA113C	A	C1	1	1	32.56	0.09347	20	M(A,L)GM	0.004673	31.71
TCDHA211C	A	C2	1	2	31.44	0.09758	20	M(A,L)GM	0.004879	31.96
TCDHA212C	A	C2	1	2	31.54	0.09757	20	M(A,L)GM	0.004878	32.05
TCDHA213C	A	C2	1	2	32.15	0.09453	20	M(A,L)GM	0.004727	31.66

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

$Average_{norm}$	**0.004824**	**31.92**
$Standard\ Dev._{norm}$		**0.4864**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**1.524**
Min.	**0.004673**	**31.37**
Max.	**0.004918**	**32.78**
Number of Spec.	**6**	**6**


Laminate Open-Hole Compression Properties (OHC2)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35

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

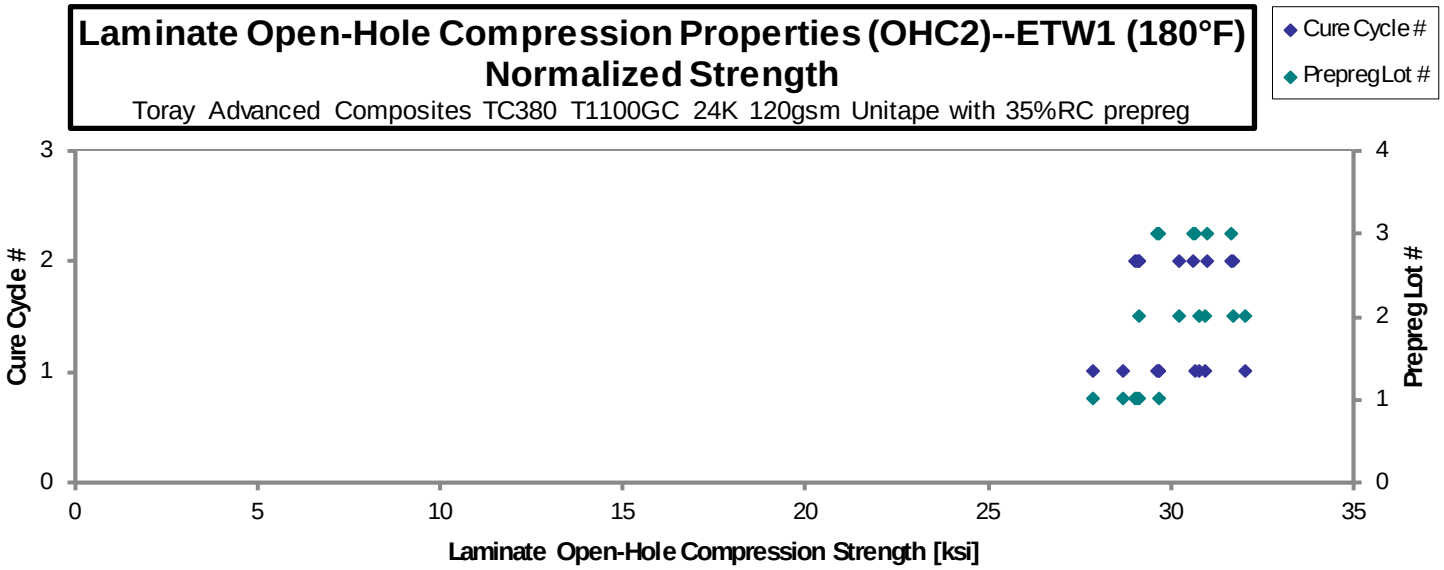
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Open-Hole Compression Properties (OHC2)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35

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

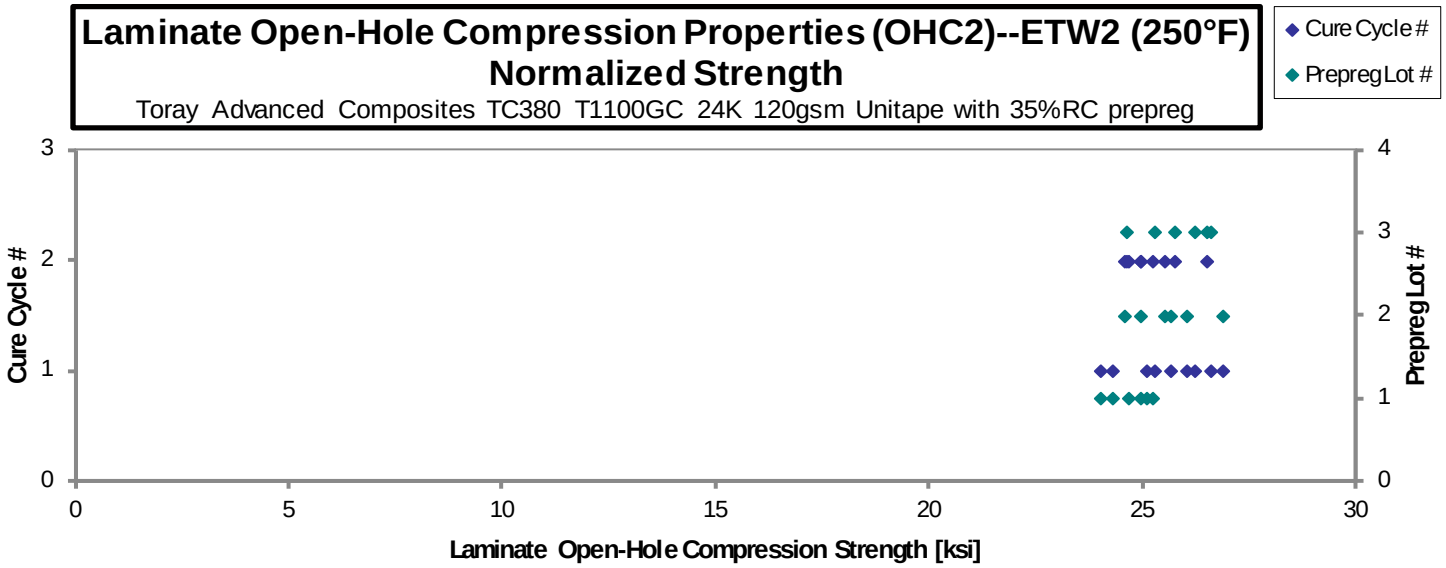
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Open-Hole Compression Properties (OHC2)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30

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

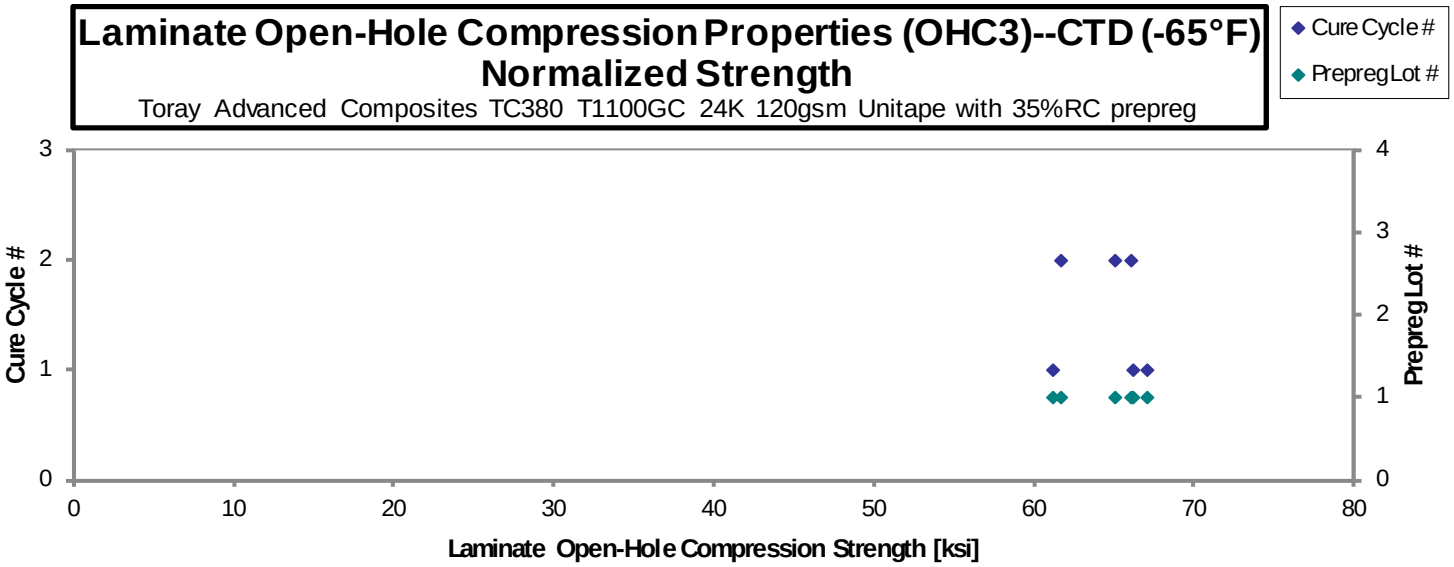
Laminate Open-Hole Compression Properties (OHC3)--CTD (-65°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDIA111B	A	C1	1	1	65.81	0.09658	20	M(A,L)GM	0.004829	66.21
TCDIA112B	A	C1	1	1	66.75	0.09652	20	M(A,L)GM	0.004826	67.11
TCDIA113B	A	C1	1	1	60.74	0.09678	20	LGM	0.004839	61.23
TCDIA211B	A	C2	1	2	64.91	0.09775	20	M(A,L)GM	0.004888	66.09
TCDIA212B	A	C2	1	2	64.19	0.09732	20	M(A,L)GM	0.004866	65.07
TCDIA213B	A	C2	1	2	60.91	0.09728	20	M(A,L)GM	0.004864	61.73

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

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


Laminate Open-Hole Compression Properties (OHC3)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60
70
80

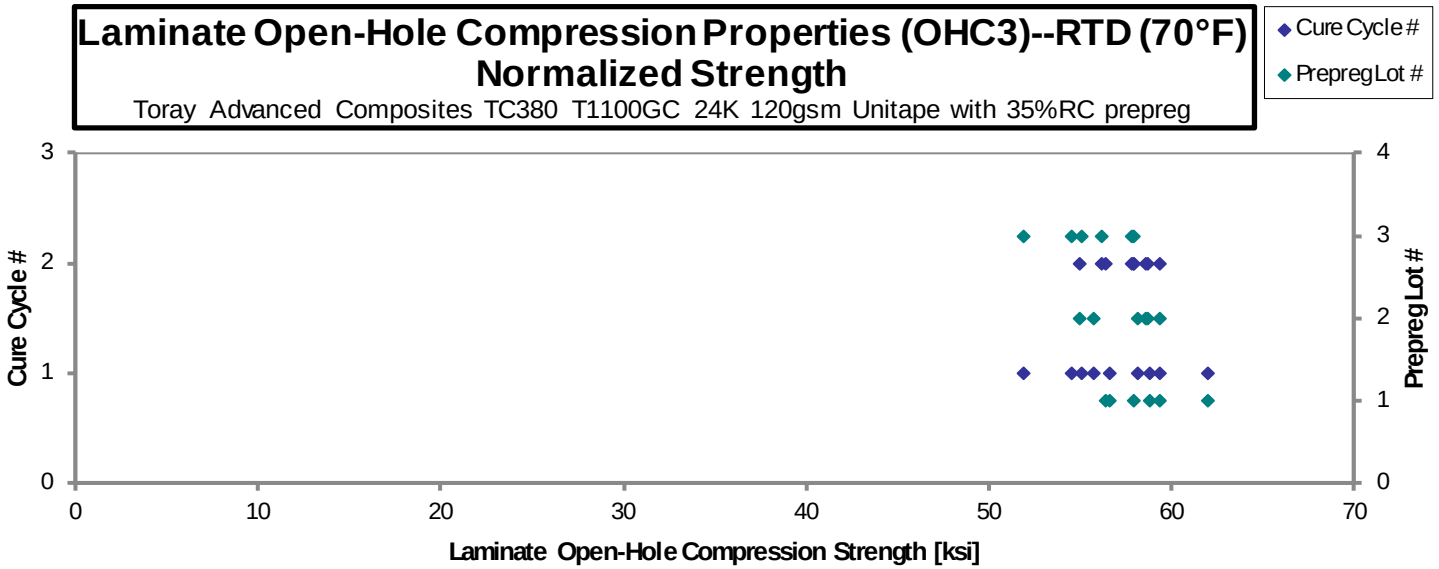
Laminate Open-Hole Compression Properties (OHC3)--RTD (70°F)□
Strength□

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**56.29**	**$Average_{norm}$**	**0.004883**	**57.23**
Standard Dev.	**2.615**	**$Standard\ Dev._{norm}$**		**2.308**
Coeff. of Var. [%]	**4.646**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.033**
Min.	**52.11**	**Min.**	**0.004669**	**51.89**
Max.	**60.99**	**Max.**	**0.005103**	**62.01**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Open-Hole Compression Properties (OHC3)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4

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

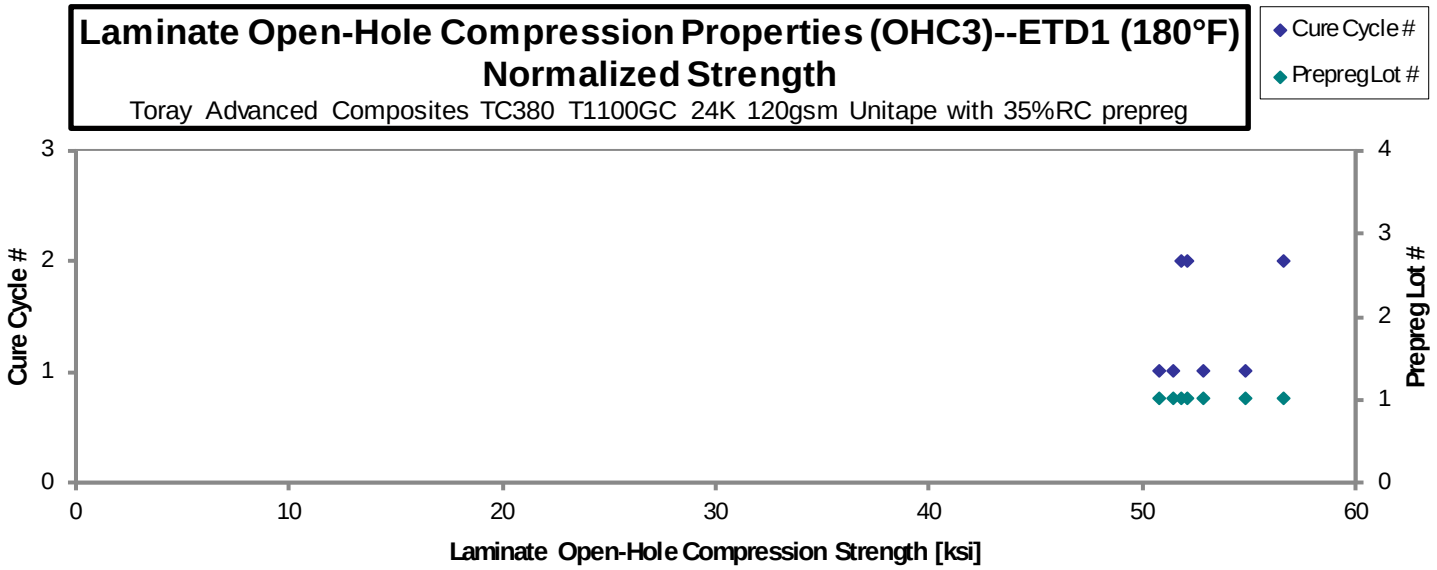
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDIA111C	A	C1	1	1	50.78	0.09728	20	LGM	0.004864	51.46
TCDIA112C	A	C1	1	1	54.06	0.09745	20	LGM	0.004873	54.88
TCDIA113C	A	C1	1	1	53.72	0.09448	20	LGM	0.004724	52.87
TCDIA114C	A	C1	1	1	52.45	0.09303	20	LGM	0.004652	50.83
TCDIA211C	A	C2	1	2	50.74	0.09858	20	LGM	0.004929	52.10
TCDIA212C	A	C2	1	2	55.01	0.09885	20	LGM	0.004943	56.64
TCDIA213C	A	C2	1	2	52.35	0.09512	20	LGM	0.004756	51.87

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

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


Laminate Open-Hole Compression Properties (OHC3)--ETD1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60

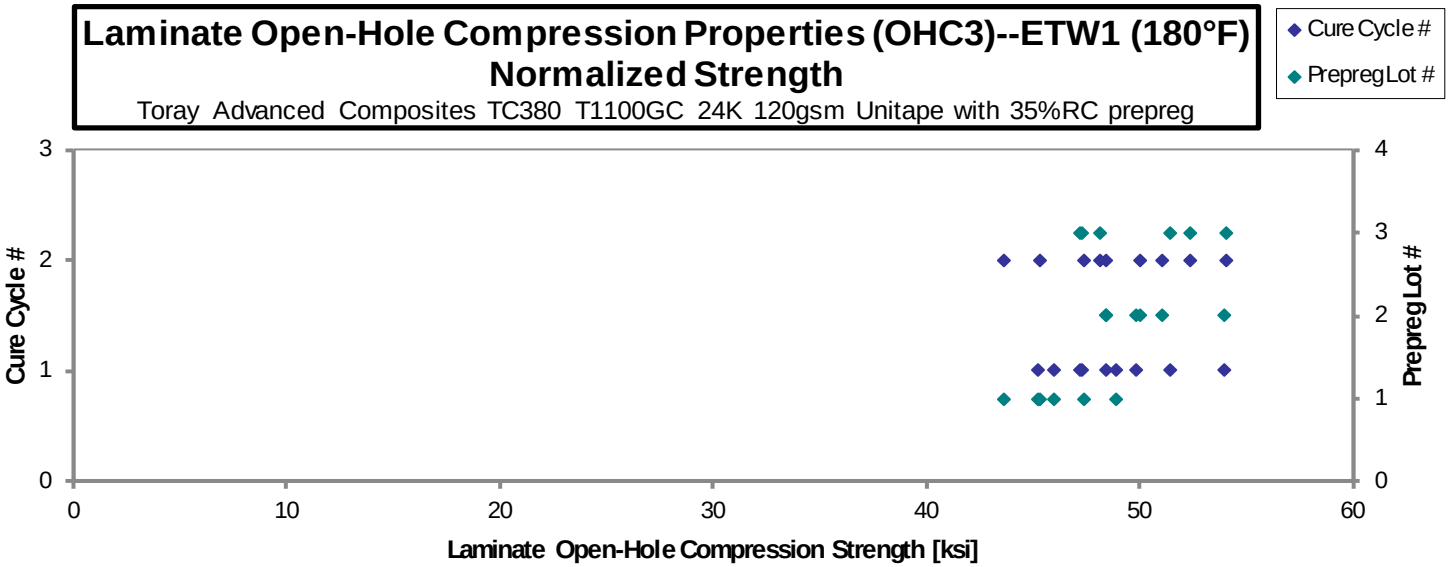
Laminate Open-Hole Compression Properties (OHC3)--ETW1 (180°F) Strength

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**47.57**	**Average$_{norm}$**	**0.004928**	**48.83**
Standard Dev.	**2.876**	**Standard Dev.$_{norm}$**		**2.961**
Coeff. of Var. [%]	**6.046**	**Coeff. of Var. [%]$_{norm}$**		**6.065**
Min.	**42.34**	**Min.**	**0.004783**	**43.65**
Max.	**53.93**	**Max.**	**0.005120**	**54.05**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Open-Hole Compression Properties (OHC3)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
10
20
30
40
50
60
0
1
2
3
4

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

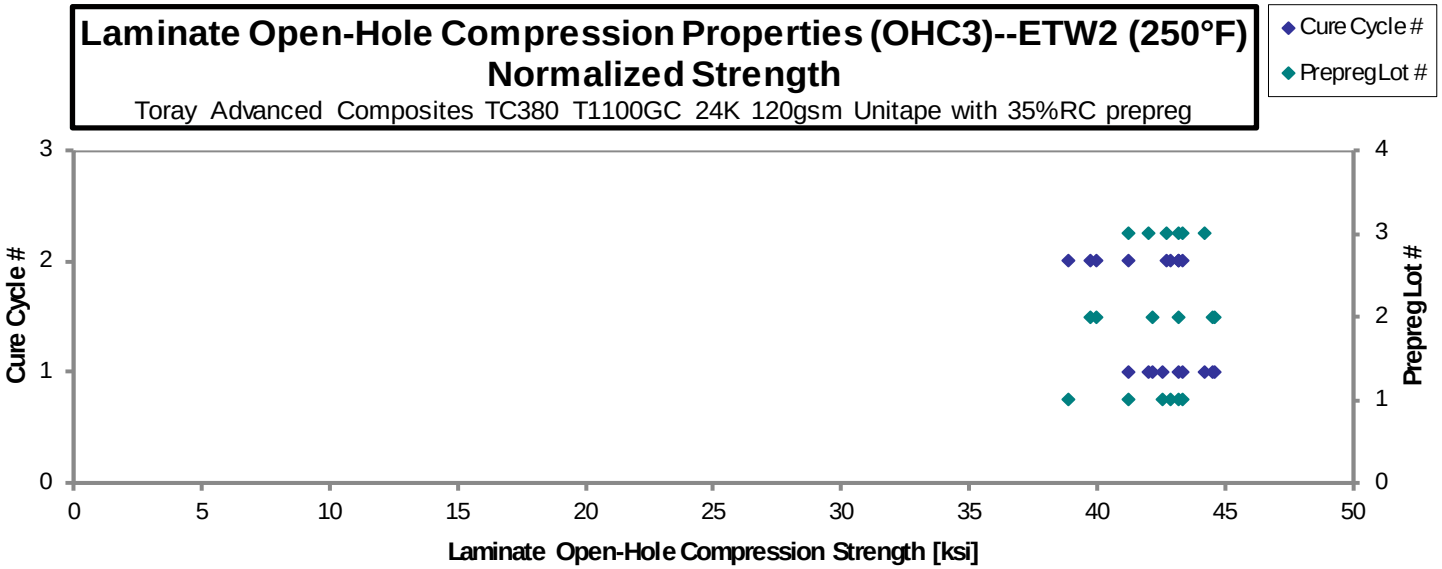
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

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

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


Laminate Open-Hole Compression Properties (OHC3)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open-Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45
50

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

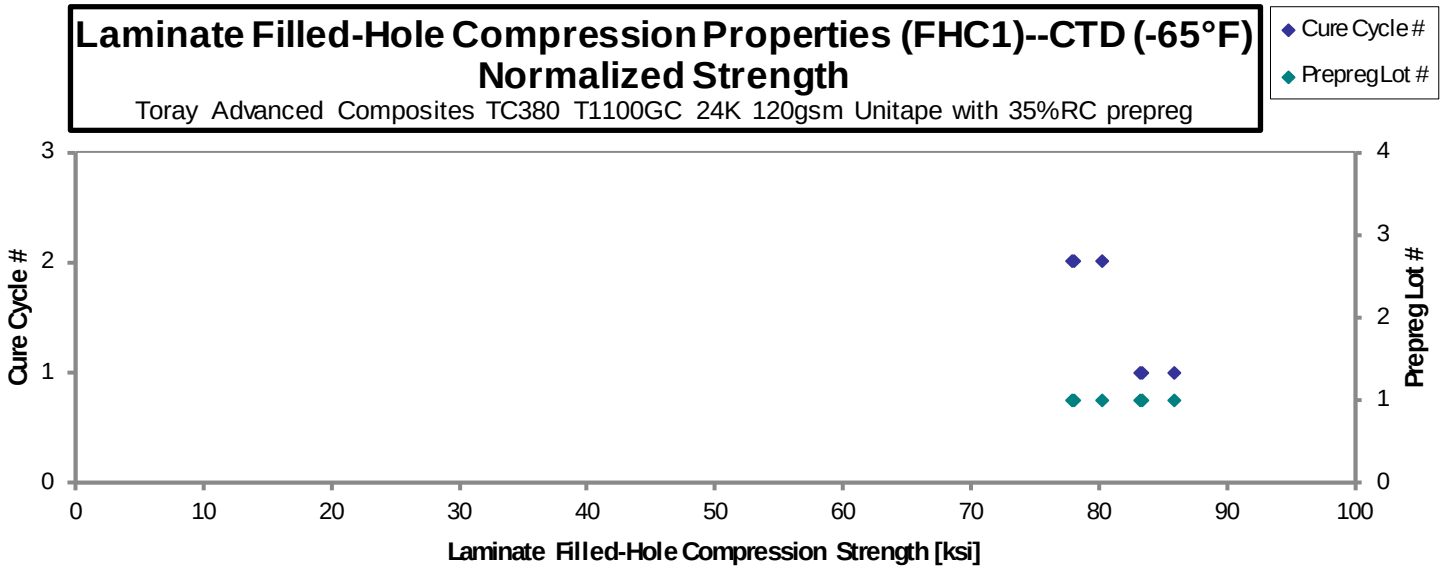
Laminate Filled-Hole Compression Properties (FHC1)--CTD (-65°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCD7A111B	A	C1	1	1	83.22	0.1152	24	M(A,L)GF	0.004799	83.21
TCD7A112B	A	C1	1	1	86.29	0.1147	24	M(A,L)GF	0.004778	85.89
TCD7A113B	A	C1	1	1	83.64	0.1148	24	M(A,L)GF	0.004782	83.33
TCD7A211B	A	C2	1	2	81.03	0.1141	24	M(A,L)GF	0.004753	80.24
TCD7A212B	A	C2	1	2	78.73	0.1139	24	M(A,L)GF	0.004747	77.86
TCD7A213B	A	C2	1	2	78.62	0.1143	24	M(A,L)GF	0.004762	77.99

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

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


Laminate Filled-Hole Compression Properties (FHC1)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100
Laminate Filled-Hole Compression Strength [ksi]

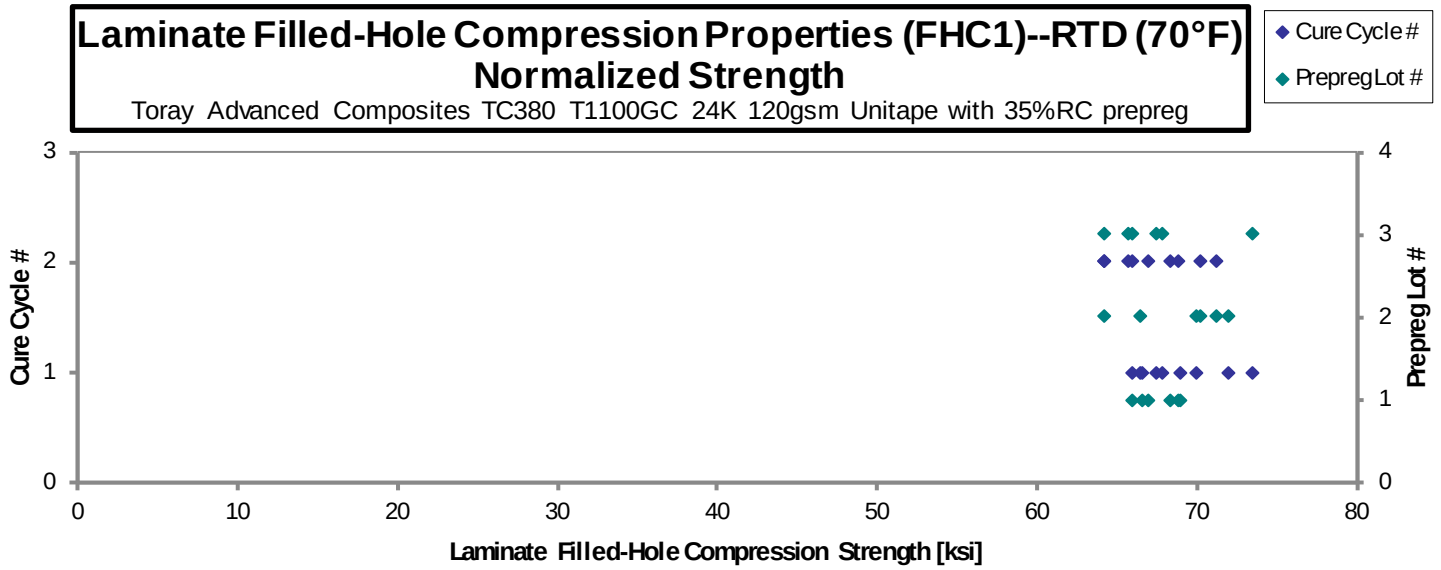
Laminate Filled-Hole Compression Properties (FHC1)--RTD (70°F)□
Strength□

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**66.91**	**$Average_{norm}$**	**0.004882**	**68.03**
Standard Dev.	**2.461**	**$Standard\ Dev._{norm}$**		**2.586**
Coeff. of Var. [%]	**3.678**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.801**
Min.	**62.19**	**Min.**	**0.004628**	**64.26**
Max.	**70.25**	**Max.**	**0.005090**	**73.45**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Filled-Hole Compression Properties (FHC1)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Compression Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60
70
80

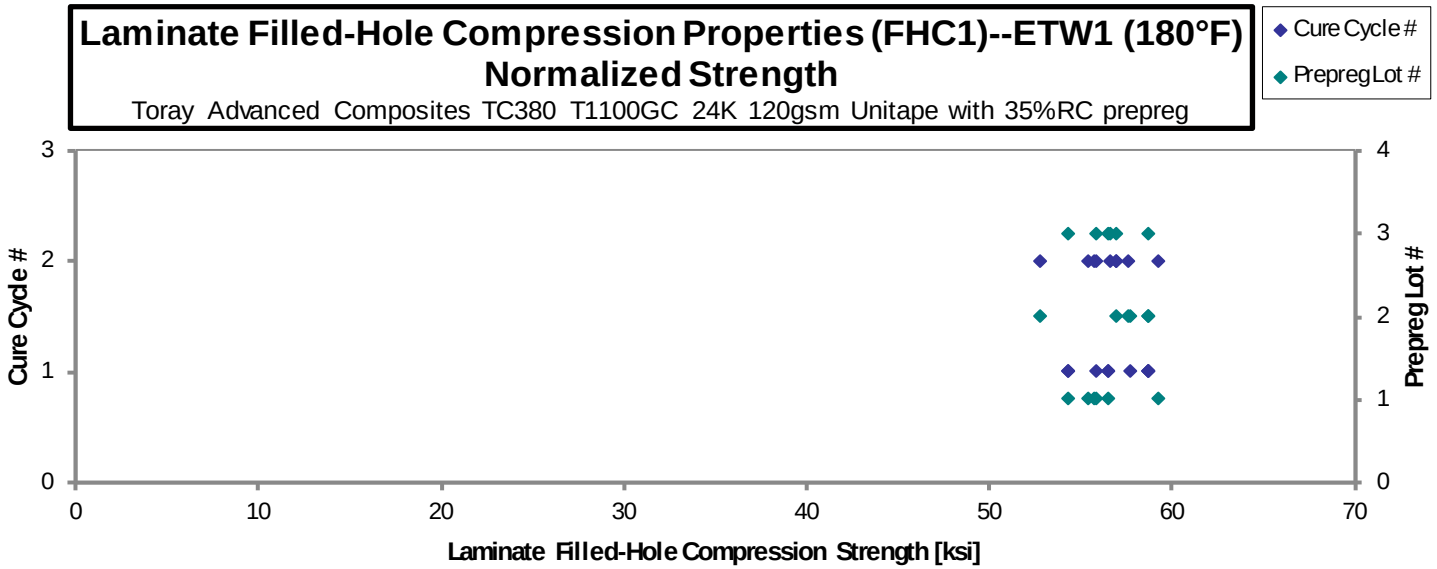
Laminate Filled-Hole Compression Properties (FHC1)--ETW1 (180°F) Strength

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

normalizing t_{ply} [in]: 0.004800

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

	Strength		$Strength_{norm}$
Average	**55.65**	**$Average_{norm}$**	**0.004884**	**56.58**
Standard Dev.	**2.217**	**$Standard\ Dev._{norm}$**		**1.740**
Coeff. of Var. [%]	**3.983**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.075**
Min.	**50.00**	**Min.**	**0.004634**	**52.79**
Max.	**59.19**	**Max.**	**0.005123**	**59.23**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Filled-Hole Compression Properties (FHC1)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4

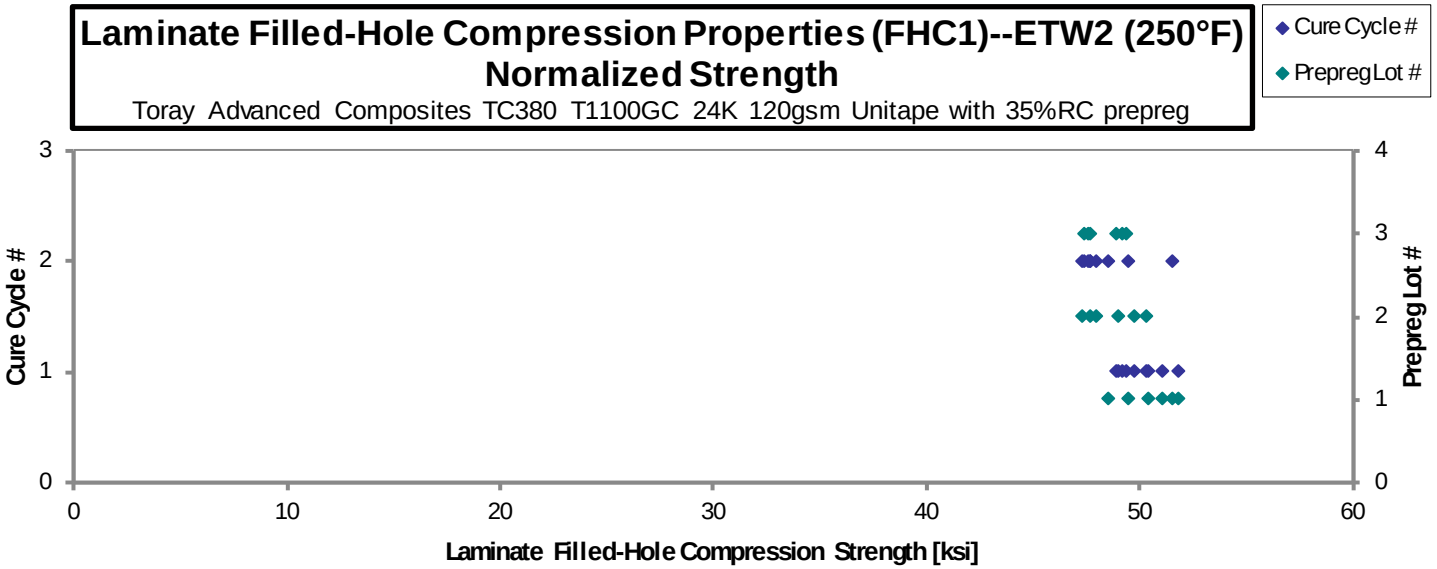
Laminate Filled-Hole Compression Properties (FHC1)--ETW2 (250°F) Strength

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**47.54**	**$Average_{norm}$**	**0.004969**	**49.16**
Standard Dev.	**2.378**	**$Standard\ Dev._{norm}$**		**1.447**
Coeff. of Var. [%]	**5.001**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.944**
Min.	**44.84**	**Min.**	**0.004793**	**47.26**
Max.	**51.91**	**Max.**	**0.005101**	**51.83**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Filled-Hole Compression Properties (FHC1)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
Laminate Filled-Hole Compression Strength [ksi]

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

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

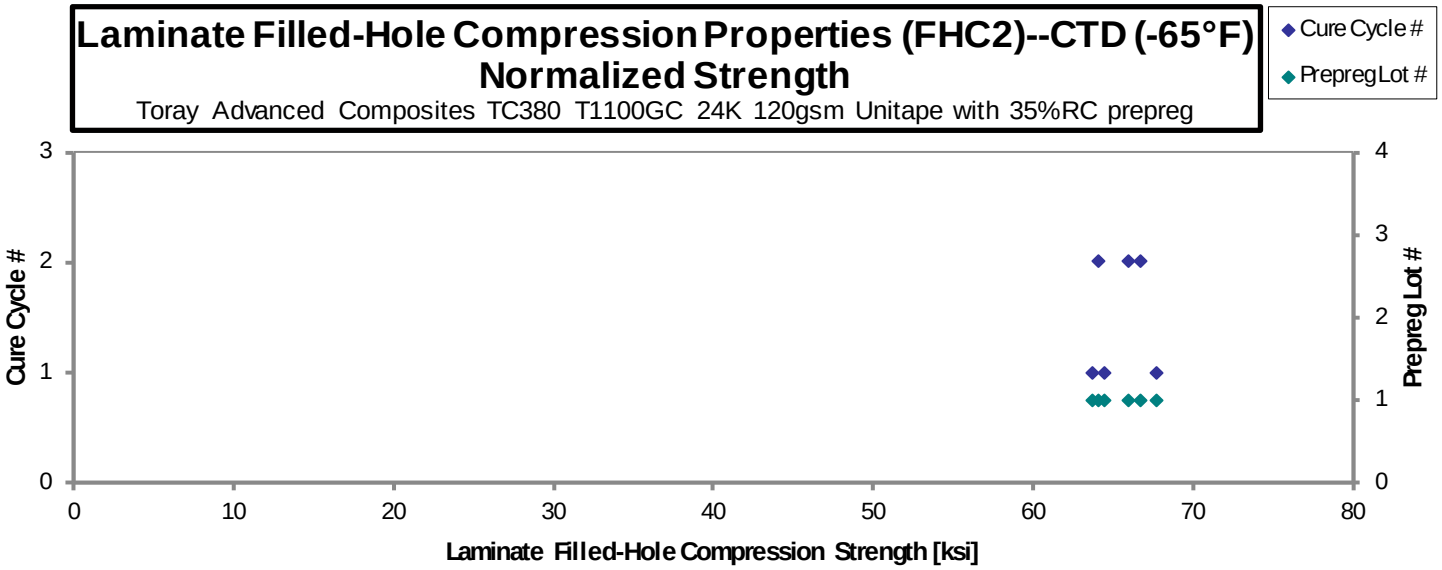
Laminate Filled-Hole Compression Properties (FHC2)--CTD (-65°F)
Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCD8A111B	A	C1	1	1	64.56	0.09582	20	M(A,L)GF	0.004791	64.44
TCD8A112B	A	C1	1	1	63.62	0.09602	20	M(A,L)GF	0.004801	63.63
TCD8A113B	A	C1	1	1	67.35	0.09648	20	M(A,L)GF	0.004824	67.69
TCD8A211B	A	C2	1	2	67.82	0.09438	20	M(A,L)GF	0.004719	66.67
TCD8A212B	A	C2	1	2	67.18	0.09430	20	M(A,L)GF	0.004715	65.99
TCD8A213B	A	C2	1	2	65.10	0.09442	20	M(A,L)GF	0.004721	64.03

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

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


Laminate Filled-Hole Compression Properties (FHC2)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
70
80
Laminate Filled-Hole Compression Strength [ksi]

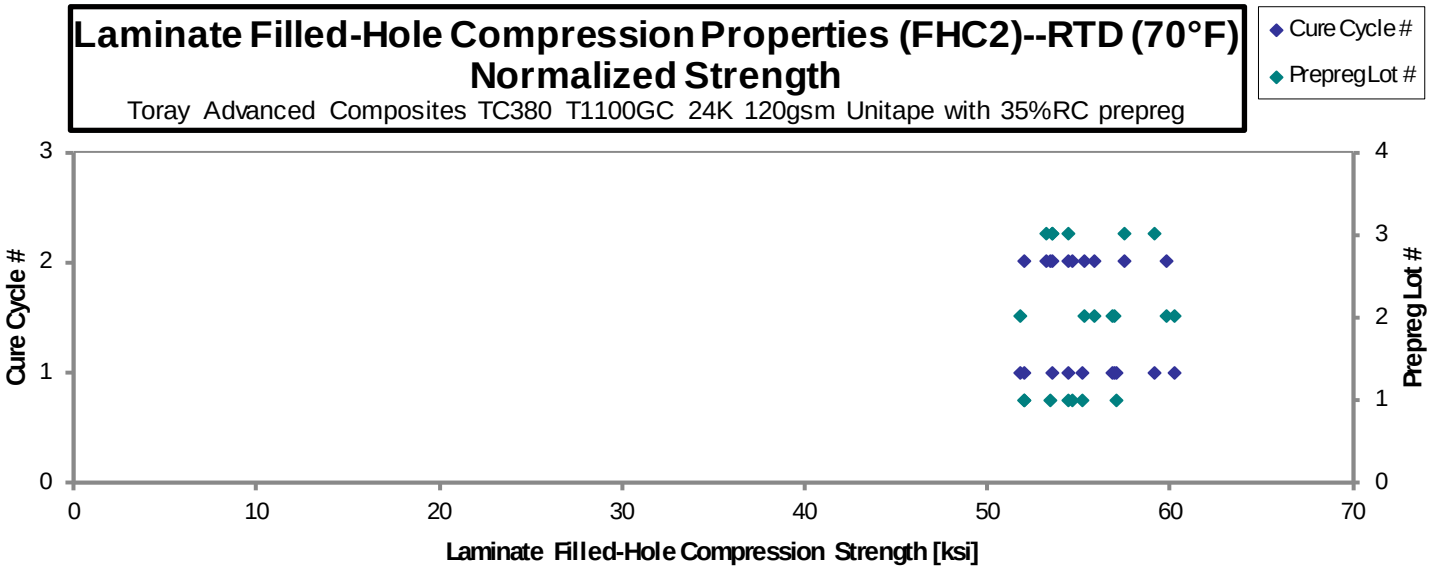
Laminate Filled-Hole Compression Properties (FHC2)--RTD (70°F)□
Strength□

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**54.61**	**$Average_{norm}$**	**0.004863**	**55.34**
Standard Dev.	**1.681**	**Standard $Dev._{norm}$**		**2.527**
Coeff. of Var. [%]	**3.079**	**Coeff. of Var. $[\%]_{norm}$**		**4.567**
Min.	**51.59**	**Min.**	**0.004661**	**51.78**
Max.	**57.21**	**Max.**	**0.005073**	**60.21**
Number of Spec.	**20**	**Number of Spec.**	**20**	**20**


Laminate Filled-Hole Compression Properties (FHC2)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4

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

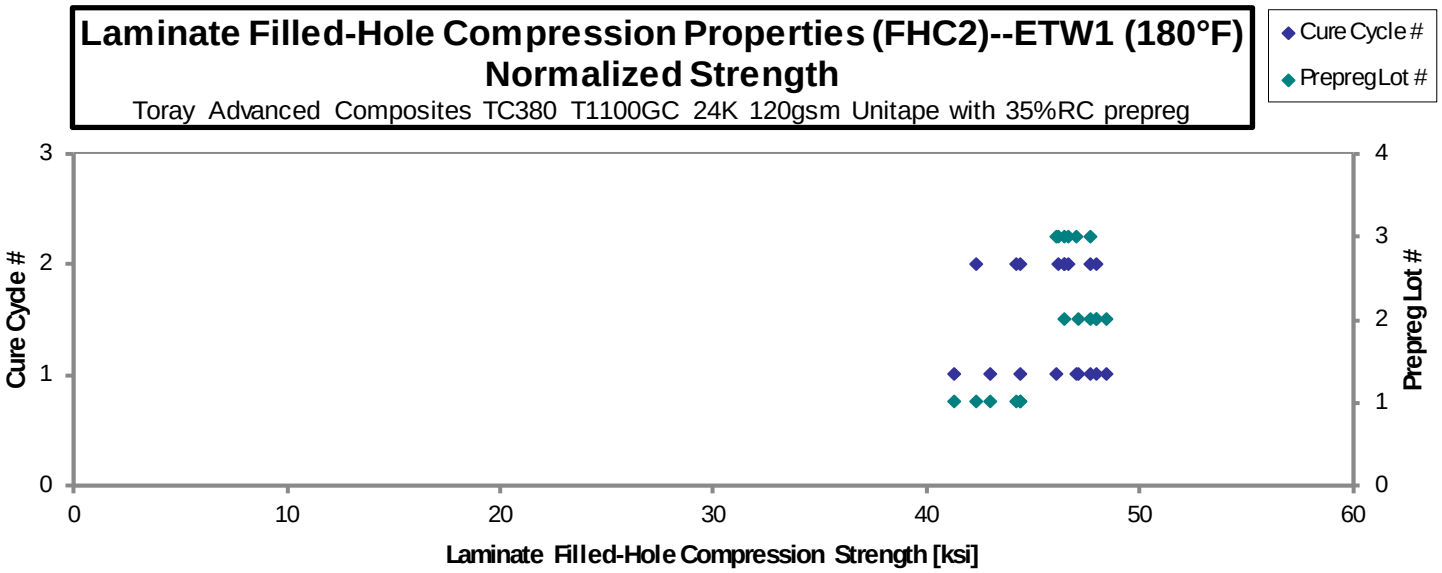
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

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

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

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


Laminate Filled-Hole Compression Properties (FHC2)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Compression Strength [ksi]
0
10
20
30
40
50
60
0
1
2
3
4

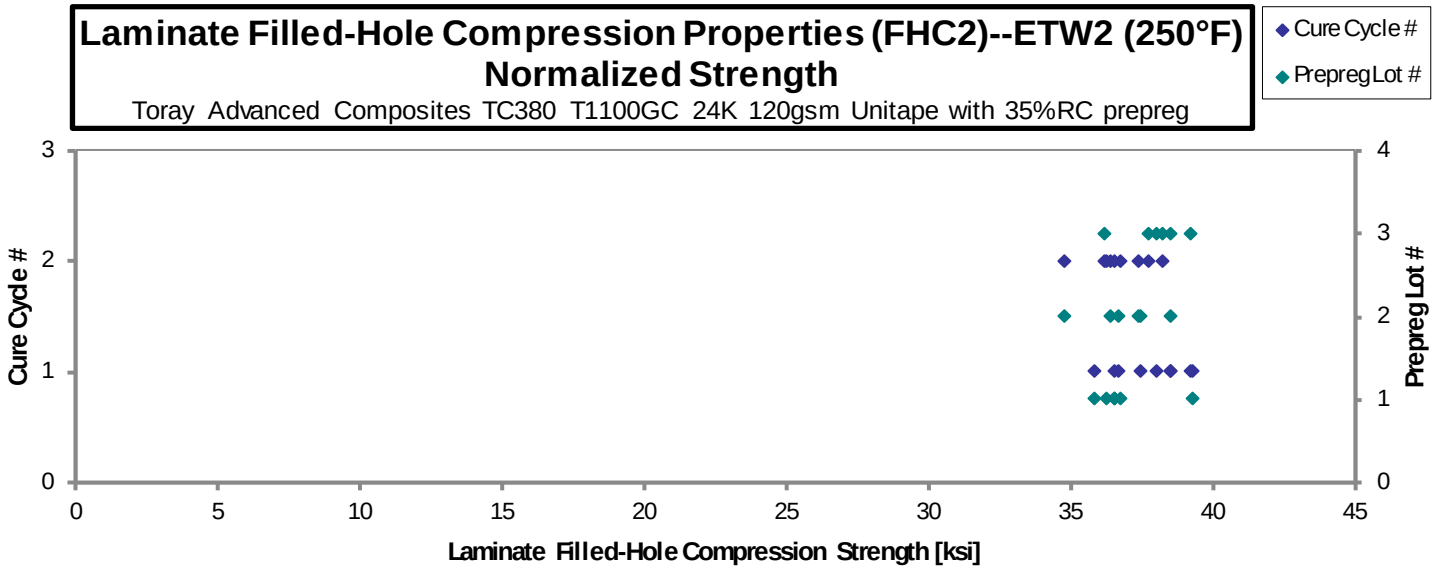
Laminate Filled-Hole Compression Properties (FHC2)--ETW2 (250°F) Strength

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**36.37**	**Average$_{norm}$**	**0.004918** / **37.23**
Standard Dev.	**1.523**	**Standard Dev.$_{norm}$**	**1.225**
Coeff. of Var. [%]	**4.187**	**Coeff. of Var. [%]$_{norm}$**	**3.290**
Min.	**32.88**	**Min.**	**0.004703** / **34.77**
Max.	**39.36**	**Max.**	**0.005140** / **39.25**
Number of Spec.	**18**	**Number of Spec.**	**18** / **18**


Laminate Filled-Hole Compression Properties (FHC2)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45
Laminate Filled-Hole Compression Strength [ksi]

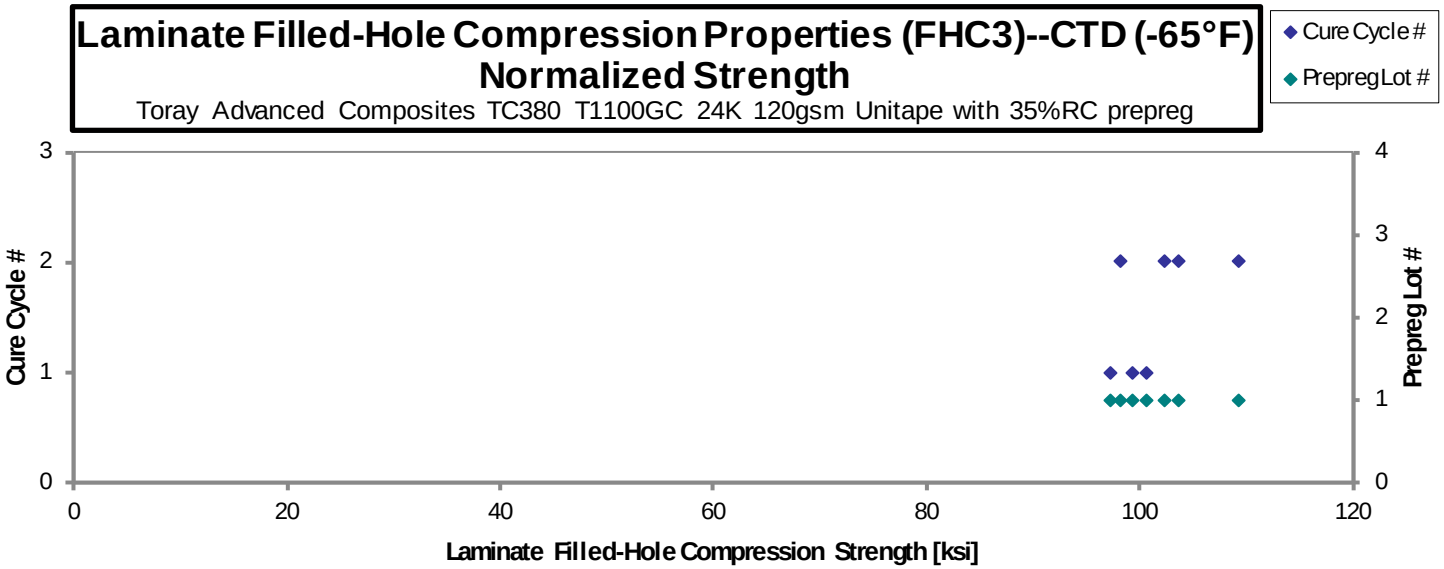
4.26 "50/40/10" Filled-Hole Compression 3 Properties (FHC3)

Laminate Filled-Hole Compression Properties (FHC3)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**100.8**	**$Average_{norm}$**	**0.004831**	**101.5**
Standard Dev.	**4.107**	**$Standard\ Dev._{norm}$**		**4.072**
Coeff. of Var. [%]	**4.073**	**Coeff. of Var. [%]$_{norm}$**		**4.014**
Min.	**96.78**	**Min.**	**0.004814**	**97.29**
Max.	**108.6**	**Max.**	**0.004846**	**109.2**
Number of Spec.	**7**	**Number of Spec.**	**7**	**7**


Laminate Filled-Hole Compression Properties (FHC3)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
Laminate Filled-Hole Compression Strength [ksi]

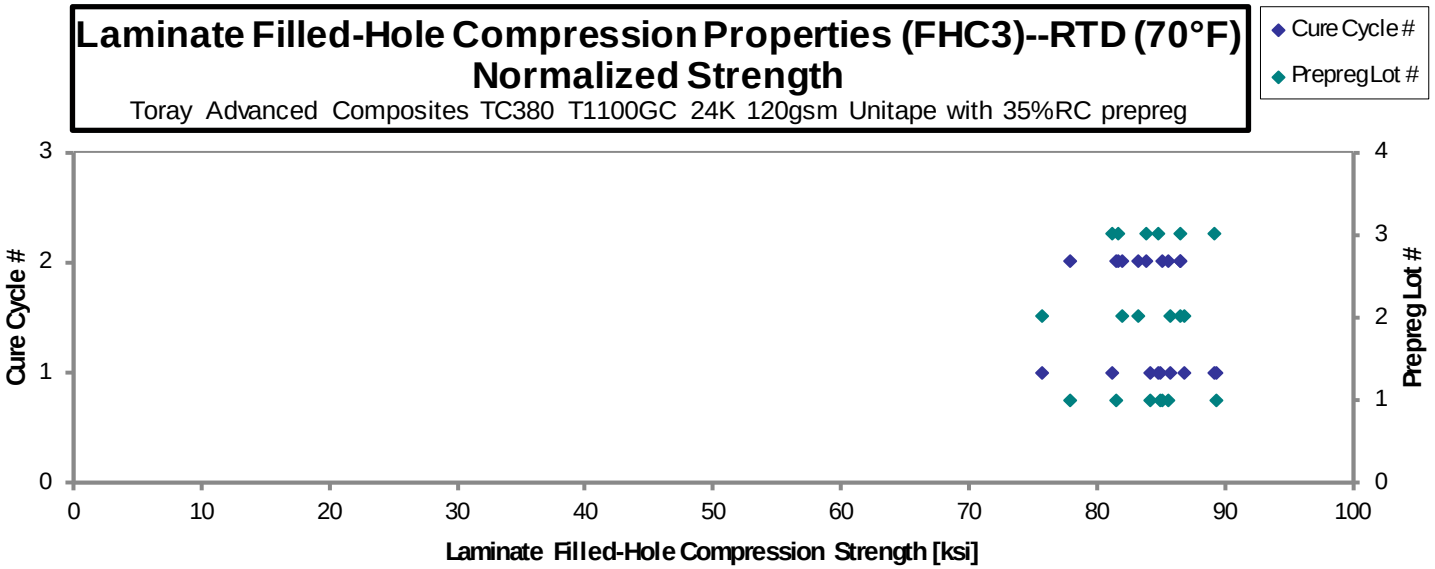
Laminate Filled-Hole Compression Properties (FHC3)--RTD (70°F)□
Strength□

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**82.84**	**$Average_{norm}$**	**0.004871**	**83.98**
Standard Dev.	**4.517**	**$Standard\ Dev._{norm}$**		**3.433**
Coeff. of Var. [%]	**5.453**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.088**
Min.	**73.39**	**Min.**	**0.004618**	**75.72**
Max.	**88.66**	**Max.**	**0.005088**	**89.26**
Number of Spec.	**19**	**Number of Spec.**	**19**	**19**


Laminate Filled-Hole Compression Properties (FHC3)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100
Laminate Filled-Hole Compression Strength [ksi]

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

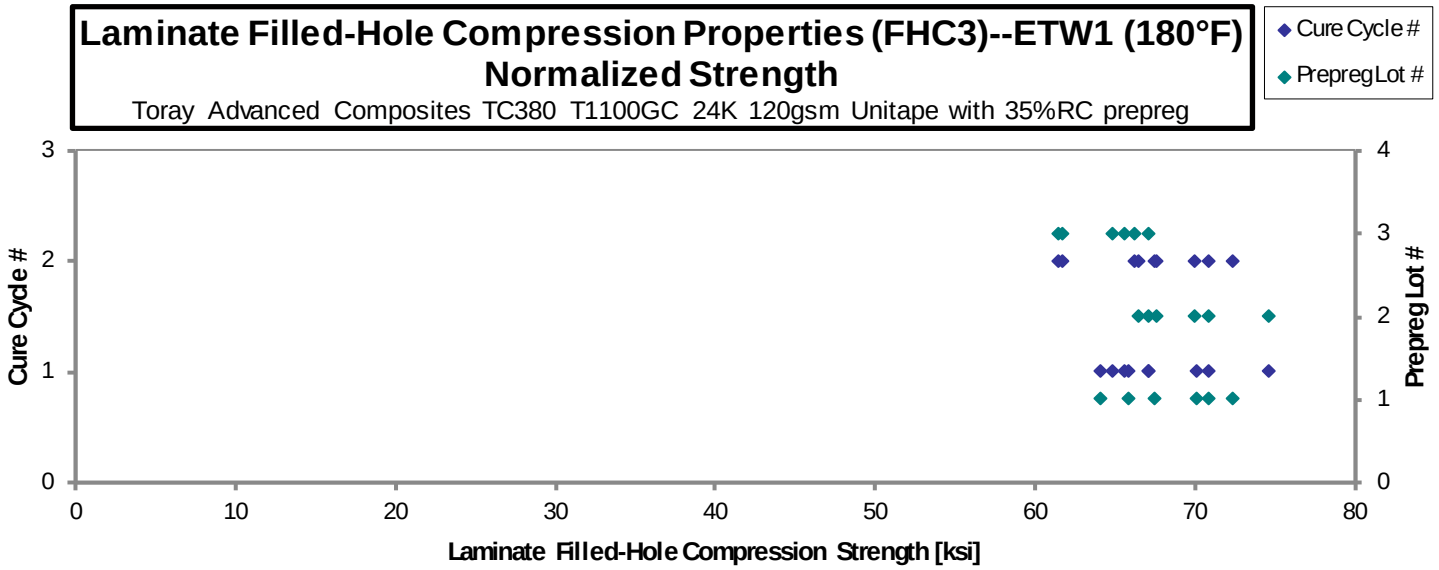
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

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

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

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	**0.004897**	**67.44**
Standard $Dev._{norm}$		**3.489**
Coeff. of $Var._{norm}$ [%]		**5.174**
Min.	**0.004682**	**61.44**
Max.	**0.005043**	**74.60**
Number of Spec.	**18**	**18**


Laminate Filled-Hole Compression Properties (FHC3)--ETW1 (180°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Compression Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60
70
80

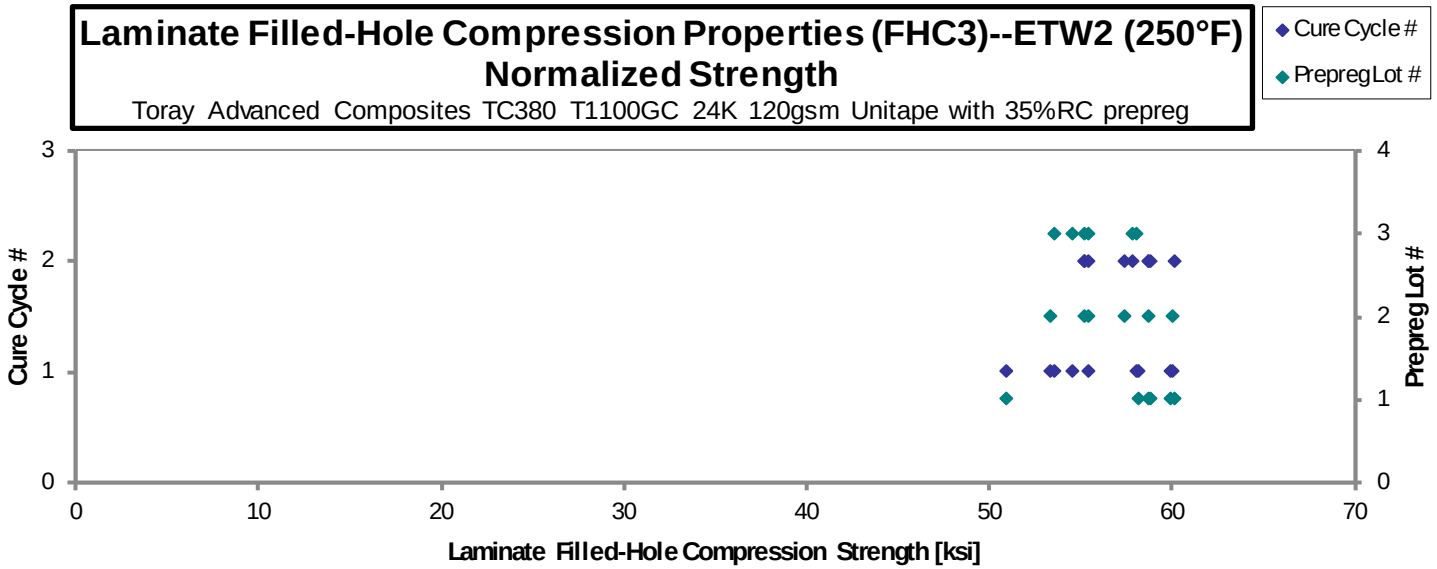
Laminate Filled-Hole Compression Properties (FHC3)--ETW2 (250°F) Strength

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

normalizing t_{ply} [in]: 0.004800

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

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**55.08**	**$Average_{norm}$**	**0.004946**	**56.72**
Standard Dev.	**3.087**	**$Standard\ Dev._{norm}$**		**2.634**
Coeff. of Var. [%]	**5.605**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.643**
Min.	**49.96**	**Min.**	**0.004814**	**50.95**
Max.	**59.84**	**Max.**	**0.005123**	**60.08**
Number of Spec.	**18**	**Number of Spec.**	**18**	**18**


Laminate Filled-Hole Compression Properties (FHC3)--ETW2 (250°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled-Hole Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4

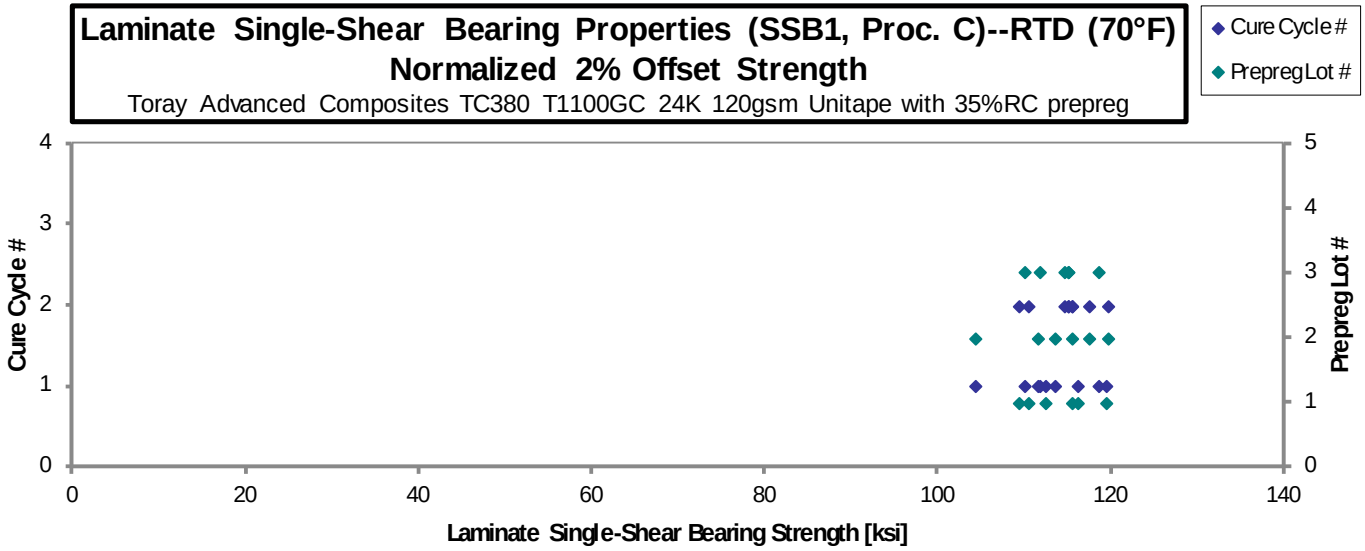
4.27 "25/50/25" Single-Shear Bearing 1 Properties (SSB1, Proc. C)

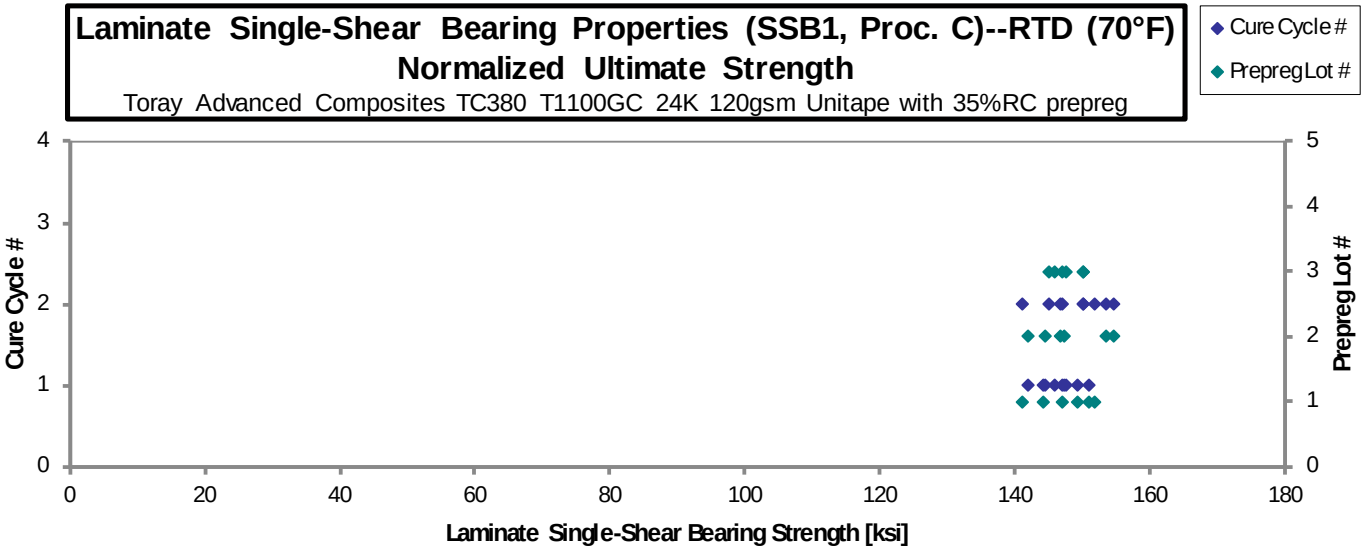
Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--RTD (70°F)
Strength & Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

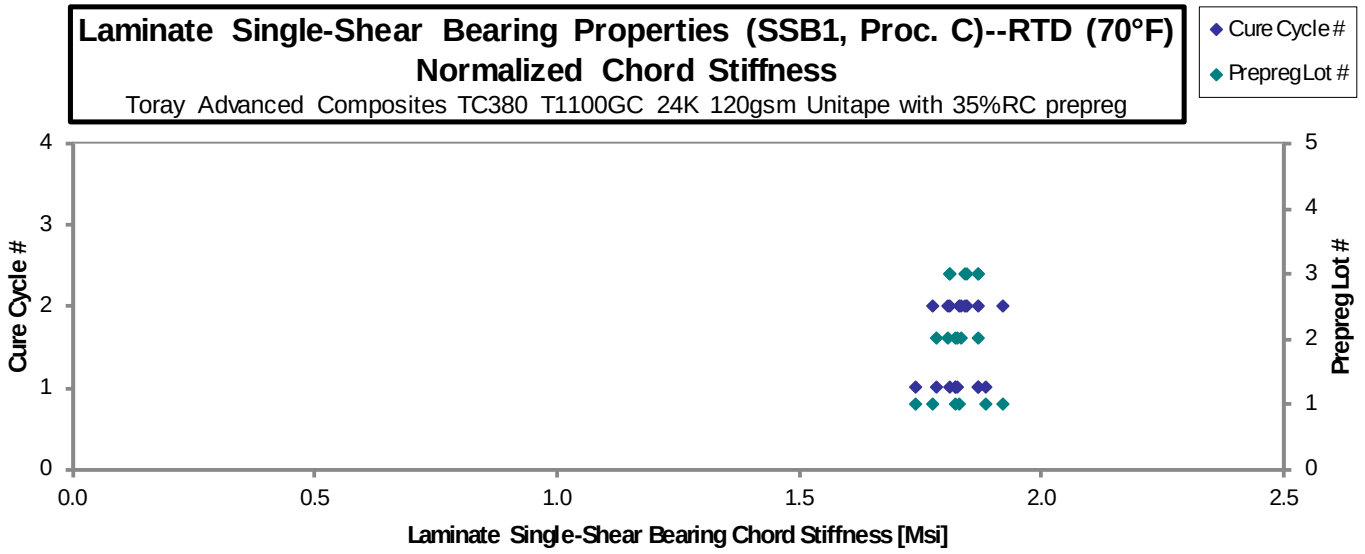
normalizing t_{ply} [in]
0.004800

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	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD1A111A	A	C1	1	1	117.8	156.6	1.821	0.1099	24	B1I	0.004581	112.4	149.5	1.738
TCD1A112A	A	C1	1	1	123.1	148.4	1.939	0.1119	24	B1I	0.004664	119.6	144.2	1.884
TCD1A113A	A	C1	1	1	118.8	154.3	1.858	0.1128	24	B1I	0.004699	116.3	151.0	1.819
TCD1A211A	A	C2	1	2	116.7	150.7	1.891	0.1080	24	B1I	0.004500	109.4	141.3	1.773
TCD1A212A	A	C2	1	2	115.9	159.3	1.918	0.1099	24	B1I	0.004578	110.5	151.9	1.830
TCD1A213A	A	C2	1	2	120.5	153.4	2.001	0.1105	24	B1I	0.004602	115.5	147.1	1.919
TCD1B111A	B	C1	2	1	123.3	156.7	1.973	0.1062	24	B1I	0.004425	113.7	144.5	1.819
TCD1B112A	B	C1	2	1	117.0	154.5	1.915	0.1098	24	B1I	0.004576	111.6	147.3	1.825
TCD1B113A	B	C1	2	1	108.5	147.7	1.851	0.1108	24	B1I	0.004617	104.4	142.0	1.781
TCD1B211A	B	C2	2	2	125.8	159.9	2.032	0.1058	24	B1I	0.004408	115.5	146.8	1.865
TCD1B212A	B	C2	2	2	121.1	158.1	1.885	0.1119	24	B1I	0.004660	117.6	153.5	1.830
TCD1B213A	B	C2	2	2	123.6	159.6	1.862	0.1116	24	B1I	0.004651	119.7	154.6	1.804
TCD1C111A	C	C1	3	1	115.7	153.6	1.962	0.1096	24	B1I	0.004566	110.1	146.1	1.867
TCD1C112A	C	C1	3	1	121.3	150.4	1.909	0.1127	24	B1I	0.004697	118.7	147.2	1.868
TCD1C113A	C	C1	3	1	113.3	149.8	1.831	0.1137	24	B1I	0.004736	111.8	147.8	1.807
TCD1C211A	C	C2	3	2	123.1	160.5	1.965	0.1078	24	B1I	0.004491	115.1	150.1	1.838
TCD1C212A	C	C2	3	2	116.8	147.8	1.877	0.1131	24	B1I	0.004713	114.7	145.1	1.843
TCD1C213A	C	C2	3	2	117.0	152.6	1.840	0.1134	24	B1I	0.004723	115.1	150.2	1.810

Average	**118.8**	**154.1**	**1.907**	**Average$_{norm}$**	**0.004605**	**114.0**	**147.8**	**1.829**
Standard Dev.	**4.293**	**4.342**	**0.06095**	**Standard Dev.$_{norm}$**		**3.965**	**3.693**	**0.04276**
Coeff. of Var. [%]	**3.612**	**2.818**	**3.196**	**Coeff. of Var. [%]$_{norm}$**		**3.479**	**2.499**	**2.338**
Min.	**108.5**	**147.7**	**1.821**	**Min.**	**0.004408**	**104.4**	**141.3**	**1.738**
Max.	**125.8**	**160.5**	**2.032**	**Max.**	**0.004736**	**119.7**	**154.6**	**1.919**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--RTD (70°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
Laminate Single-Shear Bearing Strength [ksi]


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--RTD (70°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
160
180
Laminate Single-Shear Bearing Strength [ksi]


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--RTD (70°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0.0
0.5
1.0
1.5
2.0
2.5
Laminate Single-Shear Bearing Chord Stiffness [Msi]

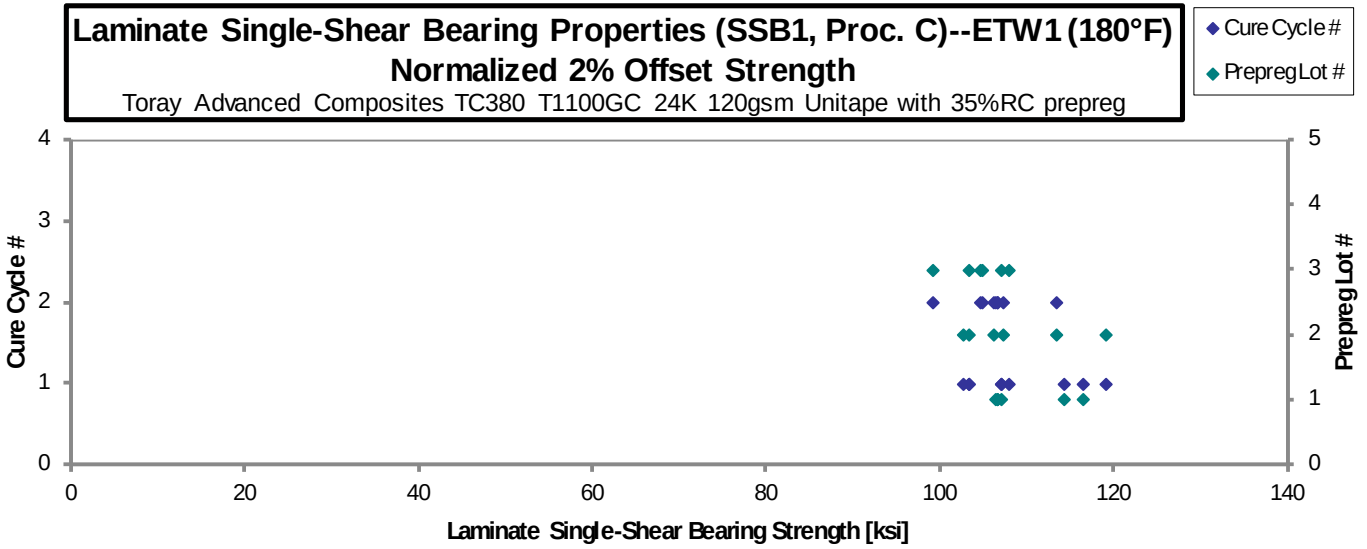
Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW1 (180°F)
Strength & Chord Stiffness

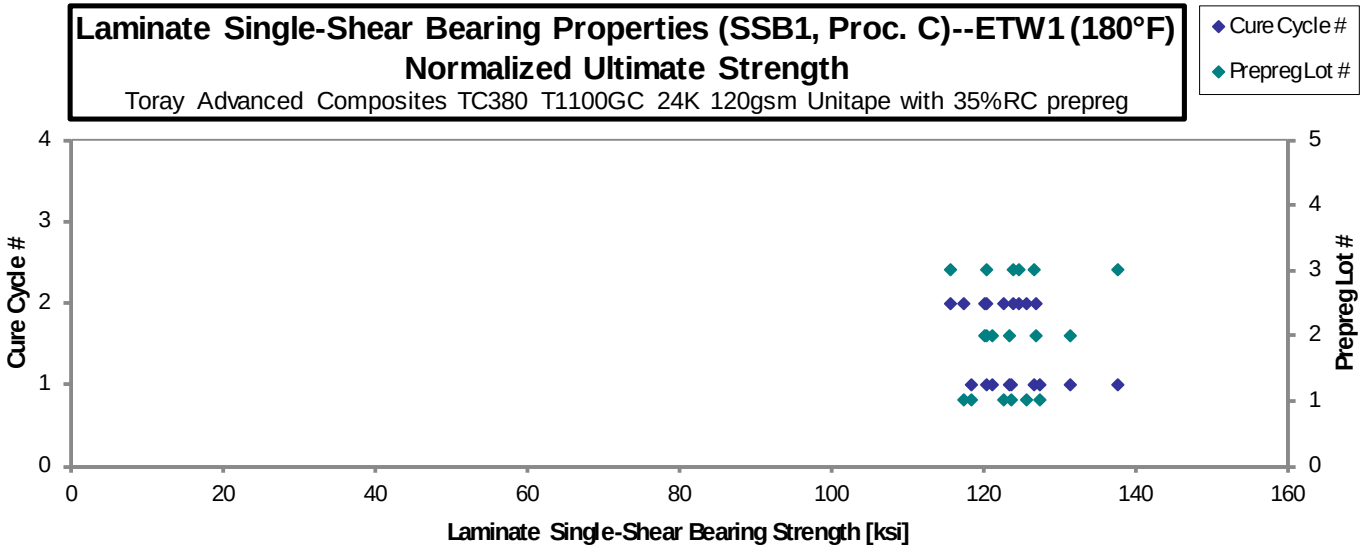
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

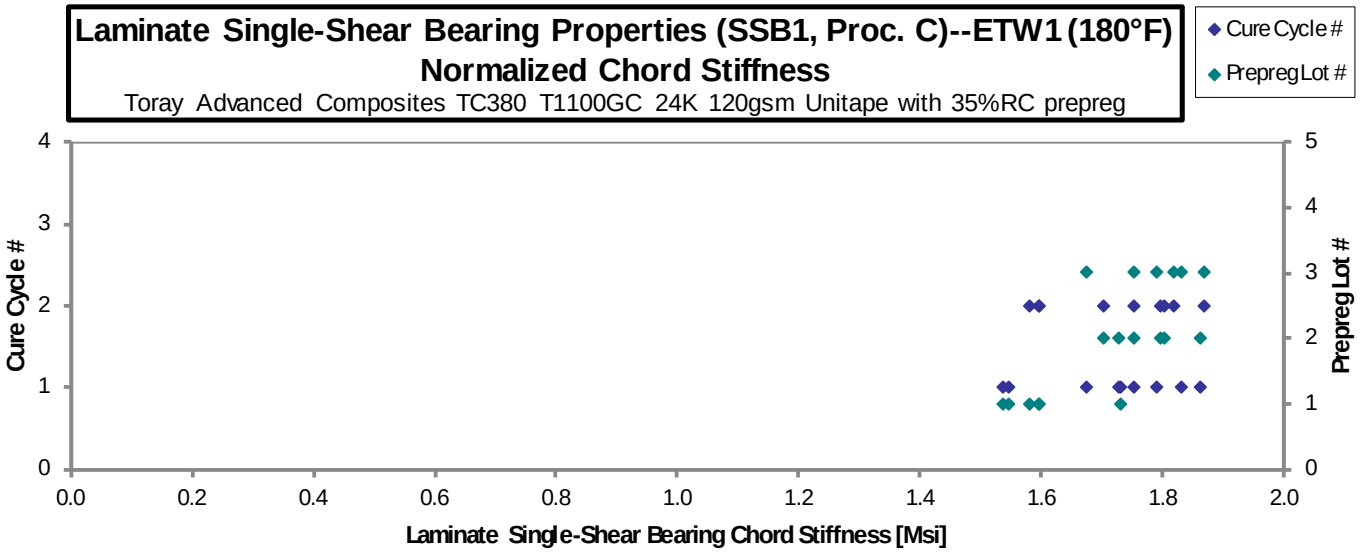
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD1A111D	A	C1	1	1	119.7	127.0	1.780	0.1121	24	B1I	0.004672	116.5	123.6	1.733
TCD1A112D	A	C1	1	1	110.4	131.4	1.594	0.1118	24	B1I	0.004657	107.1	127.5	1.547
TCD1A113D	A	C1	1	1	119.5	123.5	1.606	0.1103	24	B1I	0.004597	114.4	118.3	1.538
TCD1A211D	A	C2	1	2	110.8	127.6	1.663	0.1107	24	B1I	0.004613	106.5	122.6	1.598
TCD1A212D	A	C2	1	2	110.8	121.9	1.643	0.1110	24	B1I	0.004623	106.7	117.4	1.583
TCD1A213D	A	C2	1	2	113.0	133.0	1.692	0.1087	24	B1I	0.004531	106.7	125.6	1.597
TCD1B111D	B	C1	2	1	105.9	127.4	1.784	0.1117	24	B1I	0.004655	102.7	123.5	1.730
TCD1B112D	B	C1	2	1	124.1	136.9	1.940	0.1106	24	B1I	0.004606	119.1	131.4	1.862
TCD1B113D	B	C1	2	1	109.3	128.0	1.851	0.1091	24	B1I	0.004544	103.5	121.2	1.753
TCD1B211D	B	C2	2	2	111.6	125.1	1.768	0.1109	24	B1I	0.004621	107.4	120.4	1.702
TCD1B212D	B	C2	2	2	118.0	132.1	1.869	0.1107	24	B1I	0.004614	113.4	127.0	1.797
TCD1B213D	B	C2	2	2	113.9	128.6	1.930	0.1076	24	B1I	0.004481	106.3	120.1	1.802
TCD1C111D	C	C1	3	1	109.6	139.7	1.700	0.1136	24	B1I	0.004732	108.1	137.7	1.676
TCD1C112D	C	C1	3	1	111.3	131.7	1.906	0.1108	24	B1I	0.004617	107.1	126.7	1.833
TCD1C113D	C	C1	3	1	111.3	129.6	1.926	0.1071	24	B1I	0.004461	103.5	120.5	1.790
TCD1C211D	C	C2	3	2	105.4	124.7	1.881	0.1144	24	B1I	0.004768	104.7	123.8	1.868
TCD1C212D	C	C2	3	2	100.5	126.2	1.841	0.1139	24	B1I	0.004744	99.33	124.8	1.819
TCD1C213D	C	C2	3	2	109.7	120.9	1.833	0.1102	24	B1I	0.004590	105.0	115.6	1.753

Average	**111.9**	**128.6**	**1.789**	**Average$_{norm}$**	**0.004618**	**107.7**	**123.8**	**1.721**
Standard Dev.	**5.632**	**4.917**	**0.1151**	**Standard Dev.$_{norm}$**		**5.079**	**5.255**	**0.1082**
Coeff. of Var. [%]	**5.031**	**3.823**	**6.432**	**Coeff. of Var. [%]$_{norm}$**		**4.717**	**4.247**	**6.288**
Min.	**100.5**	**120.9**	**1.594**	**Min.**	**0.004461**	**99.33**	**115.6**	**1.538**
Max.	**124.1**	**139.7**	**1.940**	**Max.**	**0.004768**	**119.1**	**137.7**	**1.868**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW1 (180°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
140
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW1 (180°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
140
160
0
1
2
3
4
5

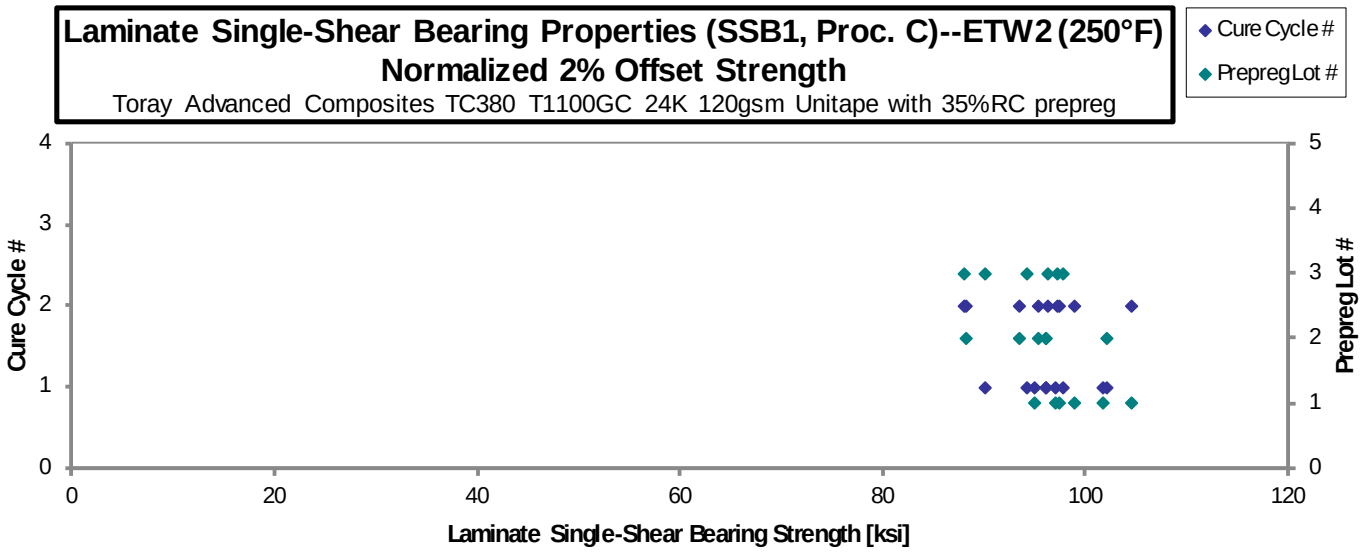

Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW1 (180°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
Laminate Single-Shear Bearing Chord Stiffness [Msi]

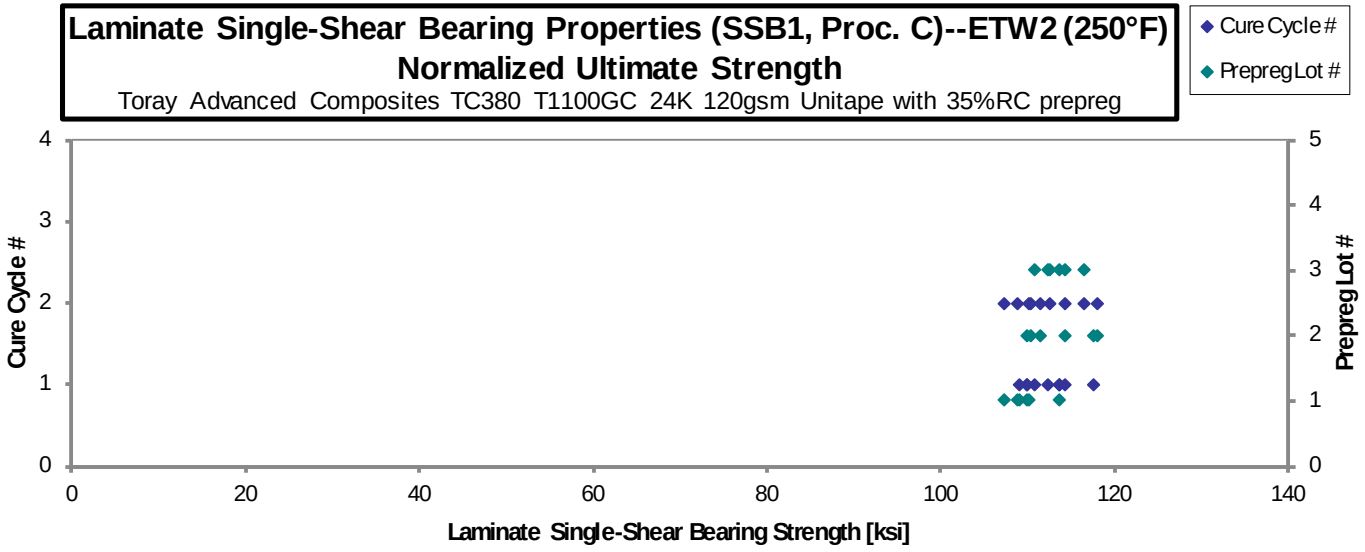
Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW2 (250°F)
Strength & Chord Stiffness

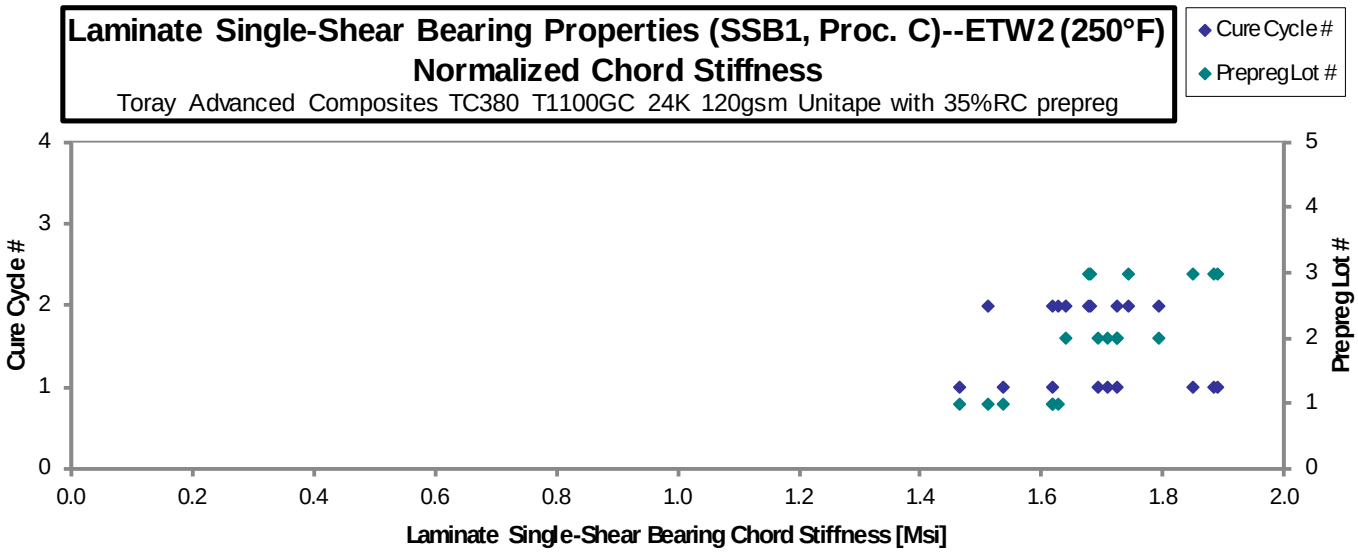
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD1A111E	A	C1	1	1	101.6	113.4	1.463	0.1154	24	B1I	0.004807	101.7	113.5	1.465
TCD1A112E	A	C1	1	1	94.87	109.9	1.535	0.1153	24	B1I	0.004804	94.95	110.0	1.536
TCD1A113E	A	C1	1	1	96.65	108.7	1.613	0.1156	24	B1I	0.004818	97.01	109.1	1.619
TCD1A211E	A	C2	1	2	99.28	112.4	1.651	0.1130	24	B1I	0.004706	97.34	110.2	1.619
TCD1A212E	A	C2	1	2	100.6	110.8	1.657	0.1131	24	B1I	0.004714	98.80	108.8	1.627
TCD1A213E	A	C2	1	2	106.2	108.9	1.537	0.1134	24	B1I	0.004724	104.5	107.2	1.513
TCD1B111E	B	C1	2	1	91.81	112.3	1.648	0.1206	24	B1I	0.005024	96.10	117.6	1.725
TCD1B112E	B	C1	2	1	97.00	108.7	1.626	0.1212	24	B1I	0.005051	102.1	114.3	1.711
TCD1B113E	B	C1	2	1	91.44	104.8	1.613	0.1209	24	B1I	0.005038	95.98	110.0	1.693
TCD1B211E	B	C2	2	2	84.30	106.4	1.568	0.1206	24	B1I	0.005023	88.21	111.4	1.640
TCD1B212E	B	C2	2	2	90.75	112.2	1.642	0.1211	24	B1I	0.005045	95.39	117.9	1.726
TCD1B213E	B	C2	2	2	89.20	105.4	1.713	0.1206	24	B1I	0.005024	93.36	110.3	1.793
TCD1C111E	C	C1	3	1	94.28	109.5	1.786	0.1194	24	B1I	0.004976	97.73	113.5	1.851
TCD1C112E	C	C1	3	1	85.91	105.6	1.795	0.1209	24	B1I	0.005037	90.15	110.9	1.884
TCD1C113E	C	C1	3	1	90.57	107.9	1.817	0.1199	24	B1I	0.004997	94.28	112.3	1.892
TCD1C211E	C	C2	3	2	92.67	112.1	1.678	0.1197	24	B1I	0.004986	96.26	116.4	1.743
TCD1C212E	C	C2	3	2	83.51	106.8	1.593	0.1215	24	B1I	0.005060	88.04	112.6	1.680
TCD1C213E	C	C2	3	2	91.86	108.1	1.589	0.1219	24	B1I	0.005077	97.16	114.4	1.681
				Average	**93.47**	**109.1**	**1.640**				**Average$_{norm}$**	**0.004940**	**96.06**	**112.2**	**1.689**
				Standard Dev.	**6.053**	**2.671**	**0.09349**				**Standard Dev.$_{norm}$**		**4.390**	**3.054**	**0.1195**
				Coeff. of Var. [%]	**6.475**	**2.448**	**5.700**				**Coeff. of Var. [%]$_{norm}$**		**4.569**	**2.721**	**7.075**
				Min.	**83.51**	**104.8**	**1.463**				**Min.**	**0.004706**	**88.04**	**107.2**	**1.465**
				Max.	**106.2**	**113.4**	**1.817**				**Max.**	**0.005077**	**104.5**	**117.9**	**1.892**
				Number of Spec.	**18**	**18**	**18**				**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW2 (250°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW2 (250°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
140
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB1, Proc. C)--ETW2 (250°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Chord Stiffness [Msi]
0
1
2
3
4
5
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0

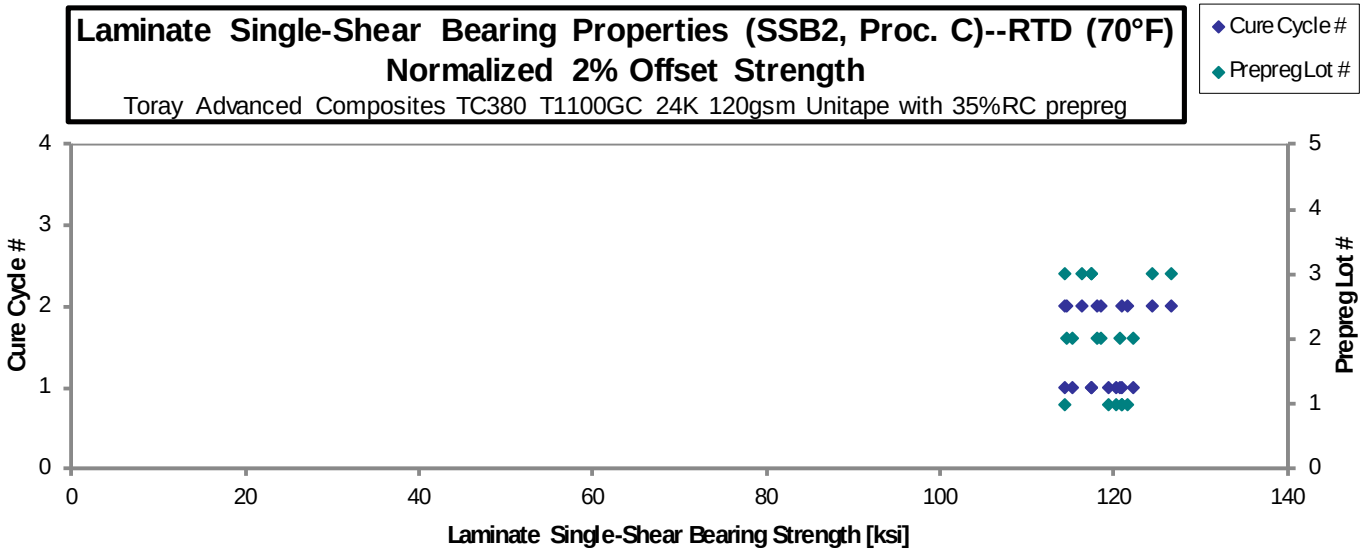
4.28 "10/80/10" Single-Shear Bearing 2 Properties (SSB2, Proc. C)

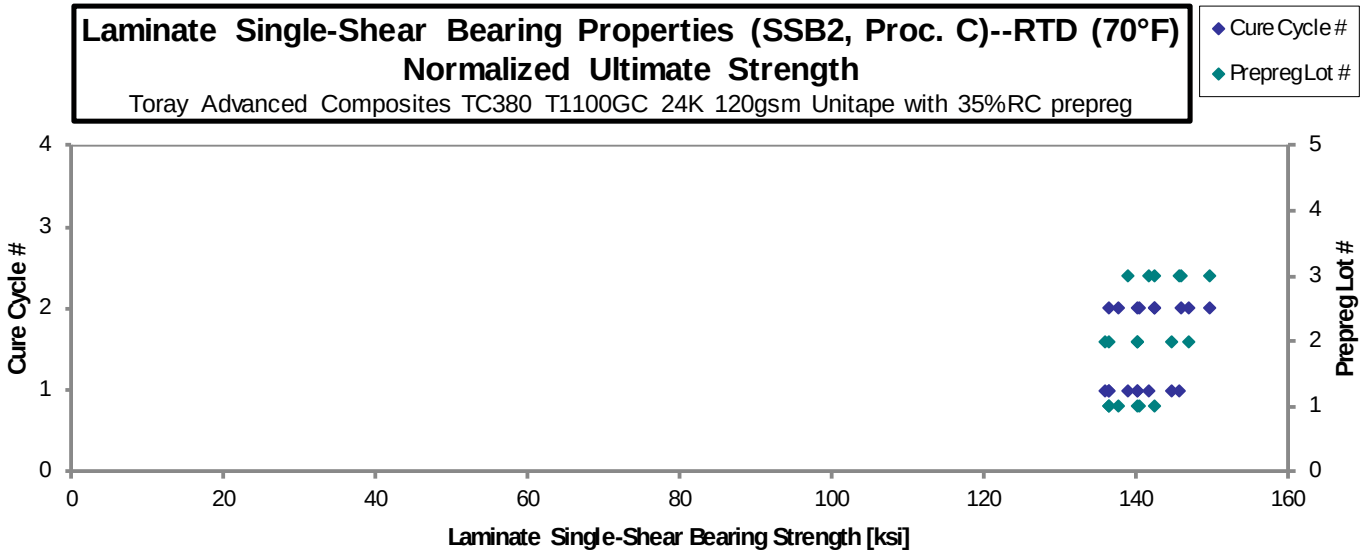
Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--RTD (70°F)
Strength & Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

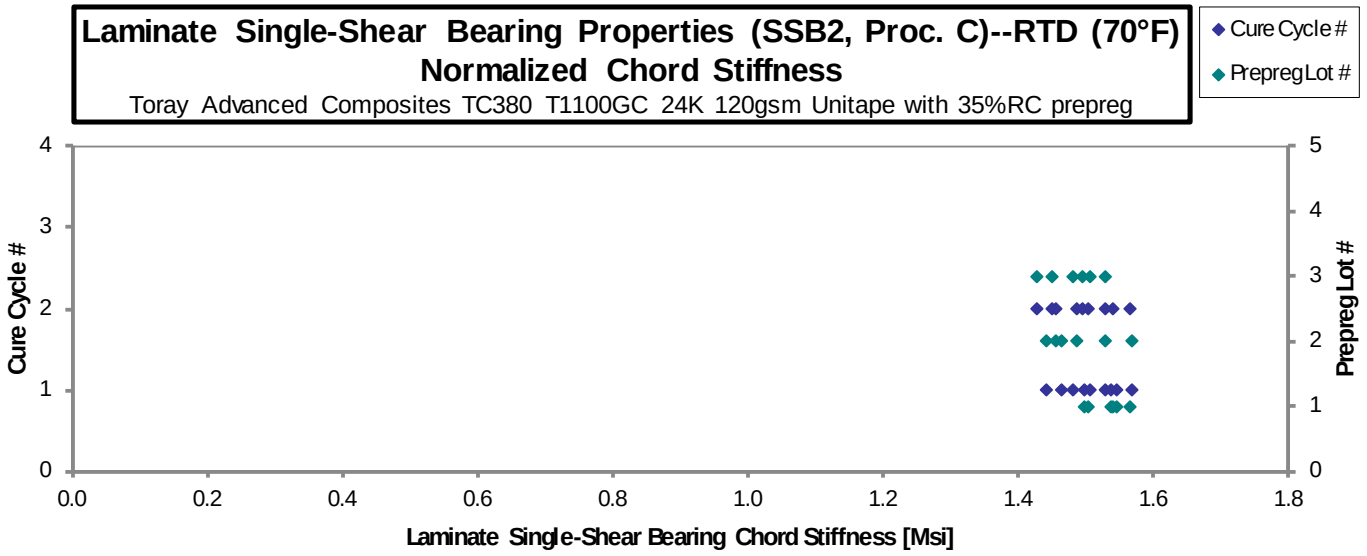
normalizing t_{ply} [in]
0.004800

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	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD2A111A	A	C1	1	1	127.9	145.2	1.643	0.09023	20	B1I	0.004512	120.3	136.5	1.544
TCD2A112A	A	C1	1	1	126.5	146.7	1.607	0.09173	20	B1I	0.004587	120.9	140.2	1.535
TCD2A113A	A	C1	1	1	125.1	143.1	1.569	0.09157	20	B1I	0.004578	119.3	136.5	1.496
TCD2A211A	A	C2	1	2	128.1	150.8	1.594	0.09055	20	B1I	0.004528	120.9	142.2	1.504
TCD2A212A	A	C2	1	2	119.5	144.1	1.636	0.09177	20	B1I	0.004588	114.3	137.7	1.563
TCD2A213A	A	C2	1	2	126.3	145.8	1.598	0.09238	20	B1I	0.004619	121.6	140.3	1.538
TCD2B111A	B	C1	2	1	123.4	147.9	1.603	0.09385	20	B1I	0.004693	120.6	144.6	1.567
TCD2B112A	B	C1	2	1	127.2	145.9	1.524	0.09215	20	B1I	0.004608	122.1	140.1	1.463
TCD2B113A	B	C1	2	1	118.8	140.0	1.486	0.09307	20	B1I	0.004653	115.2	135.8	1.441
TCD2B211A	B	C2	2	2	127.3	158.0	1.596	0.08932	20	B1I	0.004466	118.4	147.0	1.485
TCD2B212A	B	C2	2	2	122.4	141.5	1.508	0.09255	20	B1I	0.004628	118.0	136.4	1.454
TCD2B213A	B	C2	2	2	118.7	145.2	1.582	0.09263	20	B1I	0.004632	114.5	140.1	1.527
TCD2C111A	C	C1	3	1	126.3	152.6	1.645	0.08912	20	B1I	0.004456	117.3	141.6	1.527
TCD2C112A	C	C1	3	1	118.5	143.9	1.559	0.09262	20	B1I	0.004631	114.3	138.9	1.504
TCD2C113A	C	C1	3	1	120.2	149.3	1.515	0.09373	20	B1I	0.004687	117.3	145.7	1.479
TCD2C211A	C	C2	3	2	123.0	150.8	1.509	0.09072	20	B1I	0.004536	116.2	142.5	1.426
TCD2C212A	C	C2	3	2	121.6	143.8	1.392	0.09990	20	B1I	0.004995	126.5	149.7	1.448
TCD2C213A	C	C2	3	2	125.5	147.2	1.507	0.09517	20	B1I	0.004758	124.4	145.9	1.494

Average	**123.7**	**146.8**	**1.560**		**Average$_{norm}$**	**0.004620**	**119.0**	**141.2**	**1.500**
Standard Dev.	**3.451**	**4.318**	**0.06571**		**Standard Dev.$_{norm}$**		**3.495**	**4.073**	**0.04235**
Coeff. of Var. [%]	**2.790**	**2.942**	**4.213**		**Coeff. of Var. [%]$_{norm}$**		**2.937**	**2.884**	**2.824**
Min.	**118.5**	**140.0**	**1.392**		**Min.**	**0.004456**	**114.3**	**135.8**	**1.426**
Max.	**128.1**	**158.0**	**1.645**		**Max.**	**0.004995**	**126.5**	**149.7**	**1.567**
Number of Spec.	**18**	**18**	**18**		**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--RTD (70°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
Laminate Single-Shear Bearing Strength [ksi]


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--RTD (70°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
160
Laminate Single-Shear Bearing Strength [ksi]

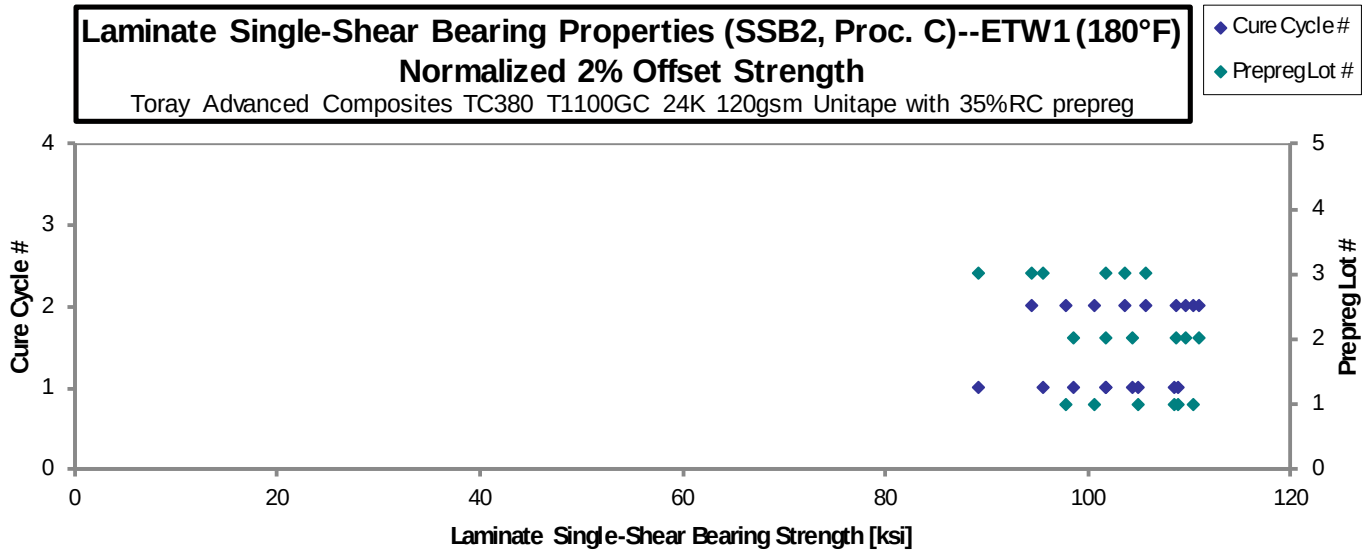

Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--RTD (70°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
Laminate Single-Shear Bearing Chord Stiffness [Msi]

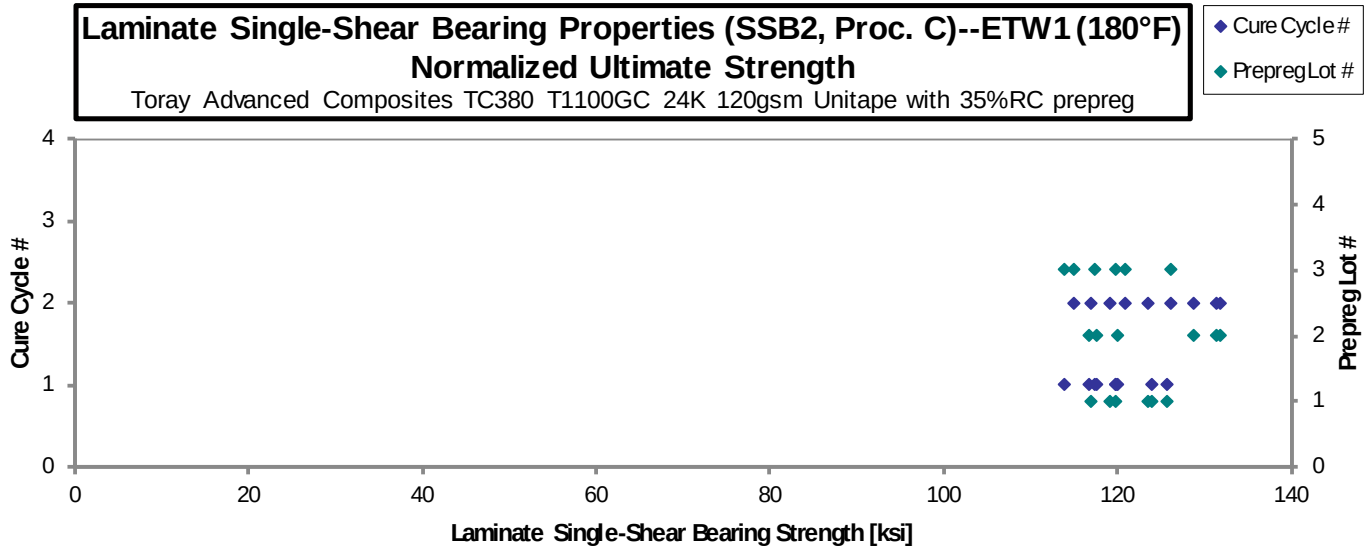
Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW1 (180°F)
Strength & Chord Stiffness

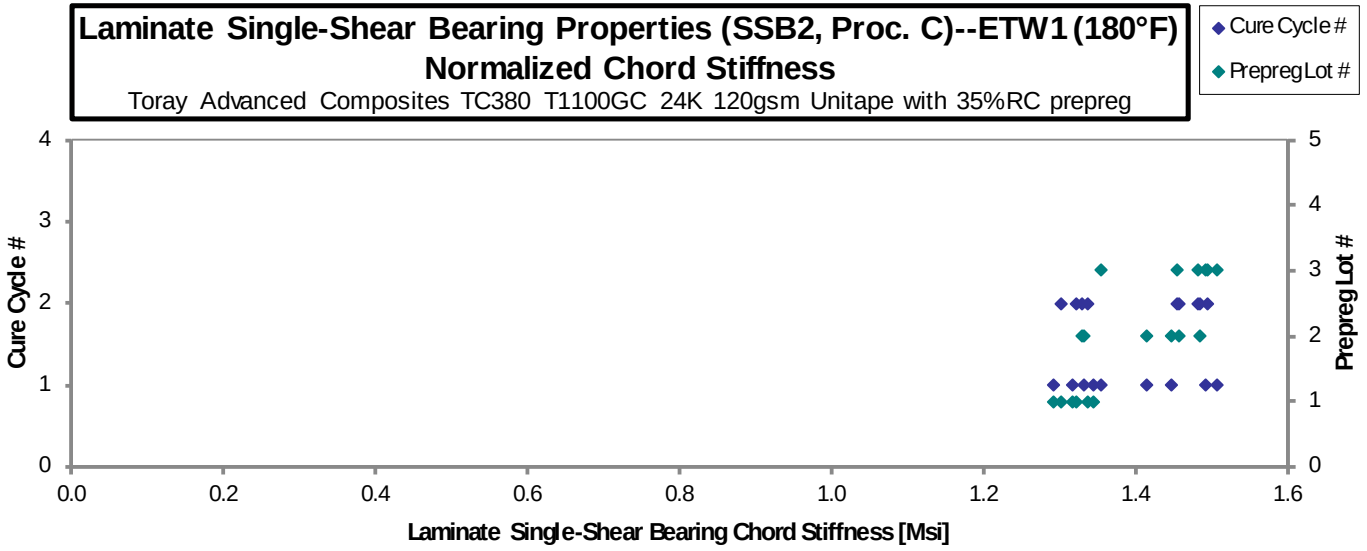
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

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	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD2A111D	A	C1	1	1	109.9	129.8	1.407	0.09177	20	B1I	0.004588	105.0	124.1	1.345
TCD2A112D	A	C1	1	1	113.5	131.0	1.369	0.09223	20	B1I	0.004612	109.0	125.8	1.315
TCD2A113D	A	C1	1	1	114.9	126.8	1.368	0.09067	20	B1I	0.004533	108.5	119.8	1.292
TCD2A211D	A	C2	1	2	105.0	124.2	1.392	0.09210	20	B1I	0.004605	100.7	119.2	1.335
TCD2A212D	A	C2	1	2	101.8	121.7	1.352	0.09237	20	B1I	0.004618	97.91	117.1	1.301
TCD2A213D	A	C2	1	2	116.3	130.0	1.392	0.09122	20	B1I	0.004561	110.5	123.5	1.322
TCD2B111D	B	C1	2	1	104.5	120.7	1.364	0.09362	20	B1I	0.004681	101.9	117.8	1.330
TCD2B112D	B	C1	2	1	106.6	122.6	1.478	0.09402	20	B1I	0.004701	104.4	120.1	1.447
TCD2B113D	B	C1	2	1	104.0	123.2	1.490	0.09107	20	B1I	0.004553	98.64	116.8	1.413
TCD2B211D	B	C2	2	2	113.4	136.5	1.376	0.09278	20	B1I	0.004639	109.6	131.9	1.330
TCD2B212D	B	C2	2	2	112.4	135.9	1.535	0.09283	20	B1I	0.004642	108.7	131.4	1.484
TCD2B213D	B	C2	2	2	118.4	137.3	1.553	0.09003	20	B1I	0.004502	111.0	128.8	1.456
TCD2C111D	C	C1	3	1	97.84	120.0	1.541	0.09388	20	B1I	0.004694	95.69	117.4	1.507
TCD2C112D	C	C1	3	1	105.5	124.3	1.403	0.09262	20	B1I	0.004631	101.8	119.9	1.353
TCD2C113D	C	C1	3	1	95.53	122.1	1.596	0.08967	20	B1I	0.004483	89.23	114.0	1.491
TCD2C211D	C	C2	3	2	107.5	123.0	1.505	0.09445	20	B1I	0.004723	105.8	121.0	1.480
TCD2C212D	C	C2	3	2	107.1	130.3	1.544	0.09292	20	B1I	0.004646	103.6	126.1	1.494
TCD2C213D	C	C2	3	2	98.15	119.5	1.509	0.09243	20	B1I	0.004622	94.50	115.1	1.453
Average					**107.3**	**126.6**	**1.454**				**Average$_{norm}$**	**0.004613**	**103.1**	**121.7**	**1.397**
Standard Dev.					**6.596**	**5.827**	**0.08089**				**Standard Dev.$_{norm}$**		**6.161**	**5.382**	**0.07826**
Coeff. of Var. [%]					**6.145**	**4.602**	**5.563**				**Coeff. of Var. [%]$_{norm}$**		**5.973**	**4.424**	**5.601**
Min.					**95.53**	**119.5**	**1.352**				**Min.**	**0.004483**	**89.23**	**114.0**	**1.292**
Max.					**118.4**	**137.3**	**1.596**				**Max.**	**0.004723**	**111.0**	**131.9**	**1.507**
Number of Spec.					**18**	**18**	**18**				**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW1 (180°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW1 (180°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
140
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW1 (180°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
Laminate Single-Shear Bearing Chord Stiffness [Msi]

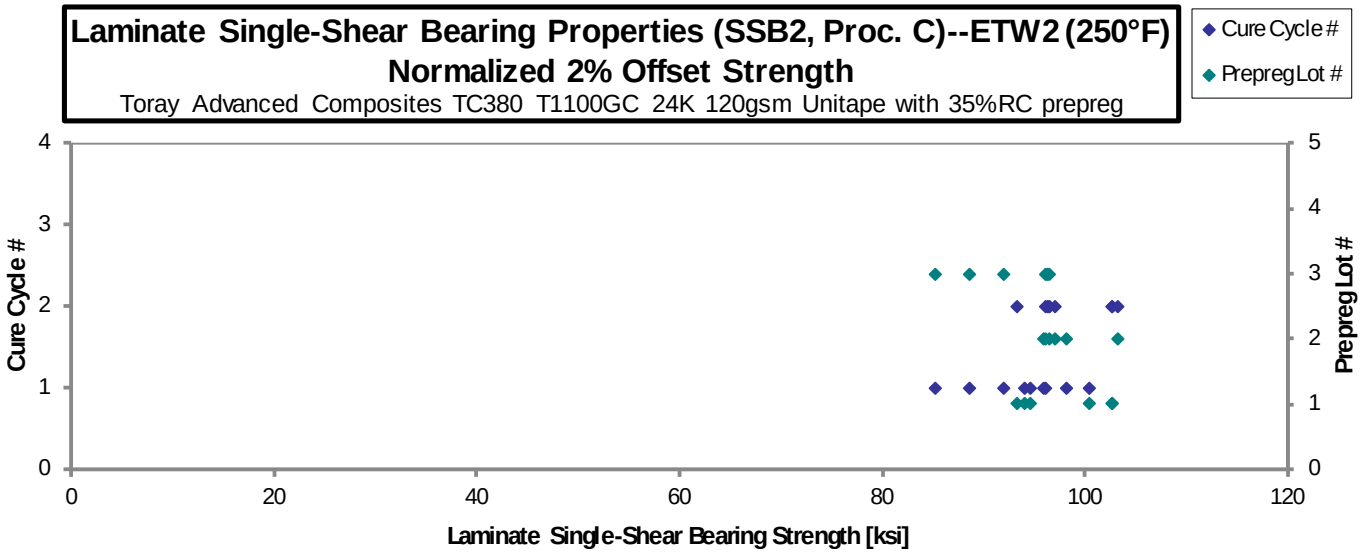
Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW2 (250°F)
Strength & Chord Stiffness

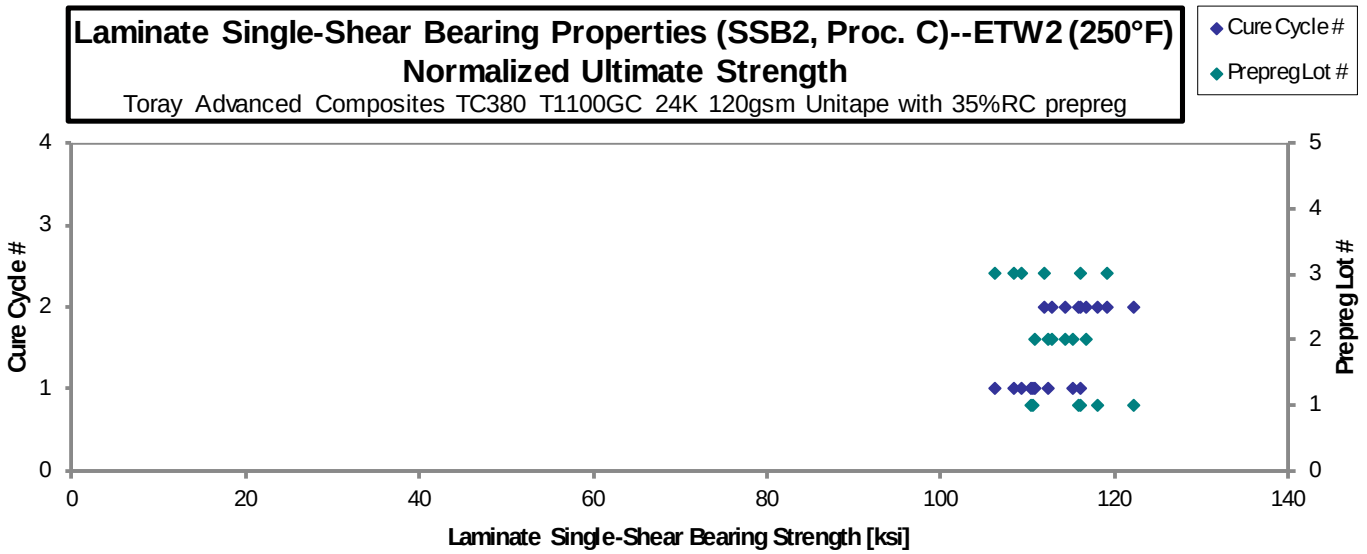
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

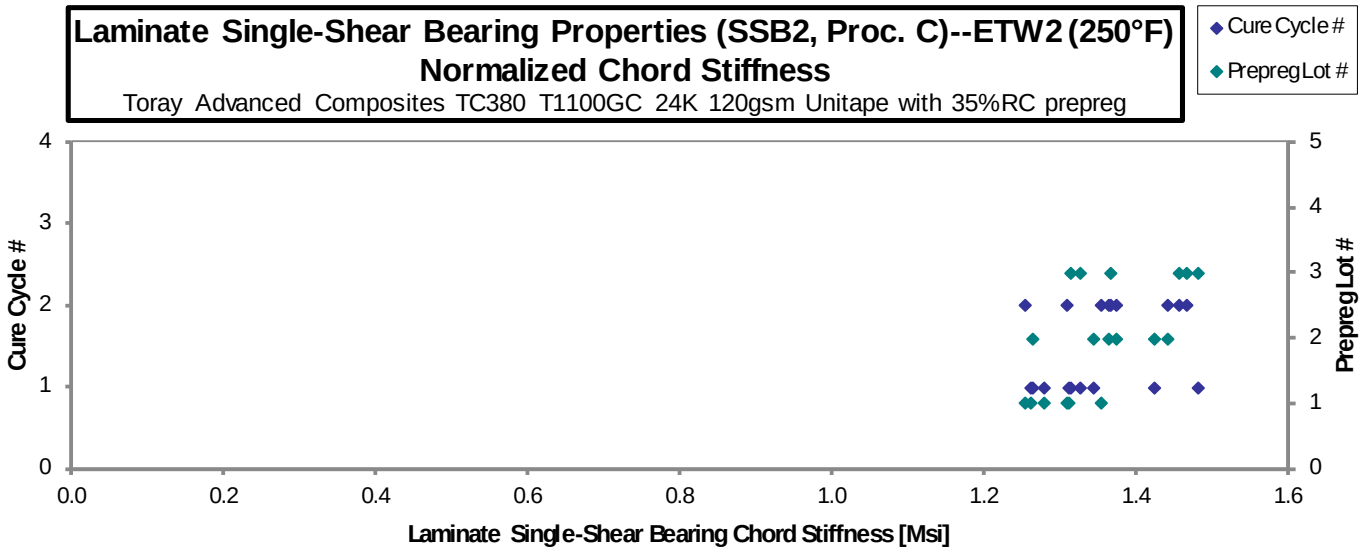
normalizing t_{ply} [in]
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Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Chord Stiffness [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD2A111E	A	C1	1	1	103.1	119.0	1.344	0.09357	20	B1I	0.004678	100.5	116.0	1.310
TCD2A112E	A	C1	1	1	96.79	112.7	1.290	0.09393	20	B1I	0.004697	94.71	110.3	1.262
TCD2A113E	A	C1	1	1	96.83	113.7	1.316	0.09333	20	B1I	0.004667	94.14	110.6	1.279
TCD2A211E	A	C2	1	2	93.47	115.9	1.254	0.09588	20	B1I	0.004794	93.36	115.7	1.253
TCD2A212E	A	C2	1	2	103.1	118.6	1.358	0.09557	20	B1I	0.004778	102.7	118.1	1.352
TCD2A213E	A	C2	1	2	102.5	121.9	1.305	0.09617	20	B1I	0.004808	102.7	122.1	1.307
TCD2B111E	B	C1	2	1	91.35	105.4	1.204	0.1008	20	B1I	0.005042	95.95	110.7	1.264
TCD2B112E	B	C1	2	1	93.34	109.4	1.353	0.1010	20	B1I	0.005048	98.17	115.1	1.423
TCD2B113E	B	C1	2	1	91.48	106.8	1.279	0.1009	20	B1I	0.005045	96.15	112.2	1.344
TCD2B211E	B	C2	2	2	92.25	107.1	1.296	0.1010	20	B1I	0.005049	97.04	112.6	1.363
TCD2B212E	B	C2	2	2	97.71	108.2	1.301	0.1014	20	B1I	0.005068	103.2	114.2	1.374
TCD2B213E	B	C2	2	2	91.52	110.7	1.368	0.1012	20	B1I	0.005058	96.43	116.7	1.442
TCD2C111E	C	C1	3	1	85.78	102.8	1.283	0.09915	20	B1I	0.004958	88.60	106.2	1.325
TCD2C112E	C	C1	3	1	88.86	105.7	1.270	0.09930	20	B1I	0.004965	91.91	109.3	1.314
TCD2C113E	C	C1	3	1	82.06	104.1	1.423	0.09982	20	B1I	0.004991	85.32	108.3	1.480
TCD2C211E	C	C2	3	2	91.80	106.5	1.386	0.1008	20	B1I	0.005038	96.36	111.8	1.455
TCD2C212E	C	C2	3	2	92.11	113.7	1.400	0.1006	20	B1I	0.005029	96.50	119.1	1.467
TCD2C213E	C	C2	3	2	91.50	110.4	1.300	0.1009	20	B1I	0.005046	96.19	116.1	1.366

Average	**93.64**	**110.7**	**1.318**	**Average$_{norm}$**	**0.004931**	**96.10**	**113.6**	**1.354**
Standard Dev.	**5.636**	**5.522**	**0.05566**	**Standard Dev.$_{norm}$**		**4.630**	**4.104**	**0.07305**
Coeff. of Var. [%]	**6.018**	**4.988**	**4.222**	**Coeff. of Var. [%]$_{norm}$**		**4.818**	**3.612**	**5.393**
Min.	**82.06**	**102.8**	**1.204**	**Min.**	**0.004667**	**85.32**	**106.2**	**1.253**
Max.	**103.1**	**121.9**	**1.423**	**Max.**	**0.005068**	**103.2**	**122.1**	**1.480**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW2 (250°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW2 (250°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
140
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB2, Proc. C)--ETW2 (250°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
Laminate Single-Shear Bearing Chord Stiffness [Msi]

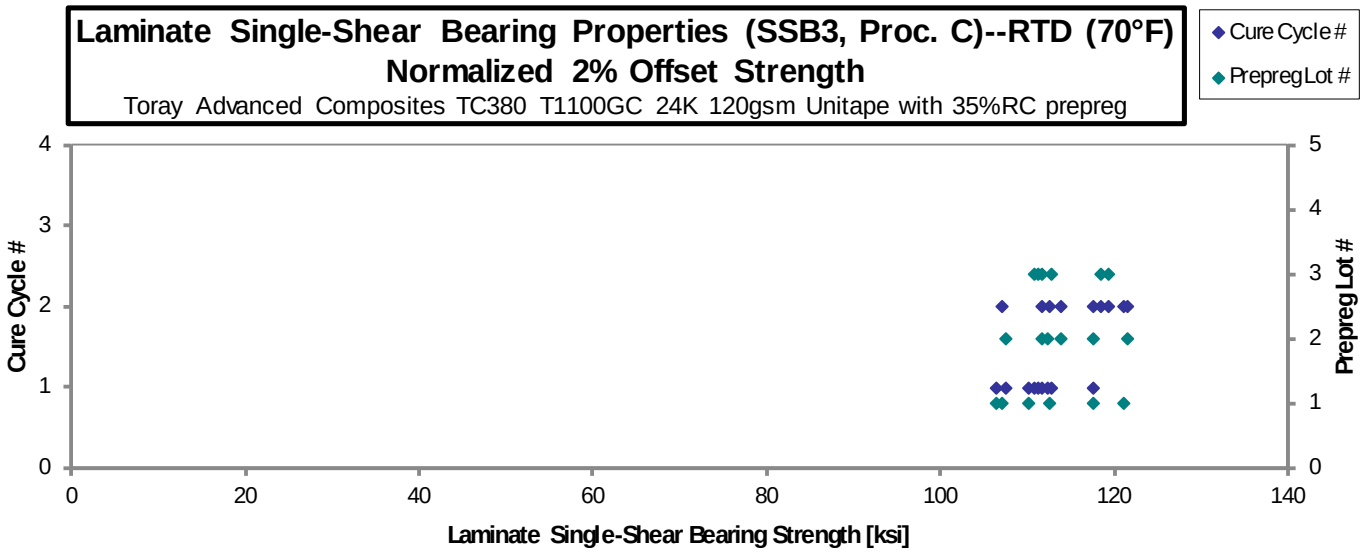
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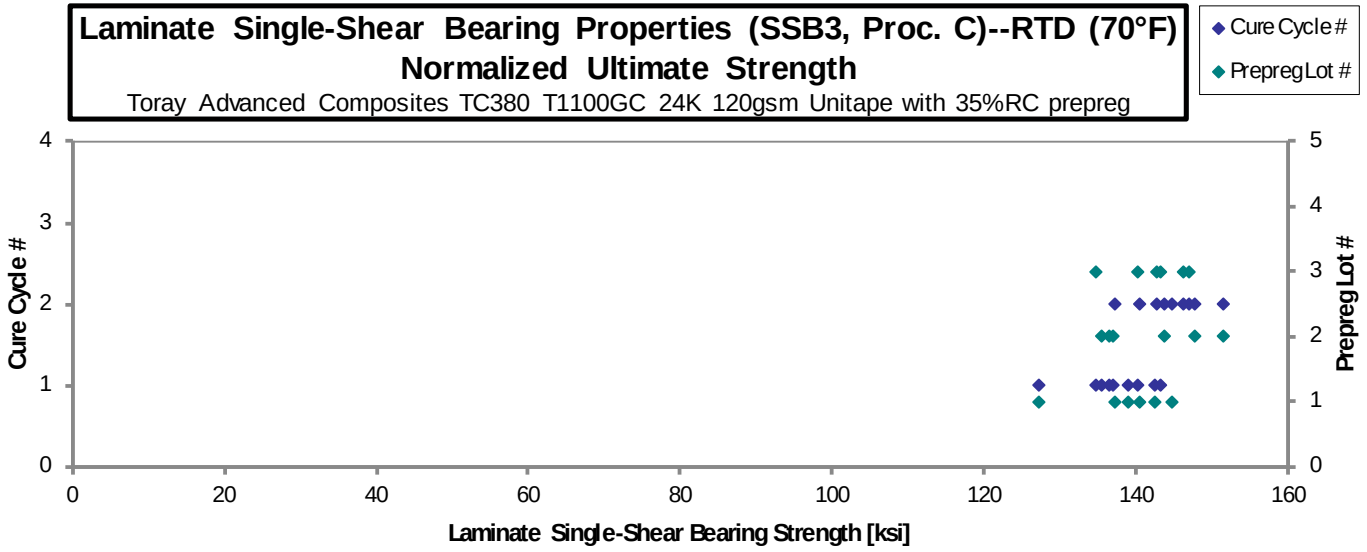
Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--RTD (70°F)
Strength & Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

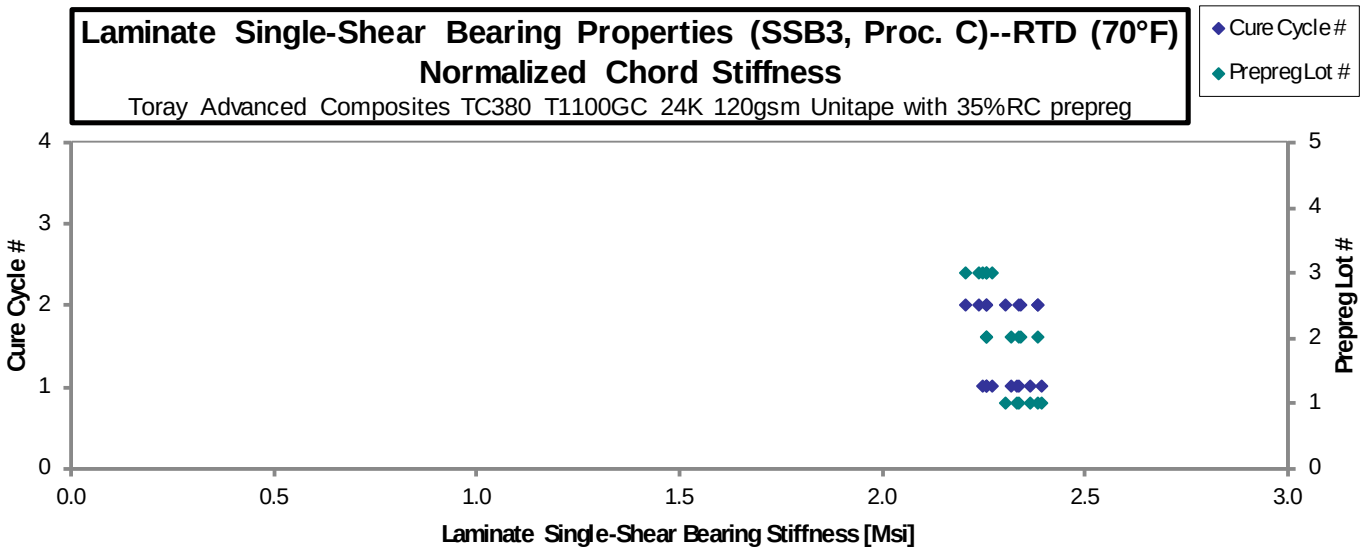
normalizing t_{ply} [in]
0.004800

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	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD3A111A	A	C1	1	1	116.9	147.2	2.536	0.09055	20	B1I	0.004528	110.2	138.8	2.392
TCD3A112A	A	C1	1	1	110.8	132.2	2.432	0.09217	20	B1I	0.004608	106.4	126.9	2.335
TCD3A113A	A	C1	1	1	121.8	147.2	2.447	0.09275	20	B1I	0.004638	117.7	142.2	2.365
TCD3A211A	A	C2	1	2	115.9	144.3	2.453	0.09327	20	B1I	0.004663	112.6	140.2	2.383
TCD3A212A	A	C2	1	2	124.8	141.3	2.408	0.09313	20	B1I	0.004657	121.1	137.0	2.336
TCD3A213A	A	C2	1	2	110.3	148.7	2.375	0.09323	20	B1I	0.004662	107.1	144.4	2.306
TCD3B111A	B	C1	2	1	121.0	146.6	2.532	0.08860	20	B1I	0.004430	111.7	135.3	2.336
TCD3B112A	B	C1	2	1	118.5	144.4	2.447	0.09092	20	B1I	0.004546	112.2	136.7	2.318
TCD3B113A	B	C1	2	1	111.1	140.8	2.333	0.09285	20	B1I	0.004643	107.4	136.2	2.256
TCD3B211A	B	C2	2	2	123.7	155.9	2.451	0.08838	20	B1I	0.004419	113.9	143.5	2.256
TCD3B212A	B	C2	2	2	128.3	159.6	2.471	0.09093	20	B1I	0.004547	121.6	151.2	2.341
TCD3B213A	B	C2	2	2	122.9	154.4	2.495	0.09178	20	B1I	0.004589	117.5	147.6	2.386
TCD3C111A	C	C1	3	1	120.0	145.8	2.434	0.08863	20	B1I	0.004432	110.8	134.6	2.248
TCD3C112A	C	C1	3	1	116.7	146.8	2.382	0.09160	20	B1I	0.004580	111.3	140.1	2.273
TCD3C113A	C	C1	3	1	116.8	148.2	2.337	0.09267	20	B1I	0.004633	112.7	143.1	2.256
TCD3C211A	C	C2	3	2	121.0	158.2	2.390	0.08860	20	B1I	0.004430	111.7	146.0	2.206
TCD3C212A	C	C2	3	2	125.0	153.5	2.342	0.09175	20	B1I	0.004588	119.4	146.7	2.238
TCD3C213A	C	C2	3	2	121.7	146.7	2.321	0.09333	20	B1I	0.004667	118.4	142.6	2.256

Average	**119.3**	**147.9**	**2.421**		**Average$_{norm}$**	**0.004570**	**113.5**	**140.7**	**2.305**
Standard Dev.	**5.126**	**6.676**	**0.06550**		**Standard Dev.$_{norm}$**		**4.697**	**5.770**	**0.05743**
Coeff. of Var. [%]	**4.297**	**4.515**	**2.705**		**Coeff. of Var. [%]$_{norm}$**		**4.137**	**4.100**	**2.492**
Min.	**110.3**	**132.2**	**2.321**		**Min.**	**0.004419**	**106.4**	**126.9**	**2.206**
Max.	**128.3**	**159.6**	**2.536**		**Max.**	**0.004667**	**121.6**	**151.2**	**2.392**
Number of Spec.	**18**	**18**	**18**		**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--RTD (70°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
Laminate Single-Shear Bearing Strength [ksi]


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--RTD (70°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0
20
40
60
80
100
120
140
160
Laminate Single-Shear Bearing Strength [ksi]


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--RTD (70°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Laminate Single-Shear Bearing Stiffness [Msi]

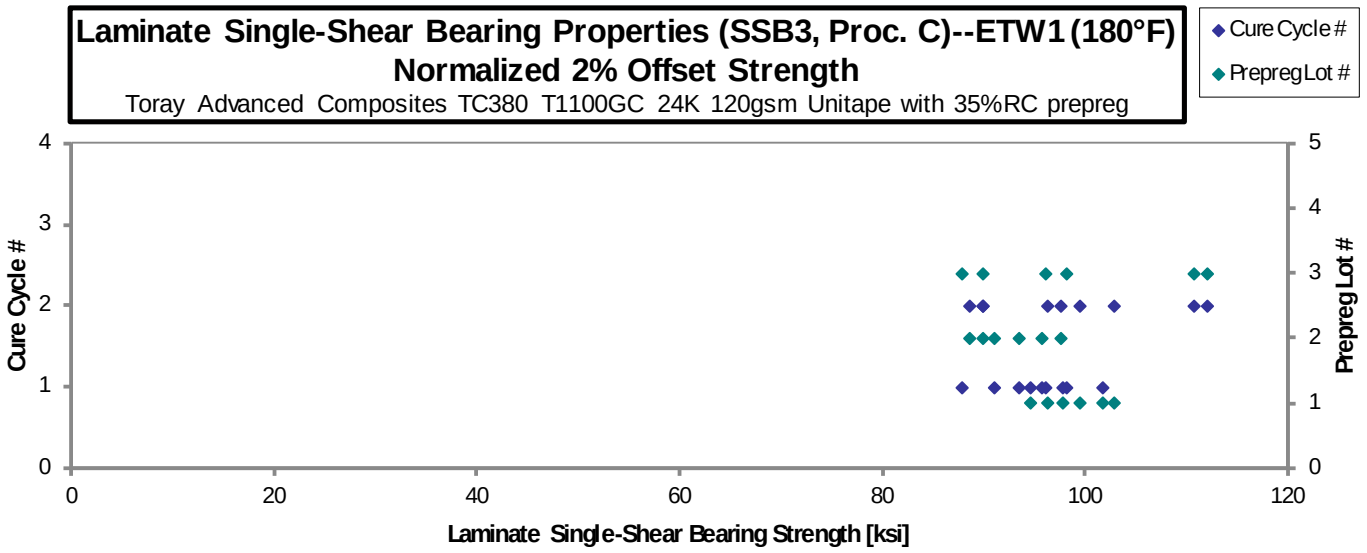
Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW1 (180°F)
Strength & Chord Stiffness

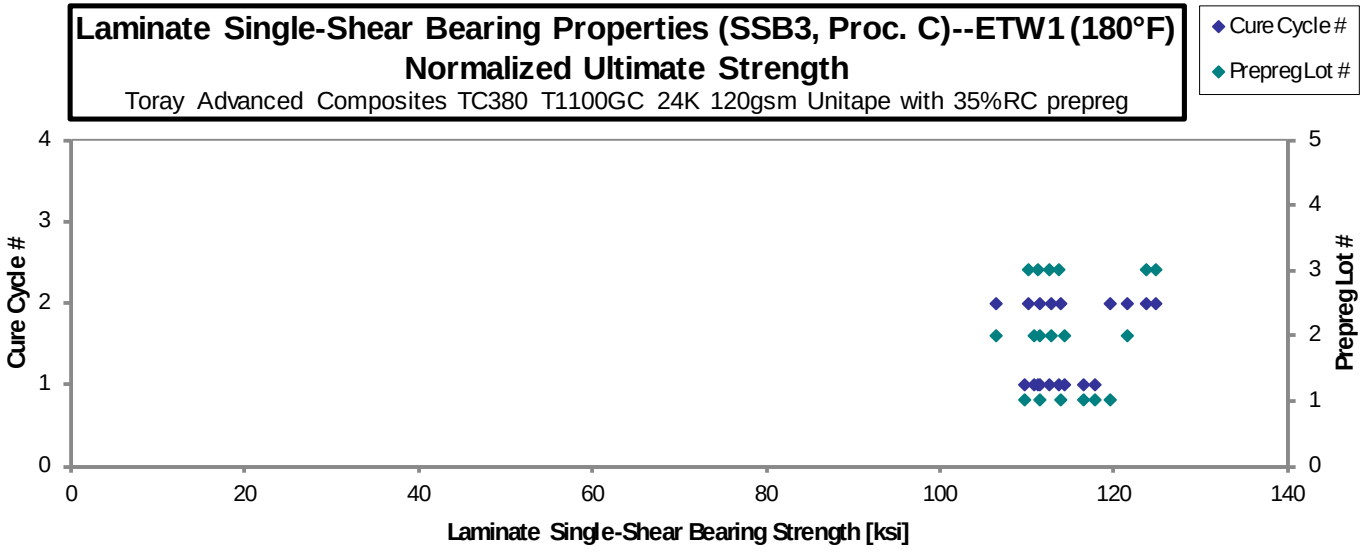
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

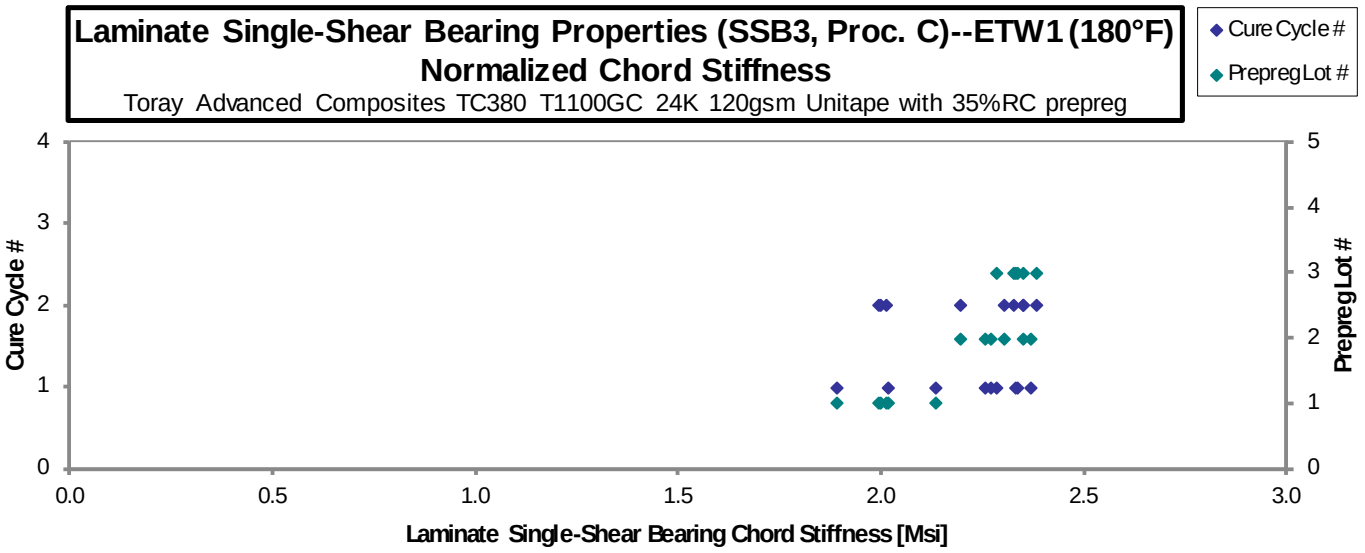
normalizing t_{ply} [in]: 0.004800

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	Avg. t_{ply} [in]	2% Offset $Strength_{norm}$ [ksi]	Ultimate $Strength_{norm}$ [ksi]	Chord $Stiffness_{norm}$ [Msi]
TCD3A111D	A	C1	1	1	106.1	122.9	2.225	0.09208	20	B1I	0.004604	101.8	117.9	2.134
TCD3A112D	A	C1	1	1	98.68	114.5	1.972	0.09198	20	B1I	0.004599	94.56	109.7	1.890
TCD3A113D	A	C1	1	1	103.1	122.9	2.126	0.09098	20	B1I	0.004549	97.73	116.5	2.015
TCD3A211D	A	C2	1	2	102.6	117.6	2.076	0.09300	20	B1I	0.004650	99.40	113.9	2.011
TCD3A212D	A	C2	1	2	99.75	123.8	2.070	0.09277	20	B1I	0.004638	96.39	119.7	2.000
TCD3A213D	A	C2	1	2	106.7	115.6	2.067	0.09250	20	B1I	0.004625	102.9	111.4	1.992
TCD3B111D	B	C1	2	1	94.64	115.3	2.364	0.09227	20	B1I	0.004613	90.96	110.8	2.272
TCD3B112D	B	C1	2	1	97.38	119.3	2.349	0.09208	20	B1I	0.004604	93.41	114.4	2.254
TCD3B113D	B	C1	2	1	101.9	118.6	2.522	0.09023	20	B1I	0.004512	95.75	111.5	2.370
TCD3B211D	B	C2	2	2	92.12	110.7	2.286	0.09225	20	B1I	0.004613	88.52	106.4	2.197
TCD3B212D	B	C2	2	2	101.4	126.3	2.444	0.09233	20	B1I	0.004617	97.54	121.5	2.351
TCD3B213D	B	C2	2	2	95.53	119.7	2.444	0.09037	20	B1I	0.004518	89.92	112.7	2.301
TCD3C111D	C	C1	3	1	91.47	115.8	2.424	0.09227	20	B1I	0.004613	87.91	111.3	2.329
TCD3C113D	C	C1	3	1	104.6	122.4	2.485	0.08825	20	B1I	0.004413	96.17	112.5	2.284
TCD3C114D	C	C1	3	1	100.0	115.8	2.379	0.09423	20	B1I	0.004712	98.20	113.7	2.335
TCD3C211D	C	C2	3	2	107.1	118.4	2.278	0.1004	20	B1I	0.005022	112.1	123.8	2.383
TCD3C212D	C	C2	3	2	115.3	130.1	2.424	0.09213	20	B1I	0.004607	110.7	124.9	2.326
TCD3C213D	C	C2	3	2	91.89	112.7	2.399	0.09393	20	B1I	0.004697	89.92	110.2	2.348

Average	**100.6**	**119.0**	**2.296**	**$Average_{norm}$**	**0.004623**	**96.88**	**114.6**	**2.211**
Standard Dev.	**6.248**	**4.973**	**0.1679**	**$Standard\ Dev._{norm}$**		**6.827**	**5.106**	**0.1599**
Coeff. of Var. [%]	**6.212**	**4.178**	**7.310**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**7.047**	**4.455**	**7.235**
Min.	**91.47**	**110.7**	**1.972**	**Min.**	**0.004413**	**87.91**	**106.4**	**1.890**
Max.	**115.3**	**130.1**	**2.522**	**Max.**	**0.005022**	**112.1**	**124.9**	**2.383**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW1 (180°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW1 (180°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
140
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW1 (180°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Chord Stiffness [Msi]
0
1
2
3
4
5
0.0
0.5
1.0
1.5
2.0
2.5
3.0

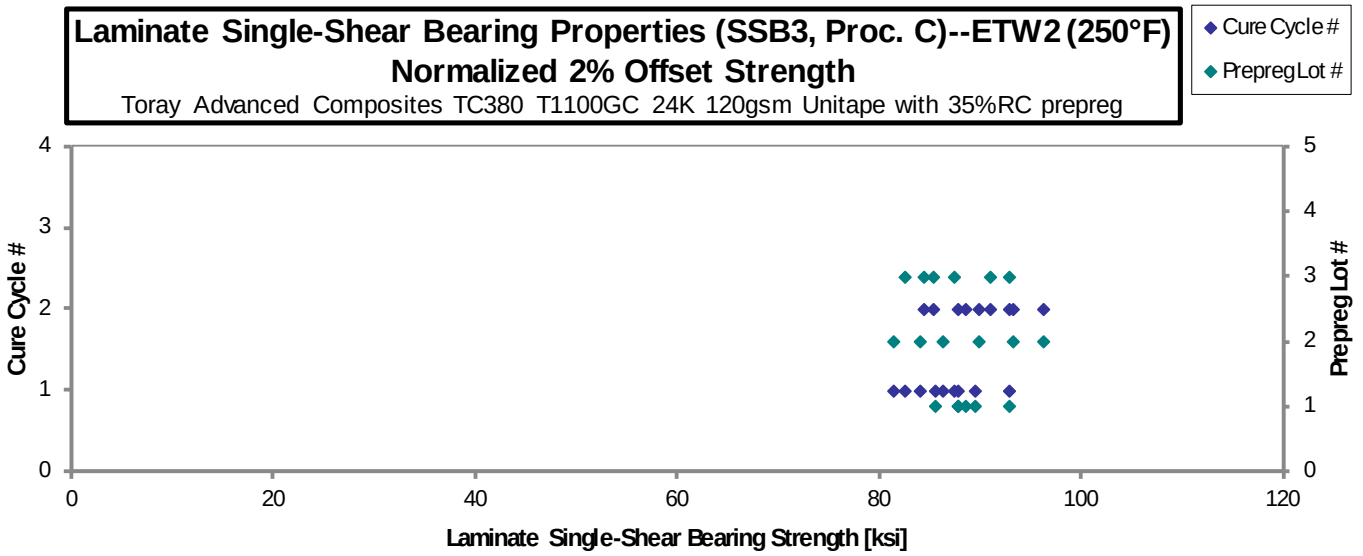
Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW2 (250°F)
Strength & Chord Stiffness

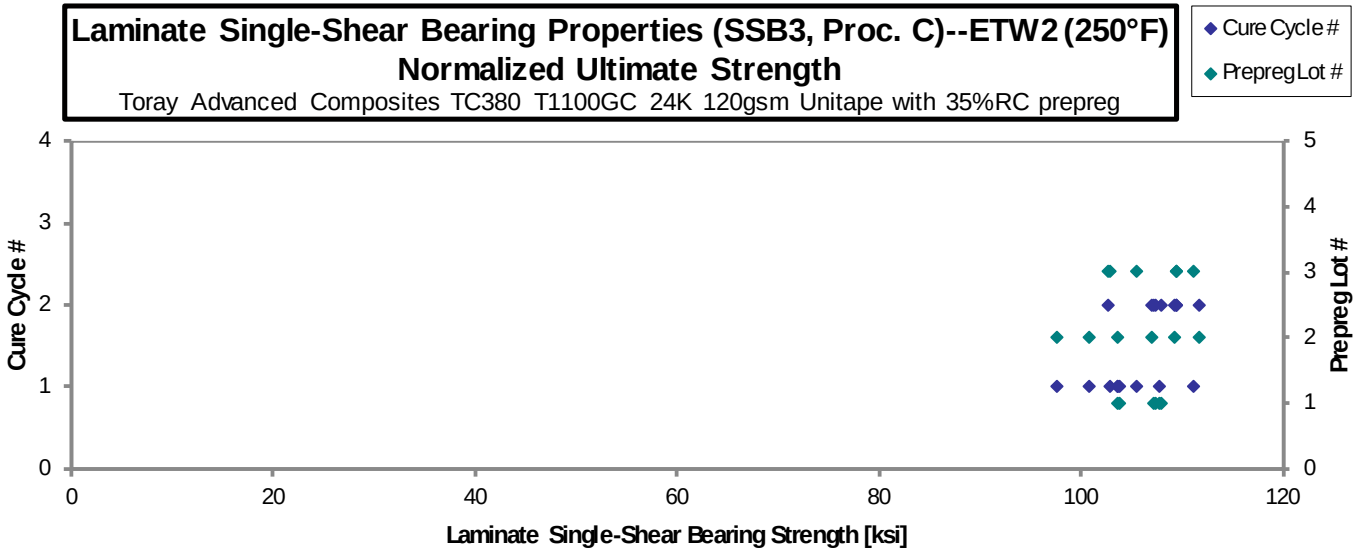
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

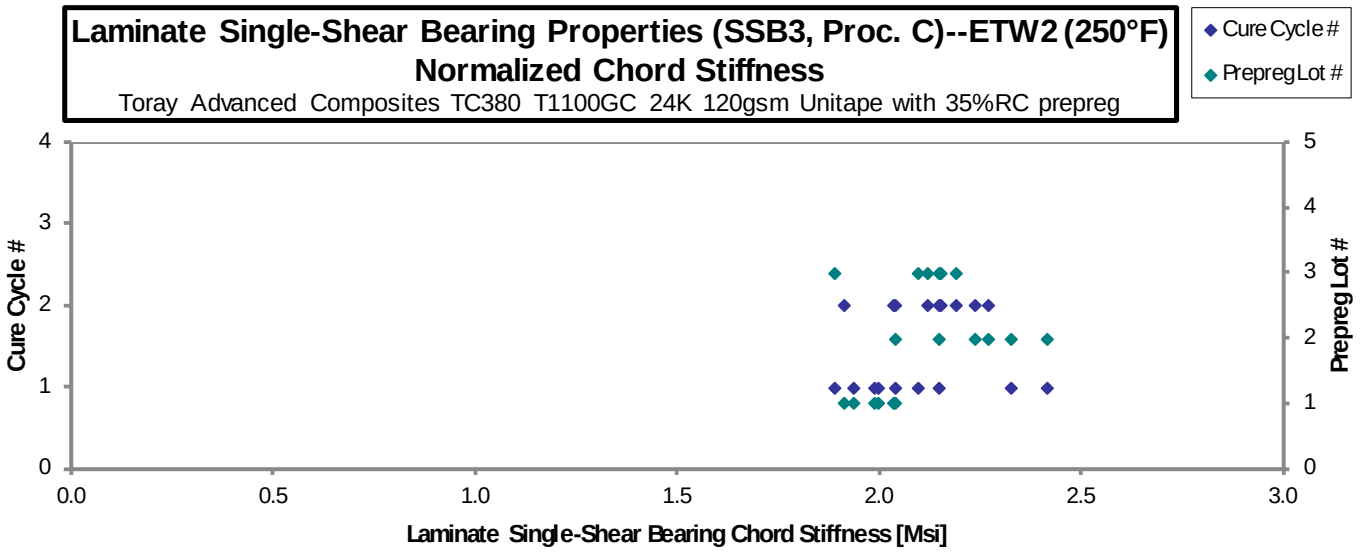
normalizing t_{ply} [in]: 0.004800

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	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]	Chord Stiffness$_{norm}$ [Msi]
TCD3A111E	A	C1	1	1	85.27	103.4	1.980	0.09637	20	B1I	0.004818	85.59	103.8	1.988
TCD3A112E	A	C1	1	1	88.49	108.8	1.952	0.09522	20	B1I	0.004761	87.77	107.9	1.936
TCD3A113E	A	C1	1	1	89.63	103.8	1.999	0.09595	20	B1I	0.004798	89.58	103.7	1.998
TCD3A211E	A	C2	1	2	88.50	107.1	1.914	0.09610	20	B1I	0.004805	88.59	107.2	1.916
TCD3A212E	A	C2	1	2	87.40	106.8	2.028	0.09643	20	B1I	0.004822	87.80	107.3	2.038
TCD3A213E	A	C2	1	2	92.67	107.7	2.039	0.09620	20	B1I	0.004810	92.86	108.0	2.043
TCD3B111E	B	C1	2	1	77.92	96.43	2.312	0.1004	20	B1I	0.005021	81.50	100.9	2.418
TCD3B112E	B	C1	2	1	82.68	99.25	2.232	0.1002	20	B1I	0.005008	86.27	103.6	2.328
TCD3B113E	B	C1	2	1	80.37	93.26	1.951	0.1005	20	B1I	0.005024	84.13	97.62	2.042
TCD3B211E	B	C2	2	2	86.32	102.6	2.177	0.1001	20	B1I	0.005004	89.99	107.0	2.269
TCD3B212E	B	C2	2	2	92.04	104.5	2.143	0.1004	20	B1I	0.005018	96.23	109.3	2.240
TCD3B213E	B	C2	2	2	89.90	107.7	2.072	0.09962	20	B1I	0.004981	93.29	111.7	2.150
TCD3C111E	C	C1	3	1	84.66	102.0	2.027	0.09928	20	B1I	0.004964	87.56	105.5	2.096
TCD3C112E	C	C1	3	1	79.85	99.37	2.076	0.09932	20	B1I	0.004966	82.61	102.8	2.148
TCD3C113E	C	C1	3	1	90.29	107.9	1.836	0.09885	20	B1I	0.004943	92.98	111.1	1.890
TCD3C211E	C	C2	3	2	82.67	106.0	2.121	0.09912	20	B1I	0.004956	85.35	109.5	2.189
TCD3C212E	C	C2	3	2	82.04	99.62	2.089	0.09890	20	B1I	0.004945	84.52	102.6	2.152
TCD3C213E	C	C2	3	2	88.11	105.9	2.052	0.09927	20	B1I	0.004963	91.11	109.5	2.122

Average	**86.05**	**103.5**	**2.055**	**Average$_{norm}$**	**0.004923**	**88.21**	**106.0**	**2.109**
Standard Dev.	**4.351**	**4.390**	**0.1152**	**Standard Dev.$_{norm}$**		**4.017**	**3.754**	**0.1443**
Coeff. of Var. [%]	**5.056**	**4.243**	**5.603**	**Coeff. of Var. [%]$_{norm}$**		**4.555**	**3.540**	**6.844**
Min.	**77.92**	**93.26**	**1.836**	**Min.**	**0.004761**	**81.50**	**97.62**	**1.890**
Max.	**92.67**	**108.8**	**2.312**	**Max.**	**0.005024**	**96.23**	**111.7**	**2.418**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**	**18**


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW2 (250°F)
Normalized 2% Offset Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW2 (250°F)
Normalized Ultimate Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Single-Shear Bearing Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4
5


Laminate Single-Shear Bearing Properties (SSB3, Proc. C)--ETW2 (250°F)
Normalized Chord Stiffness
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Laminate Single-Shear Bearing Chord Stiffness [Msi]

4.30 "25/50/25" Compression After Impact 1 Properties (CAI1)

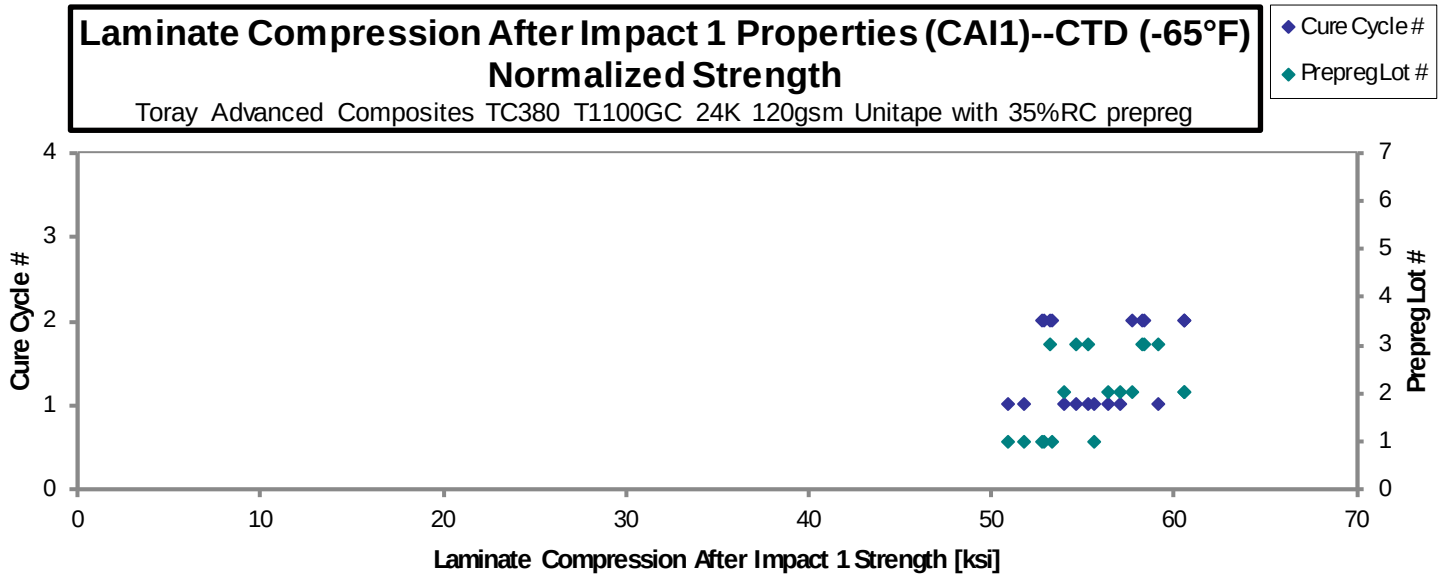
Laminate Compression After Impact 1 Properties (CAI1)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDKA111B	A	C1	1	1	51.75	284.4	0.1890	40	LDM	0.004725	50.94
TCDKA112B	A	C1	1	1	55.78	284.5	0.1914	40	LDM	0.004784	55.59
TCDKA113B	A	C1	1	1	51.98	286.5	0.1913	40	M(A,L)DM	0.004783	51.80
TCDKA211B	A	C2	1	2	54.17	279.5	0.1874	40	M(A,L)DM	0.004684	52.86
TCDKA212B	A	C2	1	2	52.27	288.6	0.1937	40	M(A,L)DM	0.004843	52.75
TCDKA213B	A	C2	1	2	55.16	279.9	0.1858	40	M(A,L)DM	0.004645	53.38
TCDKB111B	B	C1	2	1	53.26	293.3	0.1946	40	M(A,L)DM	0.004864	53.96
TCDKB112B	B	C1	2	1	53.55	303.9	0.2022	40	M(A,L)DM	0.005055	56.39
TCDKB113B	B	C1	2	1	56.80	290.2	0.1930	40	M(A,L)DM	0.004825	57.10
TCDKB211B	B	C2	2	2	56.82	291.9	0.1951	40	M(A,L)DM	0.004878	57.74
TCDKB212B	B	C2	2	2	57.22	304.3	0.2033	40	M(A,L)DM	0.005083	60.60
TCDKB213B	B	C2	2	2	60.27	289.1	0.1930	40	M(A,L)DM	0.004825	60.58
TCDKC111B	C	C1	3	1	55.12	288.7	0.1926	40	LDM	0.004815	55.29
TCDKC112B	C	C1	3	1	56.73	302.7	0.2003	40	LDM	0.005008	59.19
TCDKC113B	C	C1	3	1	54.94	287.7	0.1909	40	LDM	0.004771	54.61
TCDKC211B	C	C2	3	2	56.51	295.7	0.1985	40	LDM	0.004962	58.42
TCDKC212B	C	C2	3	2	55.68	302.9	0.2010	40	LDM	0.005025	58.29
TCDKC213B	C	C2	3	2	50.94	301.1	0.2007	40	LDM	0.005018	53.26

Average	**54.94**	
Standard Dev.	**2.364**	
Coeff. of Var. [%]	**4.302**	
Min.	**50.94**	
Max.	**60.27**	
Number of Spec.	**18**	

$Average_{norm}$	**0.004866**	**55.71**
$Standard\ Dev._{norm}$		**2.981**
Coeff. of Var. $[\%]_{norm}$		**5.350**
Min.	**0.004645**	**50.94**
Max.	**0.005083**	**60.60**
Number of Spec.	**18**	**18**


Laminate Compression After Impact 1 Properties (CAI1)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
10
20
30
40
50
60
70
Laminate Compression After Impact 1 Strength [ksi]

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

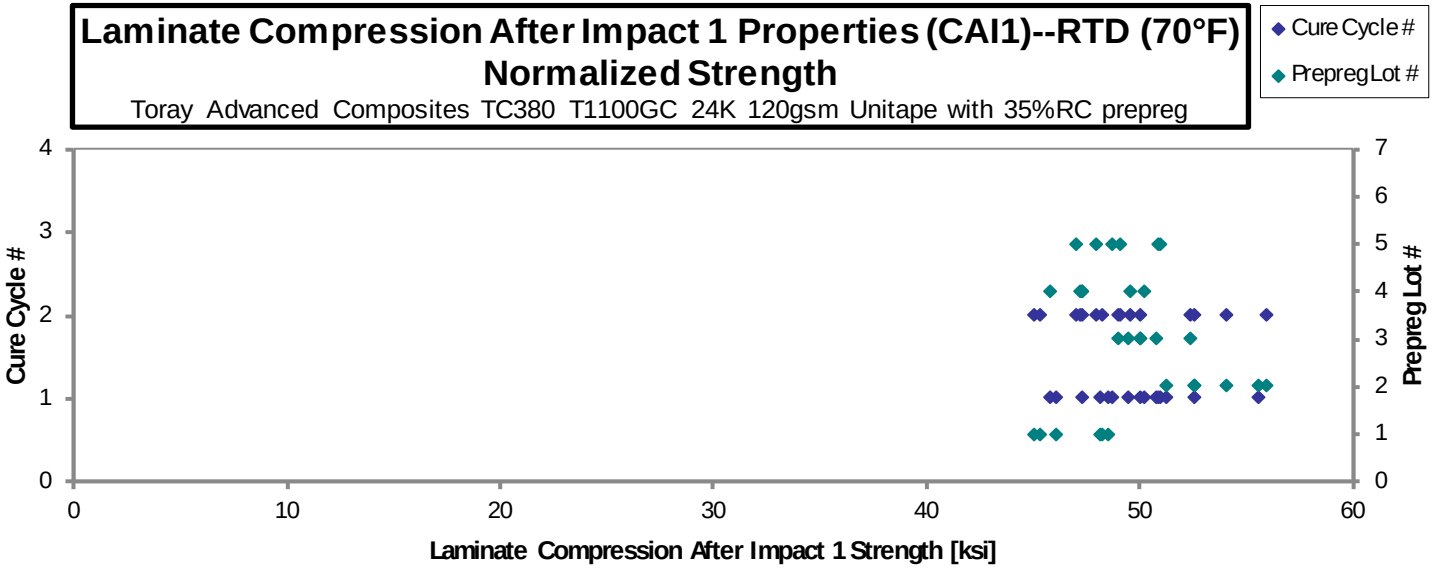
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDKA111A	A	C1	1	1	47.47	282.4	0.1866	40	M(A,L)DM	0.004664	46.13
TCDKA112A	A	C1	1	1	49.22	282.2	0.1879	40	M(A,L)DM	0.004698	48.17
TCDKA113A	A	C1	1	1	49.30	282.6	0.1890	40	M(A,L)DM	0.004724	48.52
TCDKA211A	A	C2	1	2	46.98	275.0	0.1843	40	M(A,L)DM	0.004608	45.10
TCDKA212A	A	C2	1	2	45.78	283.2	0.1902	40	M(A,L)DM	0.004754	45.34
TCDKA213A	A	C2	1	2	49.13	285.4	0.1886	40	M(A,L)DM	0.004714	48.25
TCDKB111A	B	C1	2	1	55.69	288.6	0.1917	40	M(A,L)DM	0.004793	55.61
TCDKB112A	B	C1	2	1	51.00	297.1	0.1980	40	M(A,L)DM	0.004949	52.59
TCDKB113A	B	C1	2	1	50.40	288.2	0.1953	40	M(A,L)DM	0.004882	51.26
TCDKB211A	B	C2	2	2	54.40	287.4	0.1910	40	M(A,L)DM	0.004774	54.11
TCDKB212A	B	C2	2	2	55.16	293.0	0.1947	40	M(A,L)DM	0.004868	55.93
TCDKB213A	B	C2	2	2	51.77	291.9	0.1948	40	M(A,L)DM	0.004871	52.54
TCDKC111A	C	C1	3	1	49.85	286.1	0.1904	40	LDM	0.004760	49.44
TCDKC112A	C	C1	3	1	48.76	297.7	0.1971	40	LDM	0.004926	50.04
TCDKC113A	C	C1	3	1	50.25	290.1	0.1941	40	LDM	0.004851	50.79
TCDKC211A	C	C2	3	2	48.71	291.5	0.1930	40	LDM	0.004825	48.97
TCDKC212A	C	C2	3	2	49.24	291.7	0.1950	40	LDM	0.004876	50.02
TCDKC213A	C	C2	3	2	51.88	291.0	0.1939	40	LDM	0.004848	52.40
TCDKD111A	D	C1	4	1	49.70	272.6	0.1829	40	LDM	0.004571	47.33
TCDKD112A	D	C1	4	1	46.95	279.1	0.1874	40	LDM	0.004684	45.82
TCDKD113A	D	C1	4	1	50.89	282.4	0.1894	40	LDM	0.004736	50.21
TCDKD211A	D	C2	4	2	51.45	275.9	0.1850	40	LDM	0.004625	49.57
TCDKD212A	D	C2	4	2	48.44	279.1	0.1874	40	LDM	0.004684	47.27
TCDKD213A	D	C2	4	2	47.49	285.7	0.1908	40	LDM	0.004769	47.18
TCDKE111A	E	C1	5	1	50.27	292.3	0.1945	40	M(A,L)DM	0.004863	50.94
TCDKE112A	E	C1	5	1	49.95	279.1	0.1871	40	LDM	0.004678	48.67
TCDKE113A	E	C1	5	1	49.04	297.4	0.1992	40	M(A,L)DM	0.004981	50.89
TCDKE211A	E	C2	5	2	48.55	290.6	0.1943	40	LDM	0.004858	49.14
TCDKE212A	E	C2	5	2	48.08	280.7	0.1879	40	LDM	0.004698	47.06
TCDKE213A	E	C2	5	2	46.09	299.0	0.2000	40	LDM	0.005000	48.01

	Strength [ksi]
Average	**49.73**
Standard Dev.	**2.393**
Coeff. of Var. [%]	**4.813**
Min.	**45.78**
Max.	**55.69**
Number of Spec.	**30**

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	**0.004784**	**49.58**
$Standard\ Dev._{norm}$		**2.798**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.643**
Min.	**0.004571**	**45.10**
Max.	**0.005000**	**55.93**
Number of Spec.	**30**	**30**


Laminate Compression After Impact 1 Properties (CAI1)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
1
2
3
4
5
6
7
0
10
20
30
40
50
60
Laminate Compression After Impact 1 Strength [ksi]

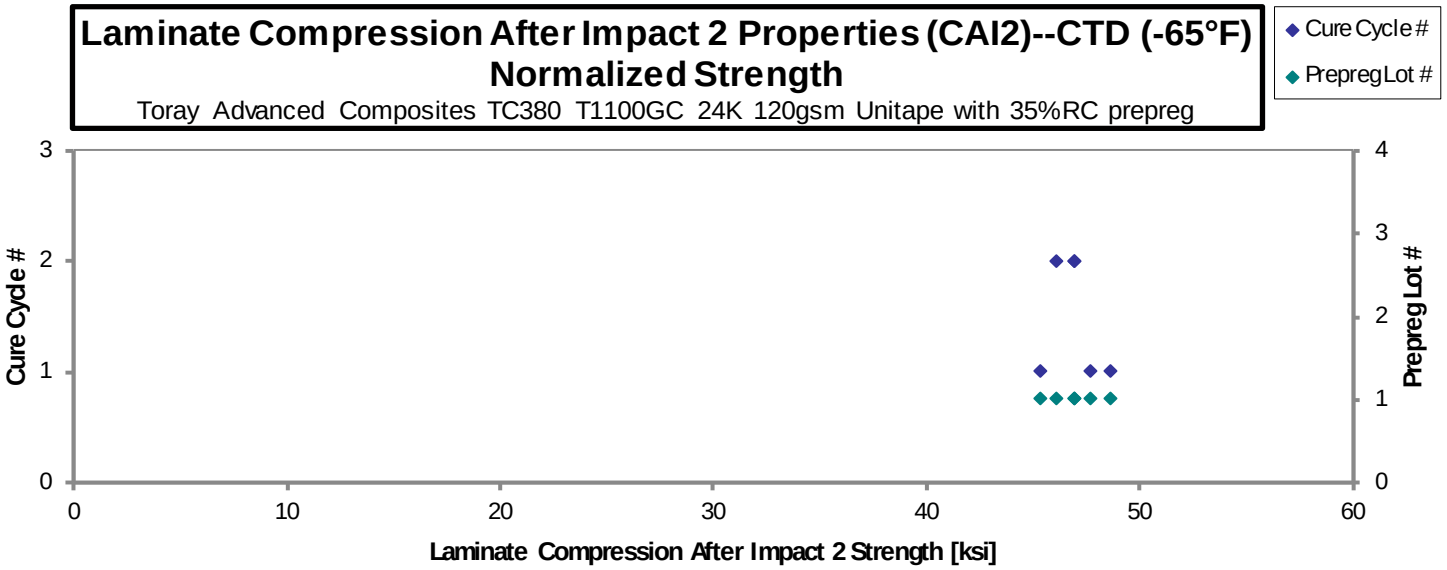
4.31 "10/80/10" Compression After Impact 2 Properties (CAI2)

Laminate Compression After Impact 2 Properties (CAI2)--CTD (-65°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]: 0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDOA111B	A	C1	1	1	46.29	278.8	0.1879	40	M(A,L)DM	0.004697	45.30
TCDOA112B	A	C1	1	1	49.05	284.6	0.1901	40	M(A,L)DM	0.004753	48.57
TCDOA113B	A	C1	1	1	47.98	284.3	0.1906	40	M(A,L)DM	0.004766	47.64
TCDOA211B	A	C2	1	2	47.76	285.7	0.1887	40	M(A,L)DM	0.004718	46.95
TCDOA212B	A	C2	1	2	46.08	288.8	0.1919	40	M(A,L)DM	0.004797	46.05
TCDOA213B	A	C2	1	2	47.99	282.7	0.1878	40	M(A,L)DM	0.004694	46.94

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	47.53	$Average_{norm}$	46.91
Standard Dev.	1.132	$Standard\ Dev._{norm}$	1.148
Coeff. of Var. [%]	2.382	$Coeff.\ of\ Var.\ [\%]_{norm}$	2.448
Min.	46.08	Min.	45.30
Max.	49.05	Max.	48.57
Number of Spec.	6	Number of Spec.	6


Laminate Compression After Impact 2 Properties (CAI2)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
Laminate Compression After Impact 2 Strength [ksi]

Laminate Compression After Impact 2 Properties (CAI2)--RTD (70°F) Strength

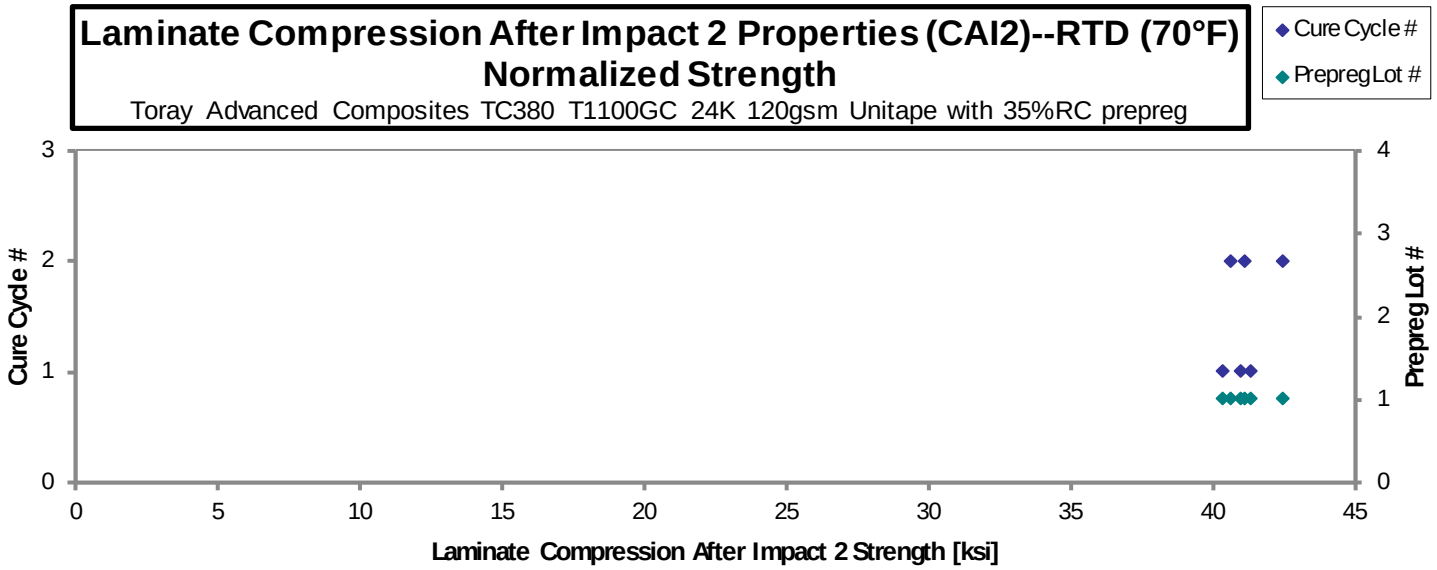
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDOA111A	A	C1	1	1	41.56	280.1	0.1863	40	M(A,L)DM	0.004656	40.31
TCDOA112A	A	C1	1	1	42.39	280.1	0.1871	40	M(A,L)DM	0.004678	41.31
TCDOA113A	A	C1	1	1	41.83	280.6	0.1880	40	M(A,L)DM	0.004700	40.96
TCDOA211A	A	C2	1	2	42.12	281.8	0.1875	40	M(A,L)DM	0.004688	41.13
TCDOA212A	A	C2	1	2	42.98	286.2	0.1897	40	M(A,L)DM	0.004742	42.46
TCDOA213A	A	C2	1	2	41.05	286.7	0.1900	40	M(A,L)DM	0.004749	40.61

Average	**41.99**	
Standard Dev.	**0.6724**	
Coeff. of Var. [%]	**1.601**	
Min.	**41.05**	
Max.	**42.98**	
Number of Spec.	**6**	

$Average_{norm}$	**0.004702**	**41.13**
$Standard\ Dev._{norm}$		**0.7449**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**1.811**
Min.	**0.004656**	**40.31**
Max.	**0.004749**	**42.46**
Number of Spec.	**6**	**6**


Laminate Compression After Impact 2 Properties (CAI2)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Compression After Impact 2 Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35
40
45

4.32 "50/40/10" Compression After Impact 3 Properties (CAI3)

Laminate Compression After Impact 3 Properties (CAI3)--CTD (-65°F) Strength

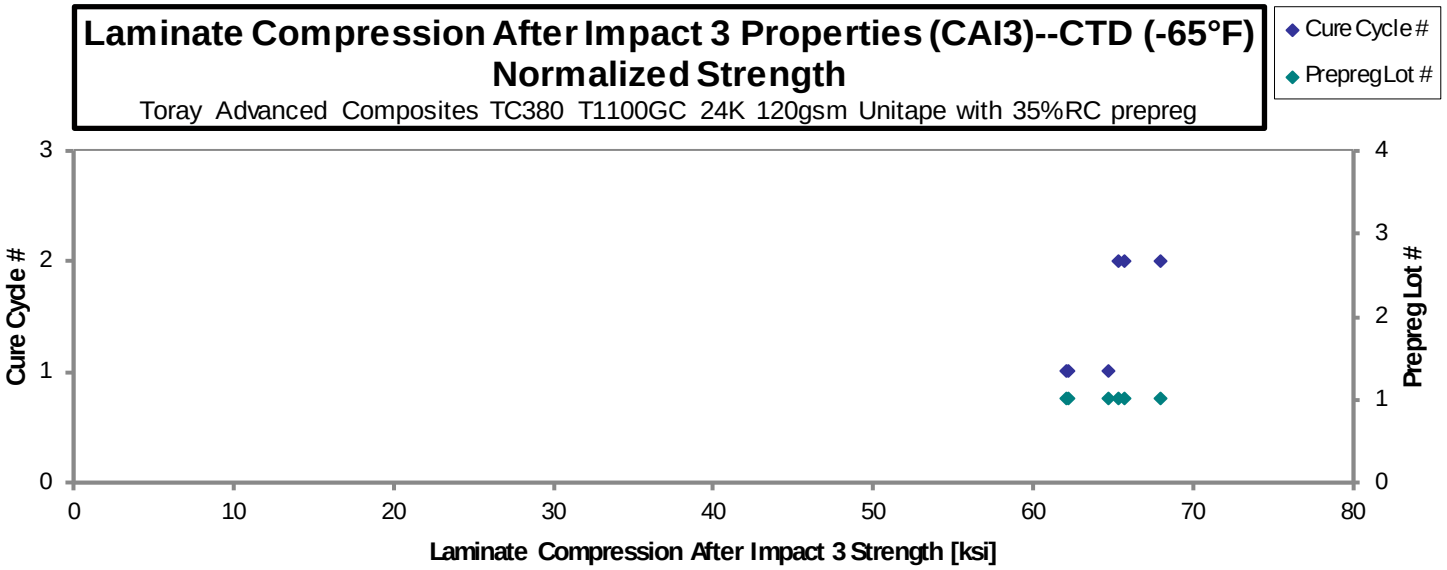
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDPA111B	A	C1	1	1	63.70	294.3	0.1950	40	M(A,L)DM	0.004874	64.69
TCDPA112B	A	C1	1	1	60.50	294.1	0.1974	40	M(A,L)DM	0.004934	62.19
TCDPA113B	A	C1	1	1	60.16	292.7	0.1980	40	M(A,L)DM	0.004949	62.03
TCDPA211B	A	C2	1	2	65.04	289.1	0.1939	40	M(A,L)DM	0.004848	65.69
TCDPA212B	A	C2	1	2	66.51	294.0	0.1963	40	M(A,L)DM	0.004908	68.01
TCDPA213B	A	C2	1	2	64.99	289.1	0.1930	40	M(A,L)DM	0.004825	65.33

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	63.48	$Average_{norm}$	64.65
Standard Dev.	2.602	$Standard\ Dev._{norm}$	2.268
Coeff. of Var. [%]	4.098	$Coeff.\ of\ Var.\ [\%]_{norm}$	3.508
Min.	60.16	Min.	62.03
Max.	66.51	Max.	68.01
Number of Spec.	6	Number of Spec.	6

	t_{ply} [in]	
$Average_{norm}$	0.004890	64.65
$Standard\ Dev._{norm}$		2.268
$Coeff.\ of\ Var.\ [\%]_{norm}$		3.508
Min.	0.004825	62.03
Max.	0.004949	68.01
Number of Spec.	6	6


Laminate Compression After Impact 3 Properties (CAI3)--CTD (-65°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
70
80
Laminate Compression After Impact 3 Strength [ksi]

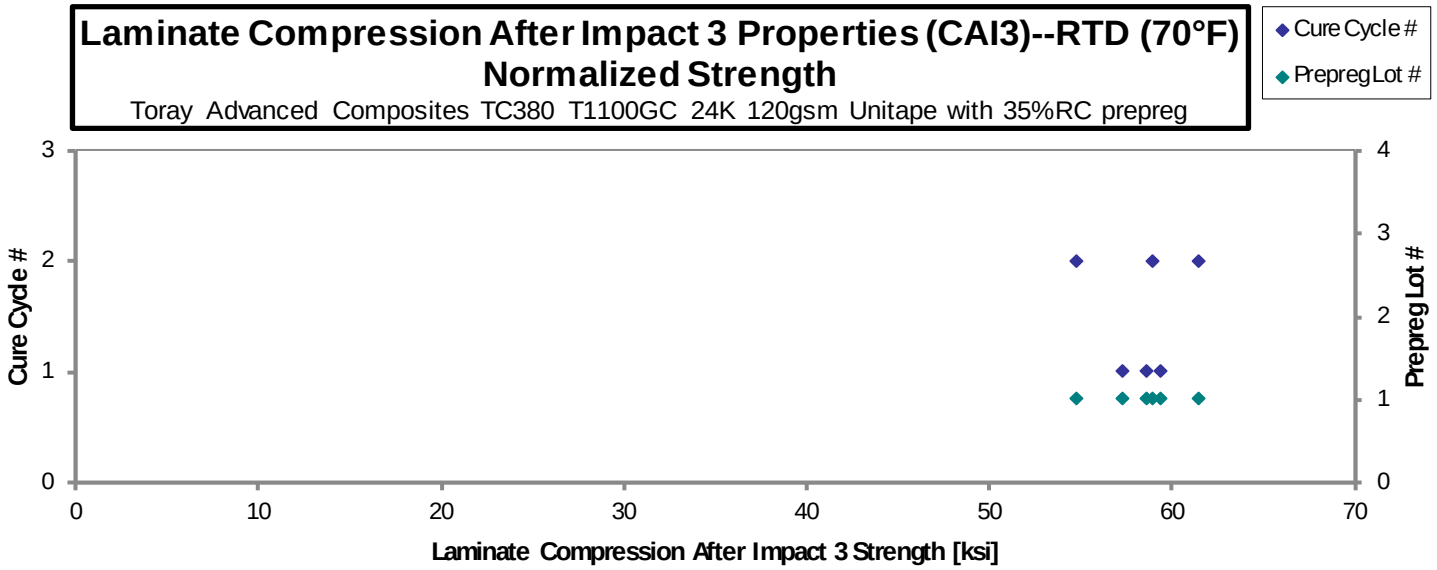
Laminate Compression After Impact 3 Properties (CAI3)--RTD (70°F) Strength

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

normalizing t_{ply} [in]
0.004800

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Measured Impact Energy [in-lbf]	Avg. Specimen Thickness [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TCDPA111A	A	C1	1	1	57.60	286.9	0.1907	40	LDM	0.004768	57.23
TCDPA112A	A	C1	1	1	58.96	289.0	0.1931	40	M(A,L)DM	0.004828	59.30
TCDPA113A	A	C1	1	1	58.11	288.2	0.1936	40	M(A,L)DM	0.004840	58.59
TCDPA211A	A	C2	1	2	59.38	286.7	0.1906	40	M(A,L)DM	0.004764	58.93
TCDPA212A	A	C2	1	2	54.73	287.1	0.1921	40	LDM	0.004801	54.74
TCDPA213A	A	C2	1	2	61.07	287.2	0.1933	40	LDM	0.004831	61.47

	Strength [ksi]		$Strength_{norm}$ [ksi]
Average	**58.31**	**$Average_{norm}$**	**0.004805**	**58.38**
Standard Dev.	**2.123**	**$Standard\ Dev._{norm}$**		**2.248**
Coeff. of Var. [%]	**3.641**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.851**
Min.	**54.73**	**Min.**	**0.004764**	**54.74**
Max.	**61.07**	**Max.**	**0.004840**	**61.47**
Number of Spec.	**6**	**Number of Spec.**	**6**	**6**


Laminate Compression After Impact 3 Properties (CAI3)--RTD (70°F)
Normalized Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
10
20
30
40
50
60
70
Laminate Compression After Impact 3 Strength [ksi]

4.33 “100/0/0” Interlaminar Tension Properties (ILT)

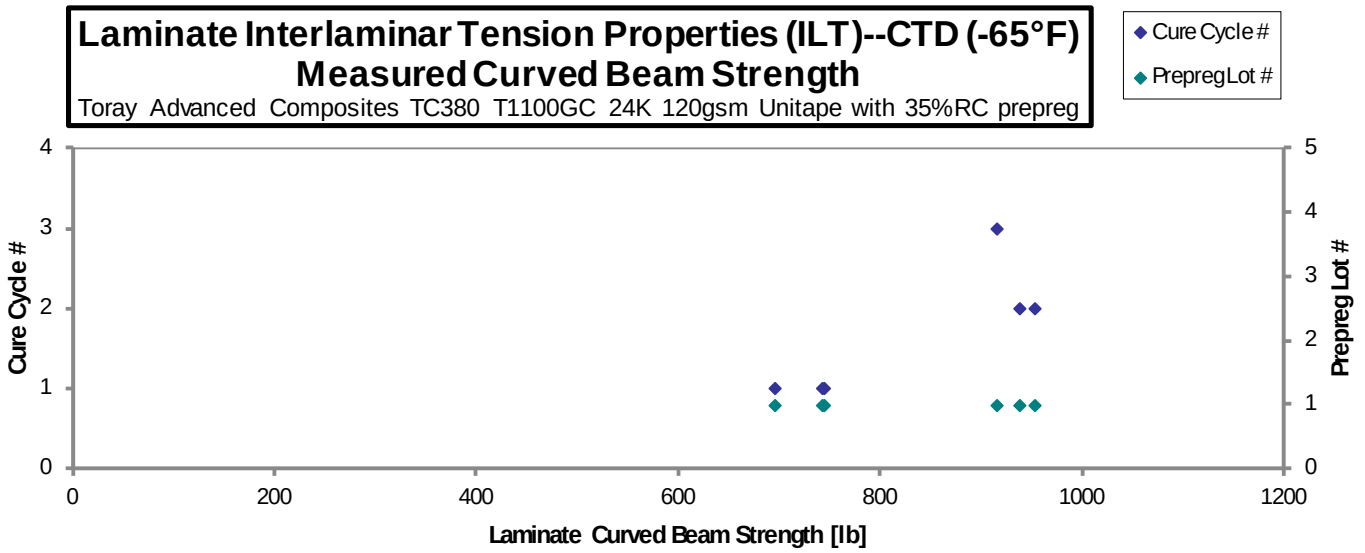
Laminate Interlaminar Tension Properties (ILT)--CTD (-65°F) Strength

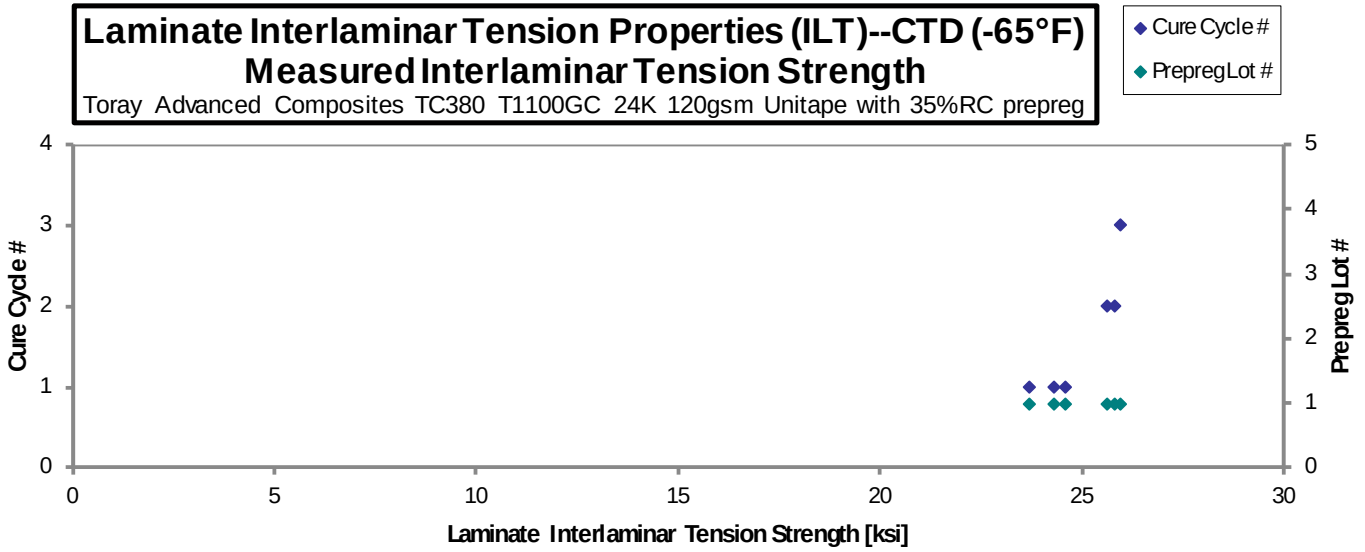
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDMA111B*	A	C1	1	1	695.0	23.69	0.1408	32	0.004399	INTERLAMINAR TENSILE FAILURE
TCDMA112B*	A	C1	1	1	741.9	24.30	0.1456	32	0.004551	INTERLAMINAR TENSILE FAILURE
TCDMA113B*	A	C1	1	1	743.6	24.57	0.1446	32	0.004517	INTERLAMINAR TENSILE FAILURE
TCDMA211B*	A	C2	1	2	938.0	25.61	0.1696	32	0.005301	INTERLAMINAR TENSILE FAILURE, OUTER PLIES FAILURE AT LEGS
TCDMA213B*	A	C2	1	2	953.8	25.82	0.1709	32	0.005339	INTERLAMINAR TENSILE FAILURE, OUTER PLIES FAILURE AT LEGS
TCDMA311B*	A	C3	1	3	914.5	25.92	0.1644	32	0.005138	INTERLAMINAR TENSILE FAILURE, OUTER PLIES FAILURE AT CURVE AND LEGS

* Cross head displacement exceeds 0.2in.

Average	**831.1**	**24.98**		**0.004874**
Standard Dev.	**116.3**	**0.9241**		
Coeff. of Var. [%]	**13.99**	**3.699**		
Min.	**695.0**	**23.69**		**0.004399**
Max.	**953.8**	**25.92**		**0.005339**
Number of Spec.	**6**	**6**		**6**


Laminate Interlaminar Tension Properties (ILT)--CTD (-65°F)
Measured Curved Beam Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Curved Beam Strength [lb]
0
200
400
600
800
1000
1200
0
1
2
3
4
5

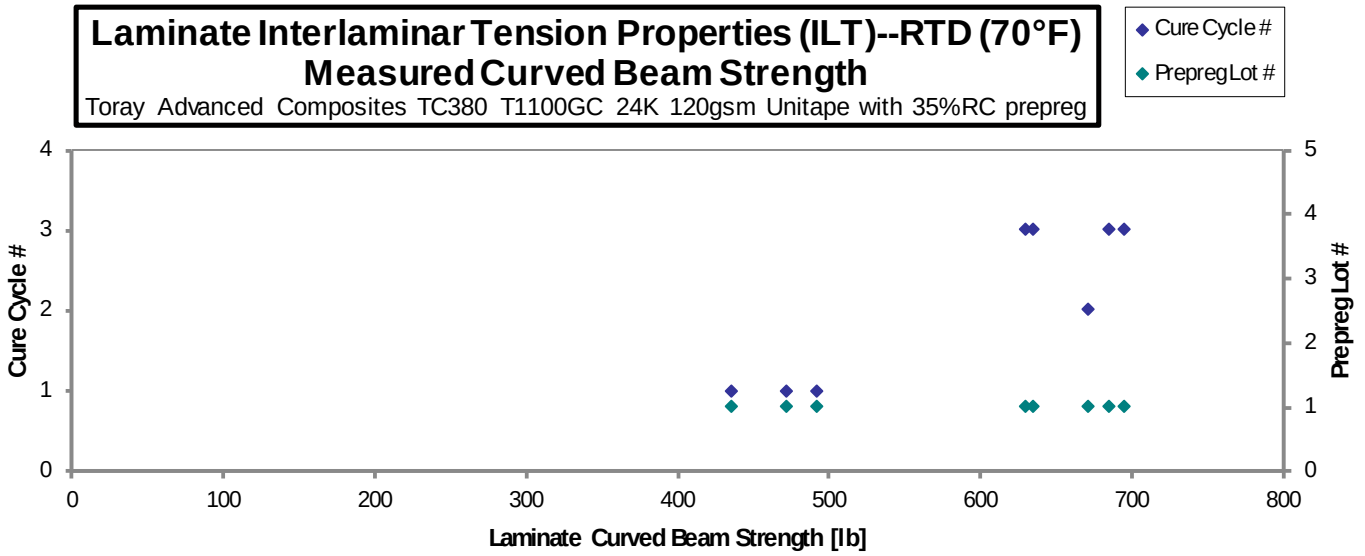

Laminate Interlaminar Tension Properties (ILT)--CTD (-65°F)
Measured Interlaminar Tension Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Interlaminar Tension Strength [ksi]
0
5
10
15
20
25
30
0
1
2
3
4
5

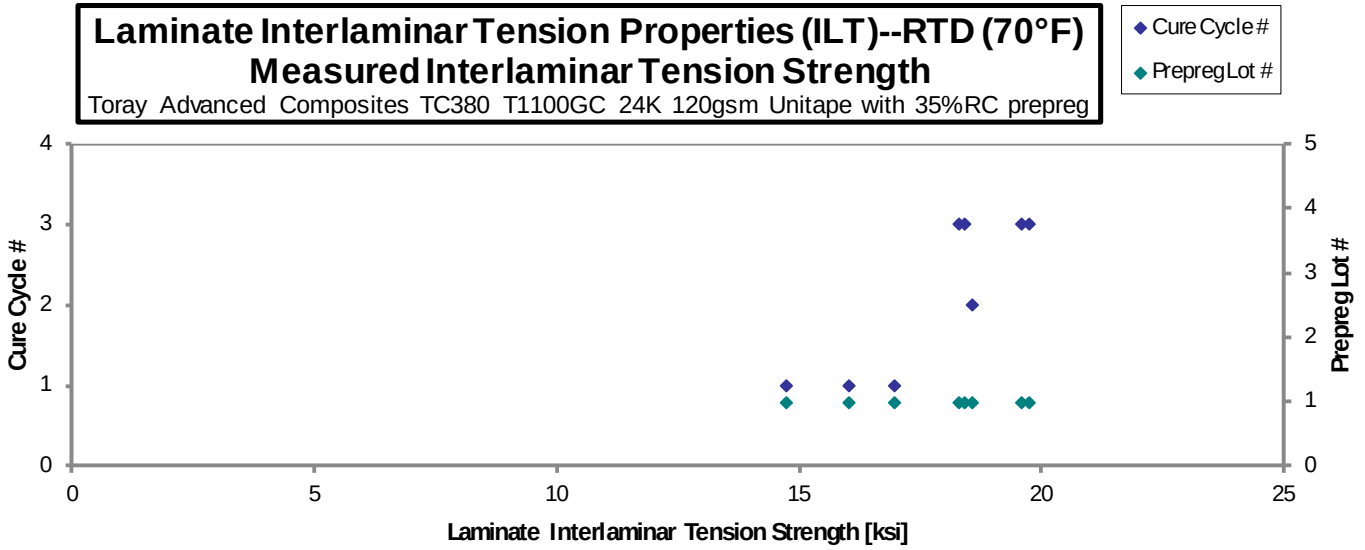
Laminate Interlaminar Tension Properties (ILT)--RTD (70°F)□
Strength□
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDMA111A*	A	C1	1	1	491.7	16.95	0.1395	32	0.004358	INTERLAMINAR TENSILE FAILURE
TCDMA112A*	A	C1	1	1	434.5	14.73	0.1415	32	0.004421	INTERLAMINAR TENSILE FAILURE
TCDMA113A*	A	C1	1	1	471.5	16.02	0.1412	32	0.004412	INTERLAMINAR TENSILE FAILURE
TCDMA211A*	A	C2	1	2	670.5	18.56	0.1677	32	0.005239	INTERLAMINAR TENSILE FAILURE, COMPRESSION FAILURE AT OUTER LEG
TCDMA311A*	A	C3	1	3	634.5	18.41	0.1612	32	0.005038	INTERLAMINAR TENSILE FAILURE
TCDMA312A*	A	C3	1	3	629.1	18.30	0.1609	32	0.005028	INTERLAMINAR TENSILE FAILURE
TCDMA313A*	A	C3	1	3	683.7	19.57	0.1631	32	0.005097	INTERLAMINAR TENSILE FAILURE
TCDMA314A*	A	C3	1	3	693.8	19.74	0.1639	32	0.005121	INTERLAMINAR TENSILE FAILURE

* Cross head displacement exceeds 0.2in.

Average	**588.7**	**17.78**		**0.004839**
Standard Dev.	**105.2**	**1.750**		
Coeff. of Var. [%]	**17.86**	**9.839**		
Min.	**434.5**	**14.73**		**0.004358**
Max.	**693.8**	**19.74**		**0.005239**
Number of Spec.	**8**	**8**		**8**

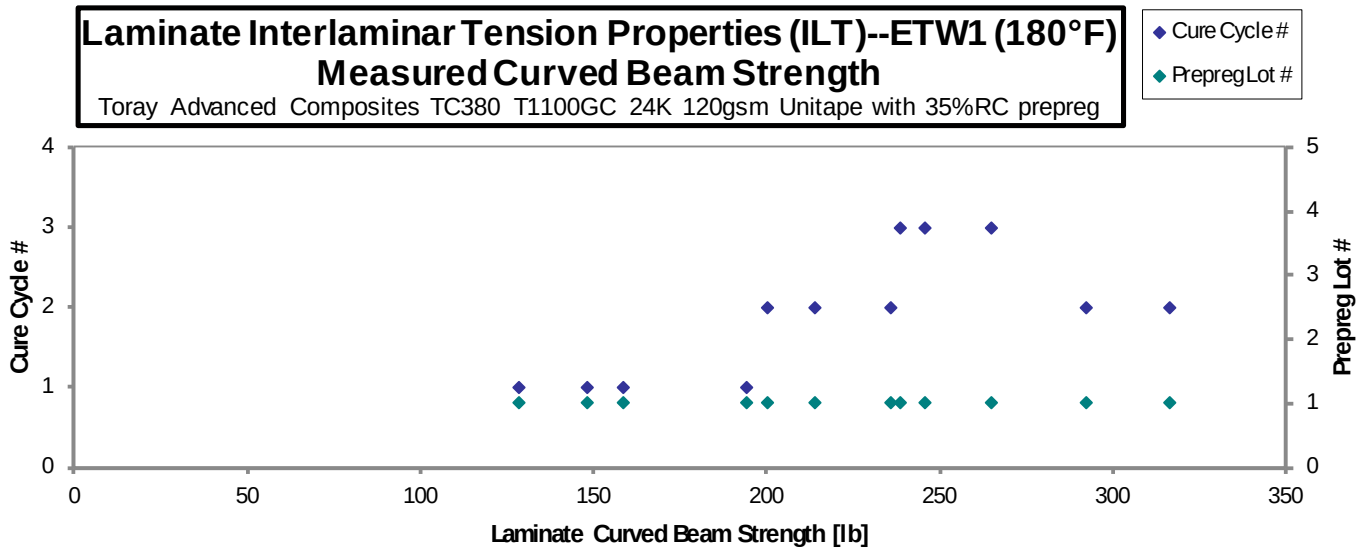

Laminate Interlaminar Tension Properties (ILT)--RTD (70°F)
Measured Curved Beam Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Curved Beam Strength [lb]
0
100
200
300
400
500
600
700
800
0
1
2
3
4
5

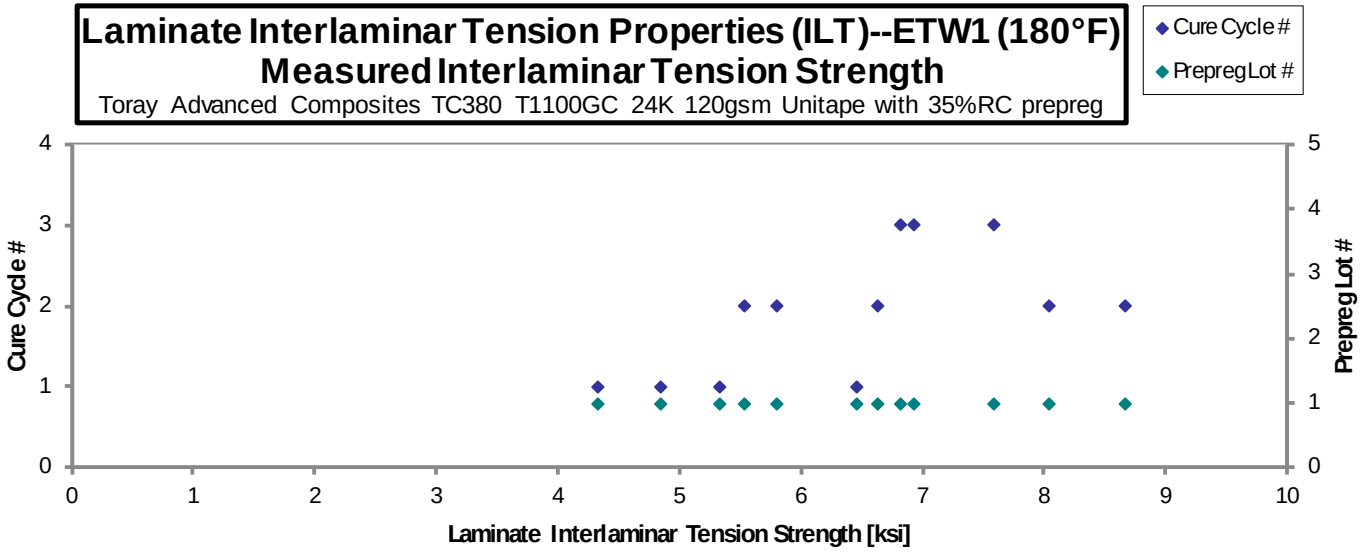

Laminate Interlaminar Tension Properties (ILT)--RTD (70°F)
Measured Interlaminar Tension Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Interlaminar Tension Strength [ksi]
0
5
10
15
20
25
0
1
2
3
4
5

Laminate Interlaminar Tension Properties (ILT)--ETW1 (180°F) Strength

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

Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
TCDMA111D	A	C1	1	1	158.4	5.334	0.1423	32	0.004445	INTERLAMINAR TENSILE FAILURE
TCDMA112D	A	C1	1	1	194.0	6.467	0.1435	32	0.004483	INTERLAMINAR TENSILE FAILURE
TCDMA113D	A	C1	1	1	128.2	4.340	0.1417	32	0.004427	INTERLAMINAR TENSILE FAILURE
TCDMA114D	A	C1	1	1	147.9	4.856	0.1453	32	0.004541	INTERLAMINAR TENSILE FAILURE
TCDMA211D	A	C2	1	2	214.0	5.802	0.1707	32	0.005333	INTERLAMINAR TENSILE FAILURE
TCDMA212D	A	C2	1	2	316.4	8.681	0.1690	32	0.005280	INTERLAMINAR TENSILE FAILURE
TCDMA213D	A	C2	1	2	235.7	6.632	0.1654	32	0.005170	INTERLAMINAR TENSILE FAILURE
TCDMA214D	A	C2	1	2	292.4	8.048	0.1685	32	0.005266	INTERLAMINAR TENSILE FAILURE
TCDMA215D	A	C2	1	2	200.4	5.537	0.1679	32	0.005248	INTERLAMINAR TENSILE FAILURE
TCDMA311D	A	C3	1	3	245.5	6.937	0.1648	32	0.005151	INTERLAMINAR TENSILE FAILURE
TCDMA312D	A	C3	1	3	238.6	6.824	0.1632	32	0.005100	INTERLAMINAR TENSILE FAILURE
TCDMA313D	A	C3	1	3	265.0	7.601	0.1628	32	0.005088	INTERLAMINAR TENSILE FAILURE
				Average	**219.7**	**6.422**			**0.004961**	
				Standard Dev.	**57.47**	**1.305**				
				Coeff. of Var. [%]	**26.15**	**20.33**				
				Min.	**128.2**	**4.340**			**0.004427**	
				Max.	**316.4**	**8.681**			**0.005333**	
				Number of Spec.	**12**	**12**			**12**	


Laminate Interlaminar Tension Properties (ILT)--ETW1 (180°F)
Measured Curved Beam Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Curved Beam Strength [lb]
0
50
100
150
200
250
300
350
0
1
2
3
4
5


Laminate Interlaminar Tension Properties (ILT)--ETW1 (180°F)
Measured Interlaminar Tension Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC prepreg
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Interlaminar Tension Strength [ksi]
0
1
2
3
4
5
6
7
8
9
10
0
1
2
3
4
5

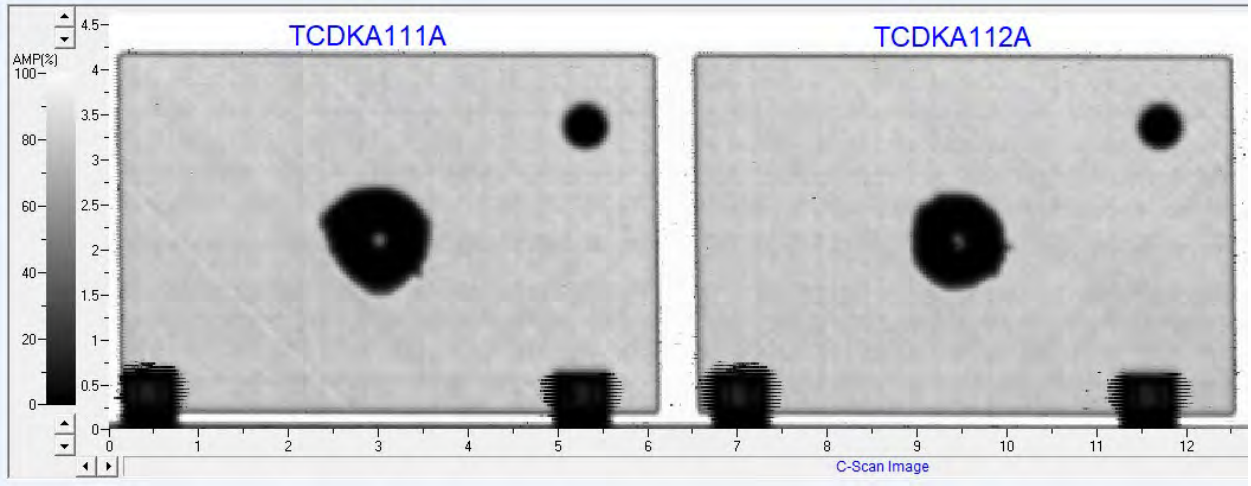
5. Additional Compression After Impact Data

5.1 “25/50/25” Compression After Impact 1 Properties (CAI1)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:



Damage Area and Dent Depth Summary:

Specimen ID	Damage Area ($inch^2$)	Dent Depth (inch)
TCDKA111B	1.0448	0.0110
TCDKA112B	0.8796	0.0125
TCDKA113B	0.9136	0.0130
TCDKA211B	1.0712	0.0105
TCDKA212B	1.1556	0.0115
TCDKA213B	1.1544	0.0100
TCDKB111B	0.7420	0.0130
TCDKB112B	0.6588	0.0135
TCDKB113B	0.7448	0.0125
TCDKB211B	0.7560	0.0085
TCDKB212B	0.6596	0.0130
TCDKB213B	0.6424	0.0090
TCDKC111B	0.7244	0.0130
TCDKC112B	0.7868	0.0125
TCDKC113B	0.7568	0.0125
TCDKC211B	0.8864	0.0115
TCDKC212B	0.7696	0.0125
TCDKC213B	0.7284	0.0125
TCDKA111A	1.0660	0.0115
TCDKA112A	0.8876	0.0120
TCDKA113A	0.9800	0.0120
TCDKA211A	1.2528	0.0095
TCDKA212A	1.2520	0.0110
TCDKA213A	1.2084	0.0095
TCDKB111A	0.7072	0.0125
TCDKB112A	0.6744	0.0130
TCDKB113A	0.7004	0.0110
TCDKB211A	0.6768	0.0115
TCDKB212A	0.7852	0.0065
TCDKB213A	0.7792	0.0130
TCDKC111A	0.7964	0.0120
TCDKC112A	0.8248	0.0130
TCDKC113A	0.8304	0.0125
TCDKC211A	0.9600	0.0120
TCDKC212A	0.8172	0.0120
TCDKC213A	0.8332	0.0115

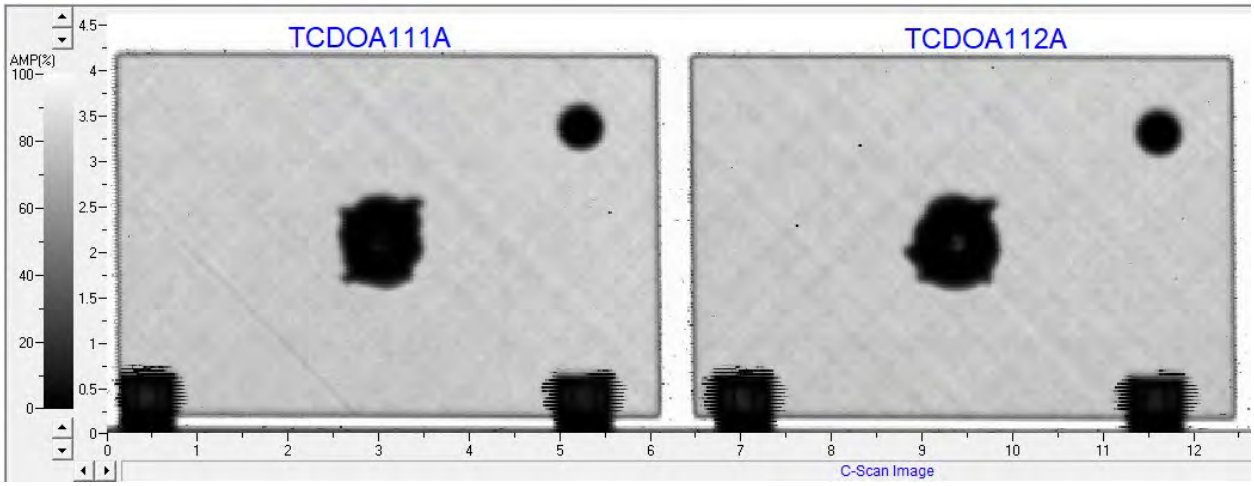
Specimen ID	Damage Area ($inch^2$)	Dent Depth (inch)
TCDKD111A	0.8788	0.0100
TCDKD112A	1.0136	0.0100
TCDKD113A	0.8920	0.0095
TCDKD211A	0.8268	0.0100
TCDKD212A	0.7404	0.0110
TCDKD213A	0.8160	0.0100
TCDKE111A	0.9524	0.0110
TCDKE112A	1.0684	0.0105
TCDKE113A	0.8848	0.0120
TCDKE211A	1.0436	0.0105
TCDKE212A	1.0336	0.0105
TCDKE213A	1.0412	0.0110

5.2 “10/80/10” Compression After Impact 2 Properties (CAI2)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:



Damage Area and Dent Depth Summary:

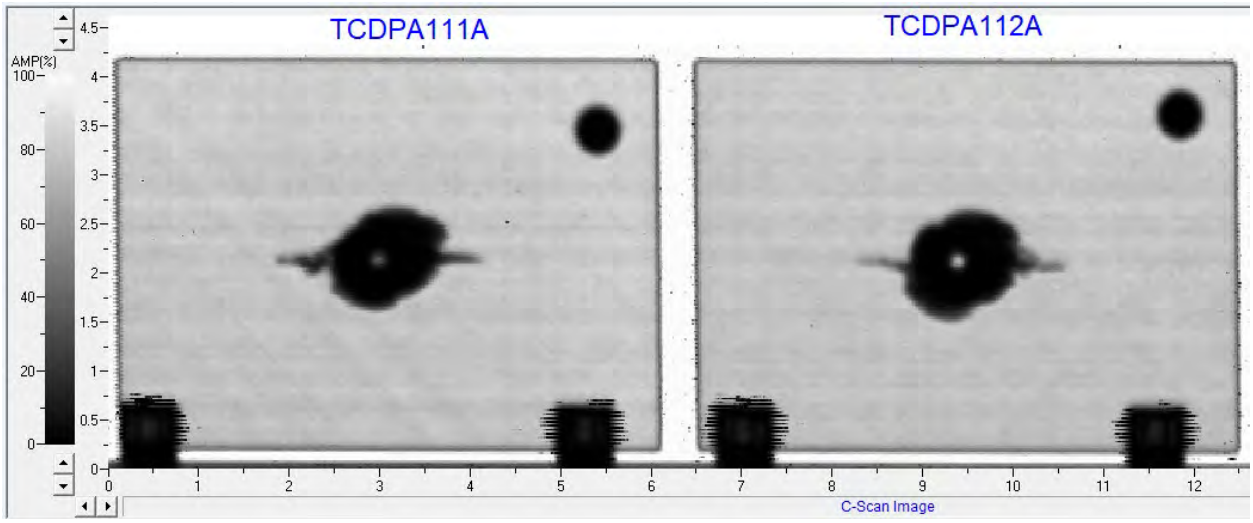
Specimen ID	Damage Area (inch^2)	Dent Depth (inch)
TCDOA111B	0.7844	0.0110
TCDOA112B	0.8660	0.0115
TCDOA113B	0.7708	0.0115
TCDOA211B	0.8628	0.0120
TCDOA212B	0.8048	0.0125
TCDOA213B	0.9120	0.0115
TCDOA111A	0.7920	0.0115
TCDOA112A	0.8260	0.0120
TCDOA113A	0.8720	0.0115
TCDOA211A	0.8224	0.0115
TCDOA212A	0.8312	0.0115
TCDOA213A	0.8320	0.0120

5.3 “50/40/10” Compression After Impact 3 Properties (CAI3)

Target Impact Energy Level: 1500 in-lb/in

Impactor Diameter: 0.625”

Representative of Damage Area:

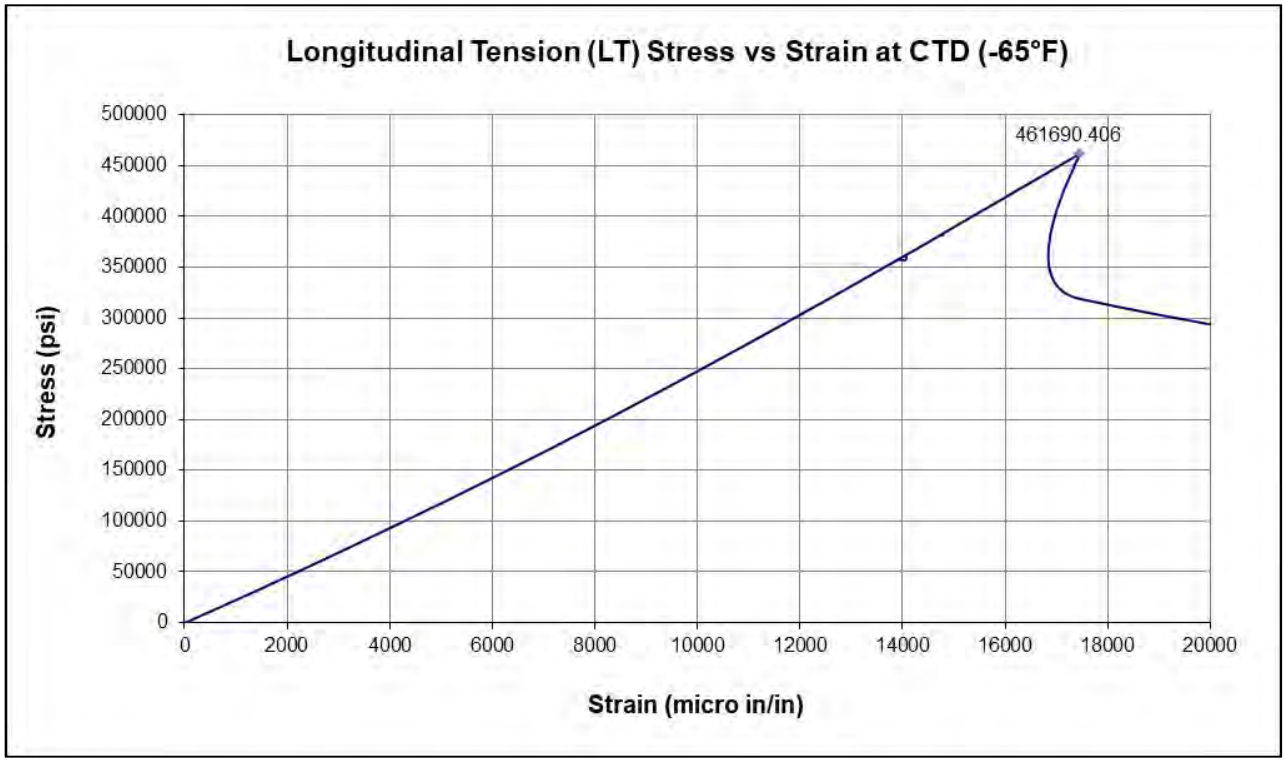


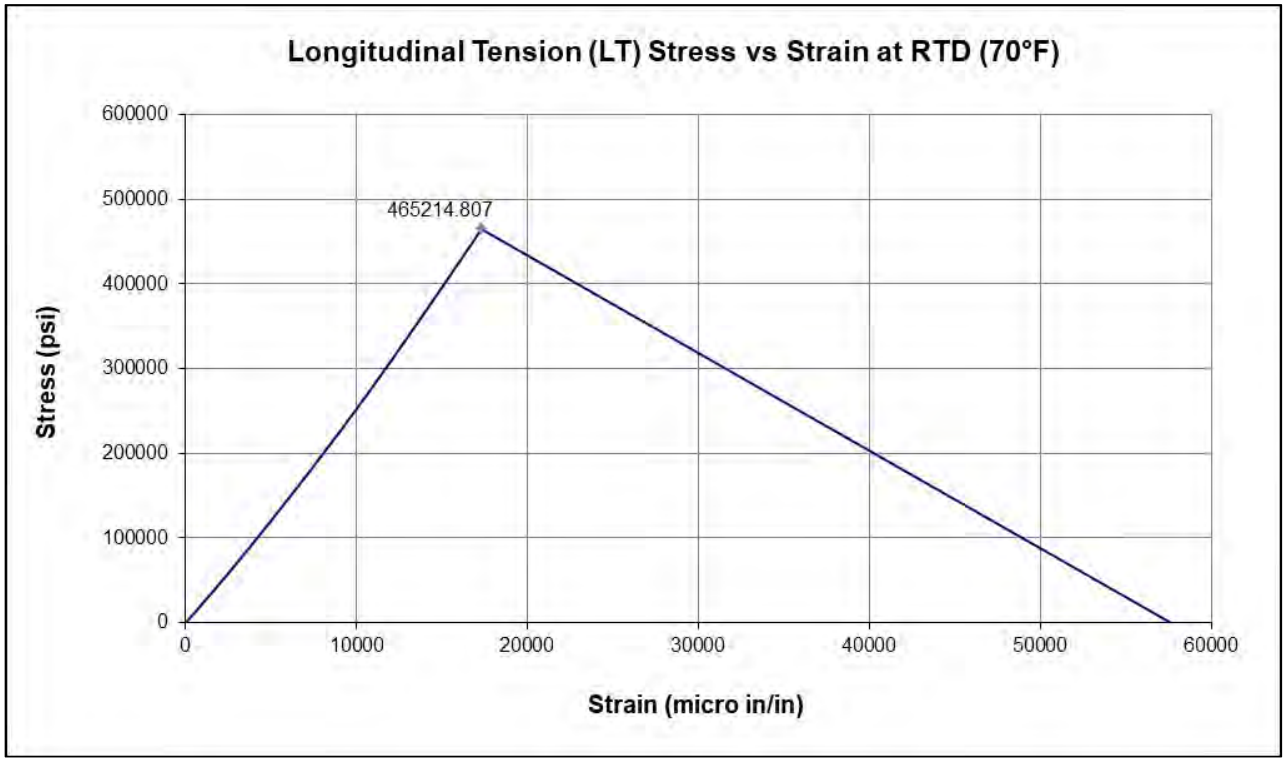
Damage Area and Dent Depth Summary:

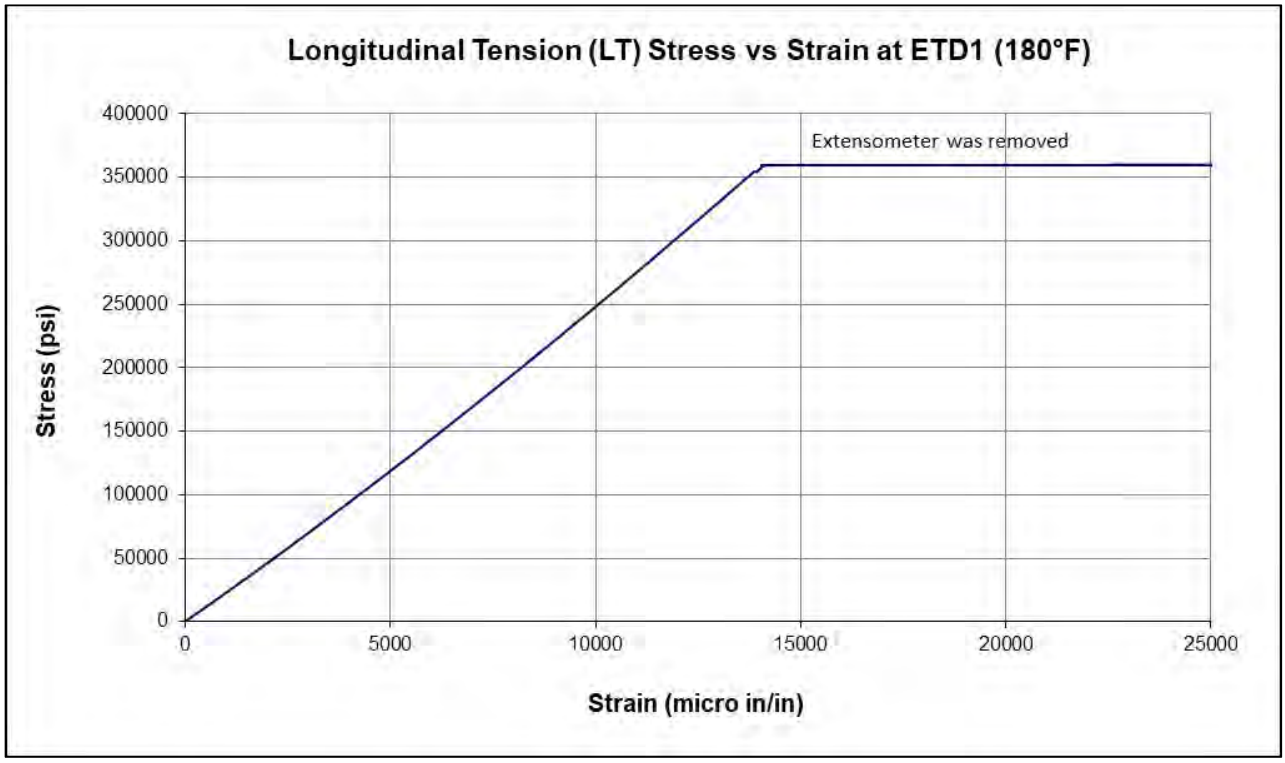
Specimen ID	Damage Area (inch^2)	Dent Depth (inch)
TCDPA111B	0.9836	0.0120
TCDPA112B	1.1072	0.0135
TCDPA113B	1.0256	0.0135
TCDPA211B	1.1628	0.0125
TCDPA212B	1.0388	0.0130
TCDPA213B	1.2008	0.0125
TCDPA111A	1.0996	0.0125
TCDPA112A	1.1044	0.0120
TCDPA113A	1.0260	0.0120
TCDPA211A	1.1764	0.0120
TCDPA212A	1.2404	0.0120
TCDPA213A	1.3116	0.0125

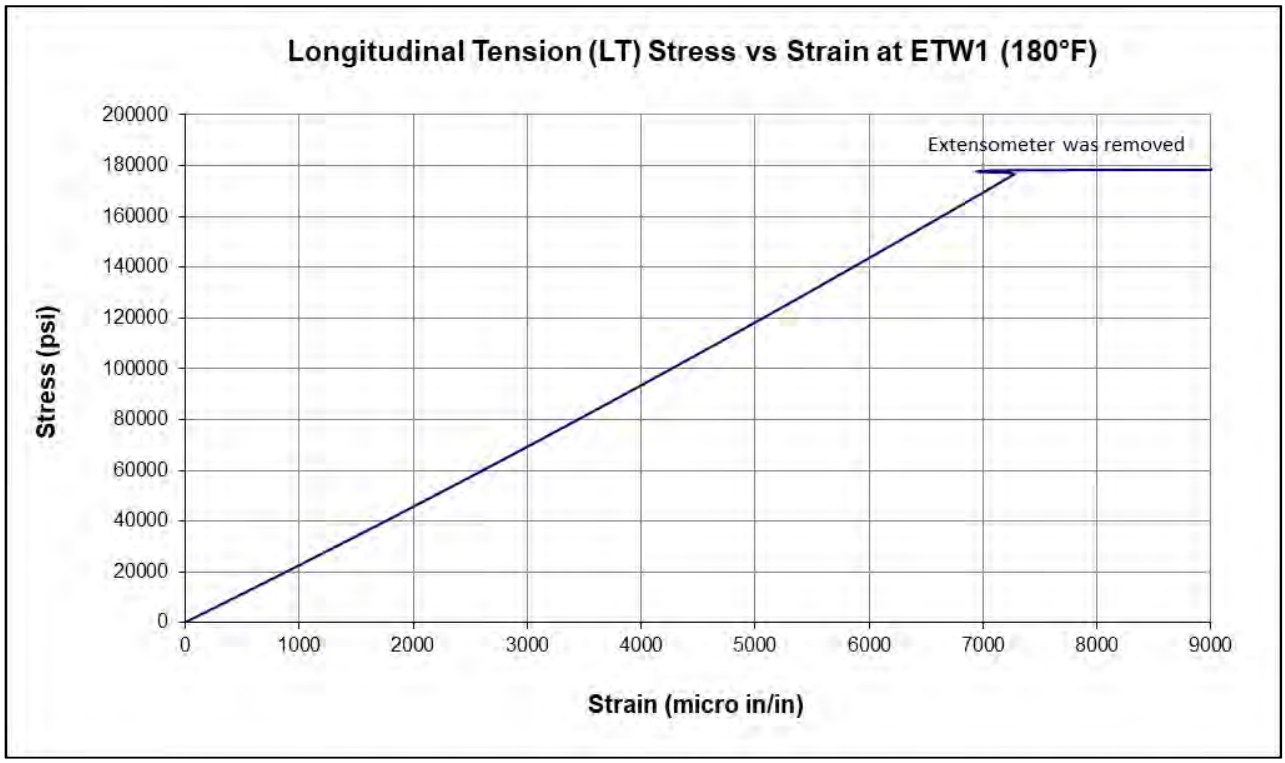
6. Full Stress vs. Strain Curve

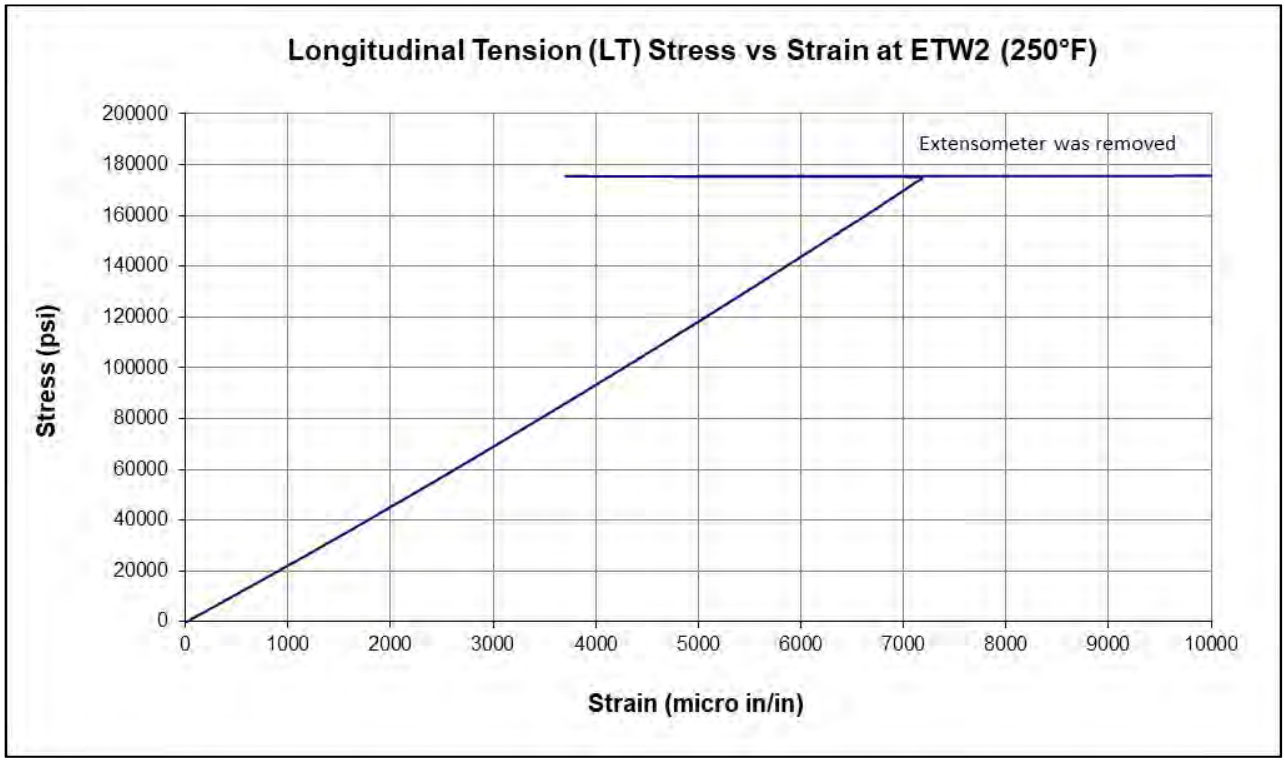
6.1 Longitudinal Tension (LT)



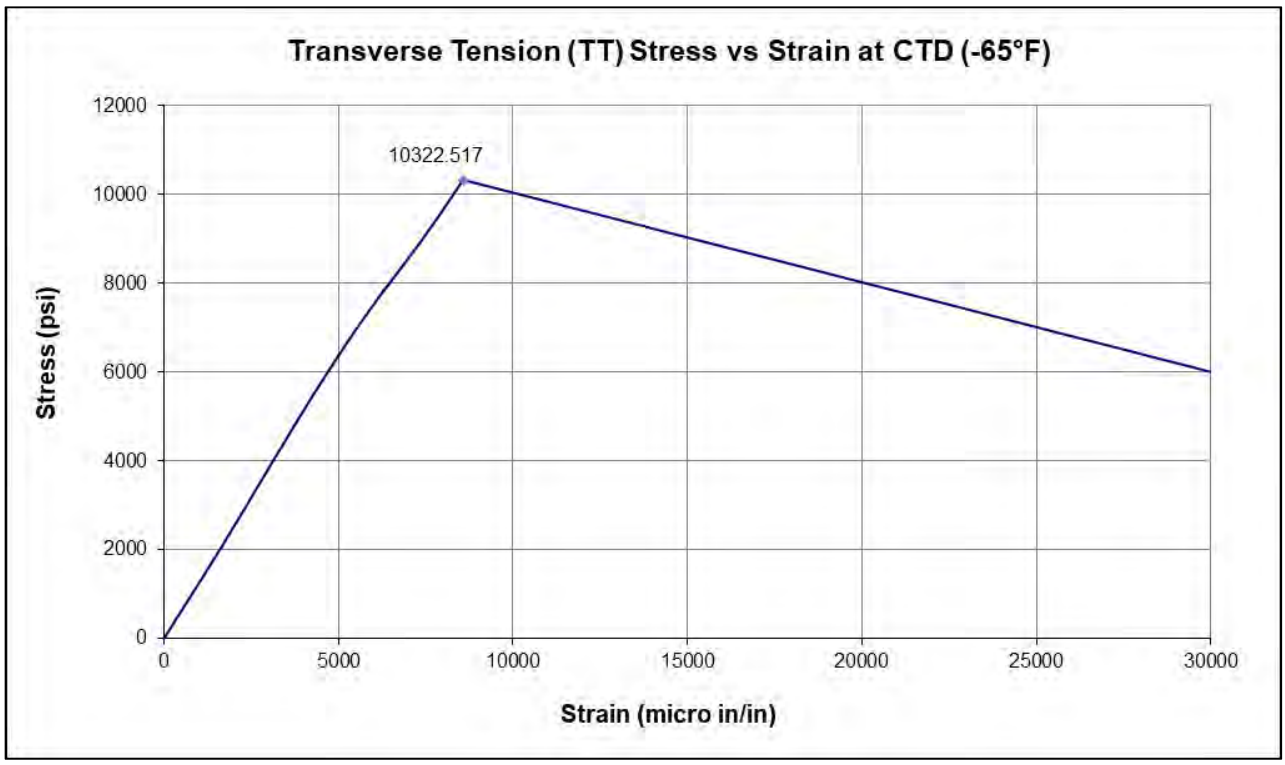


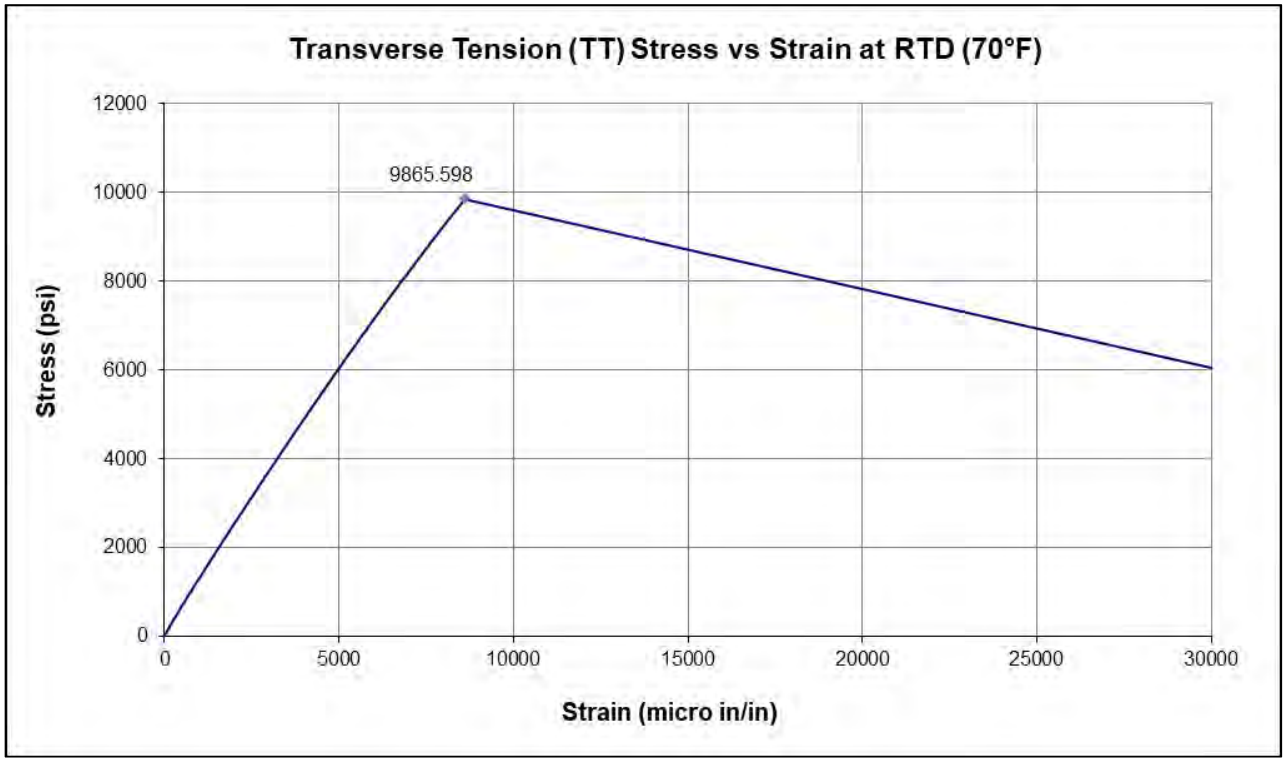

Longitudinal Tension (LT) Stress vs Strain at ETD1 (180°F)
Extensometer was removed
Stress (psi)
400000
350000
300000
250000
200000
150000
100000
50000
0
0
5000
10000
15000
20000
25000
Strain (micro in/in)

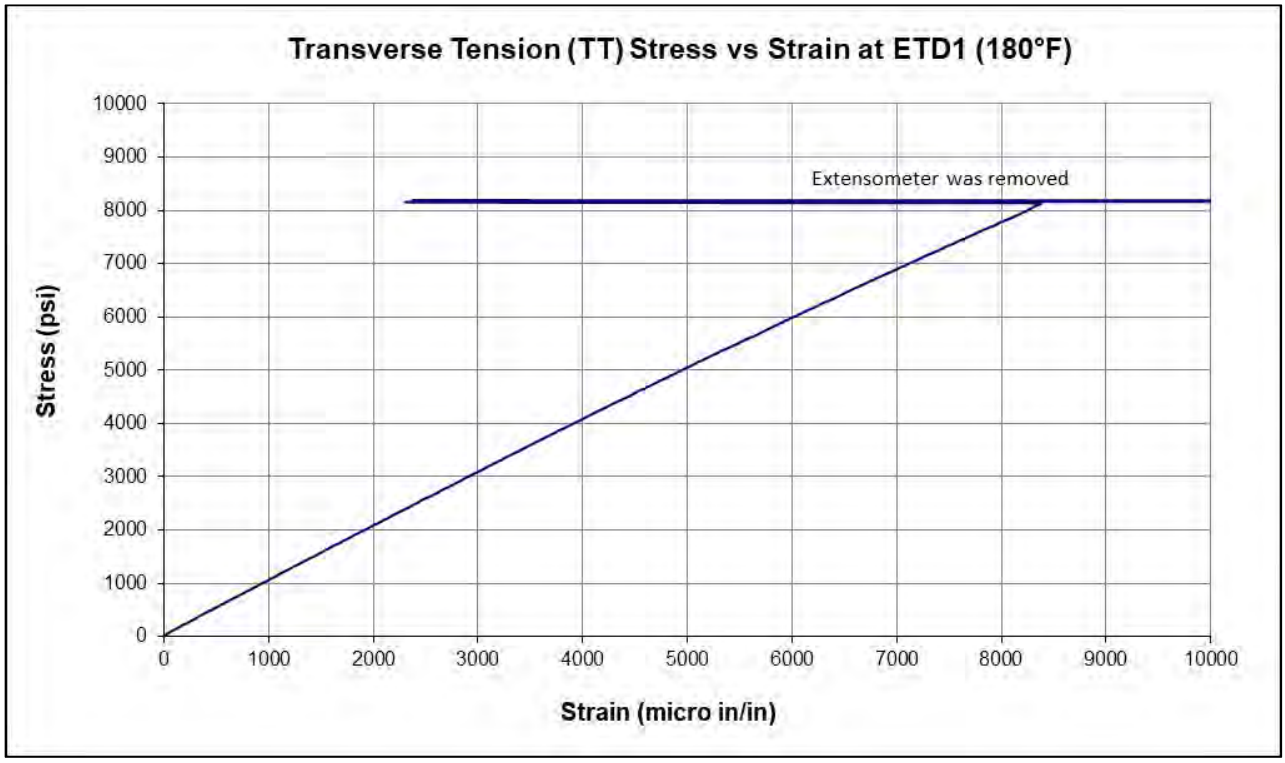

Longitudinal Tension (LT) Stress vs Strain at ETW1 (180°F)
Extensometer was removed
Stress (psi)
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Strain (micro in/in)

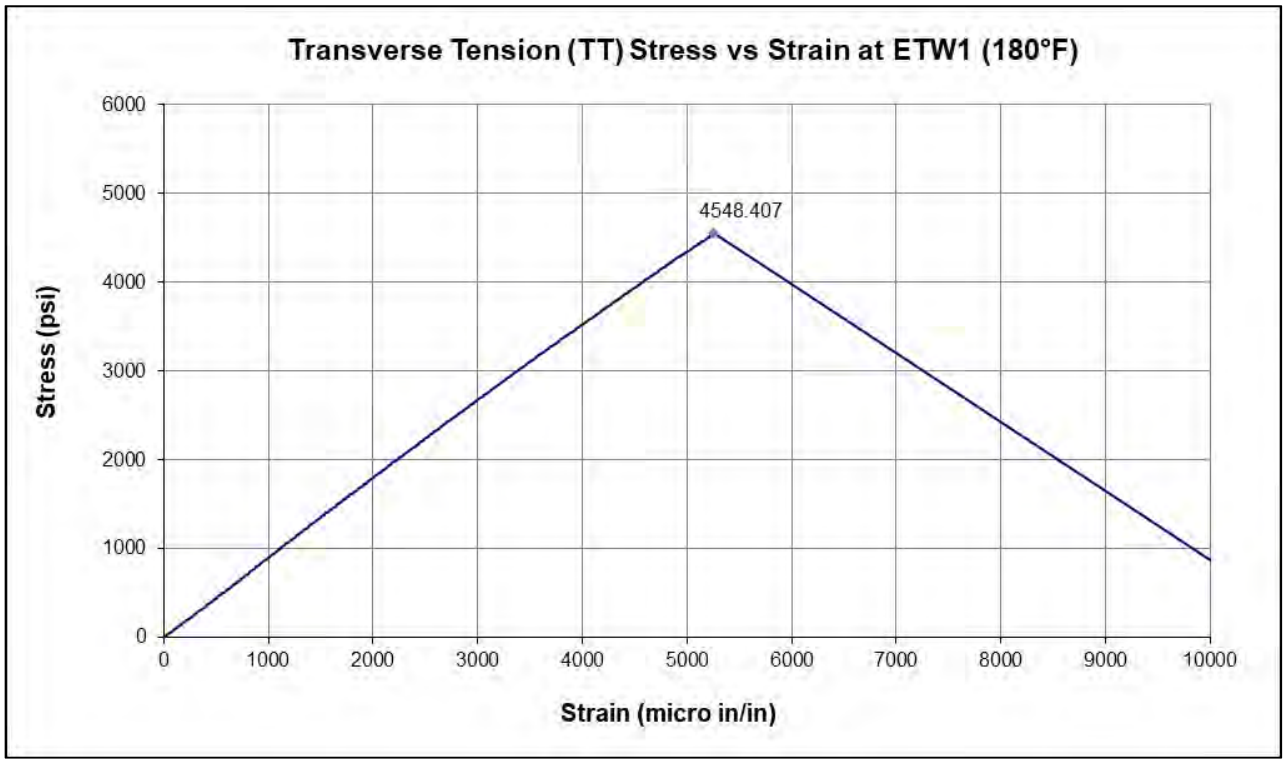

Longitudinal Tension (LT) Stress vs Strain at ETW2 (250°F)
Extensometer was removed
Stress (psi)
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Strain (micro in/in)

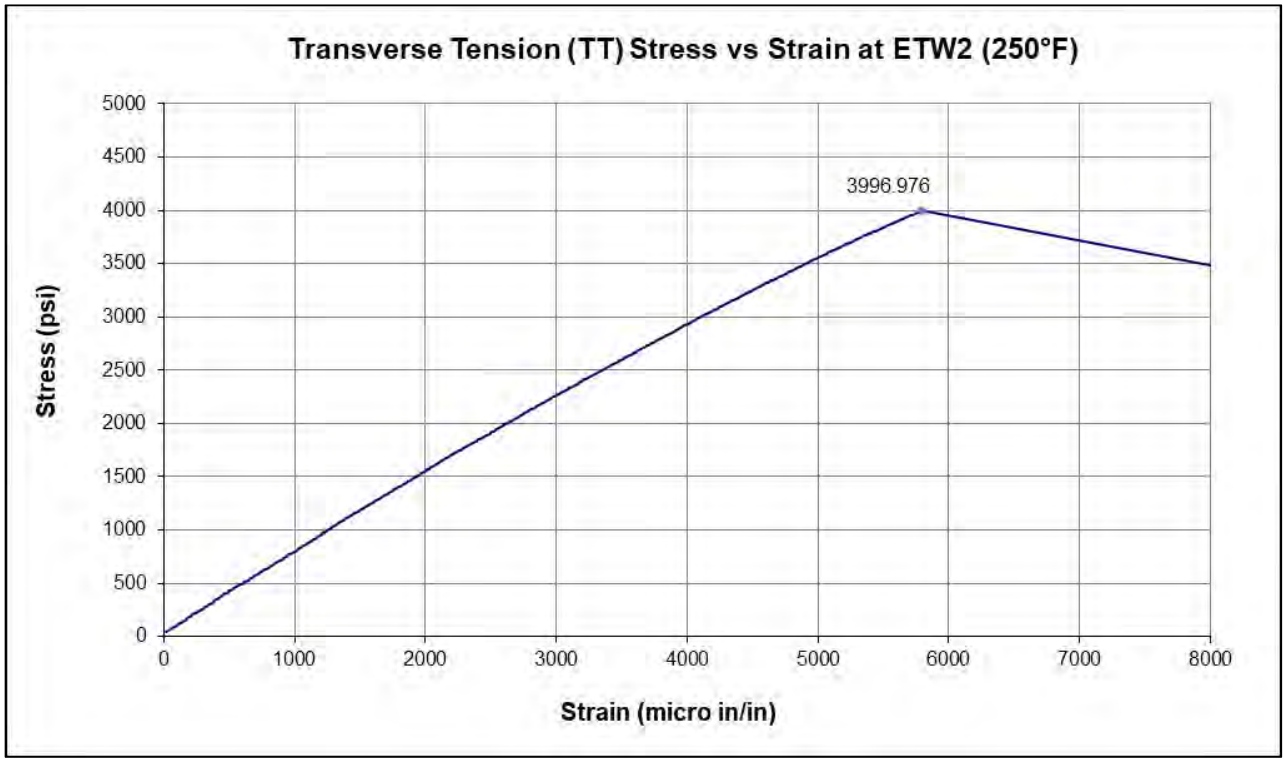
6.2 Transverse Tension (TT)



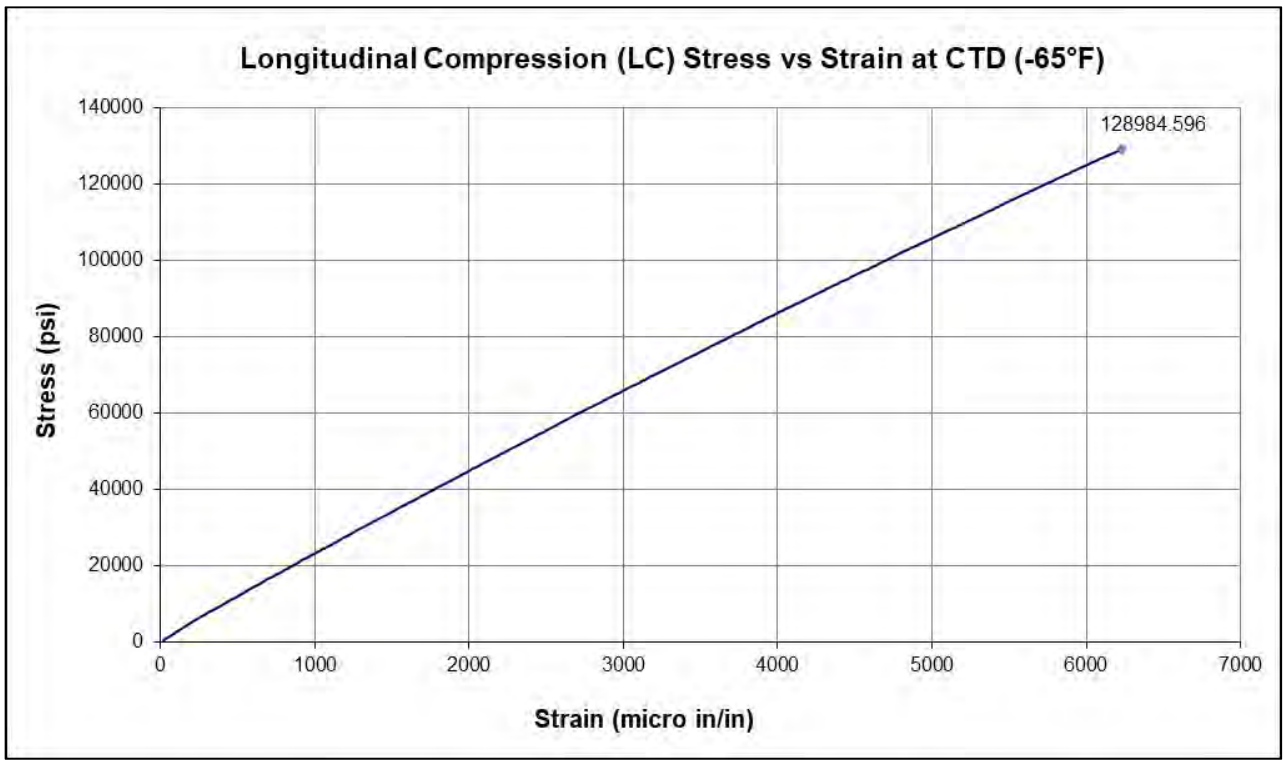


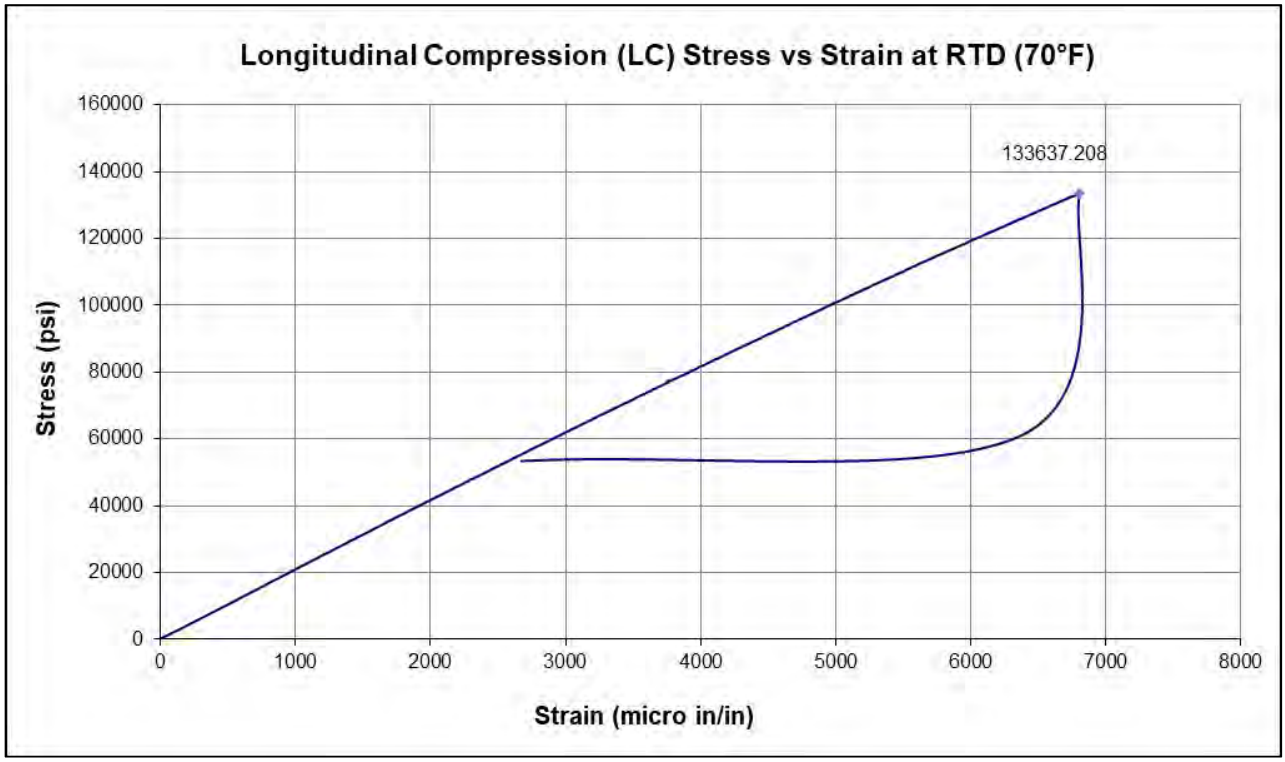

Transverse Tension (TT) Stress vs Strain at ETD1 (180°F)
Extensometer was removed
Stress (psi)
Strain (micro in/in)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000

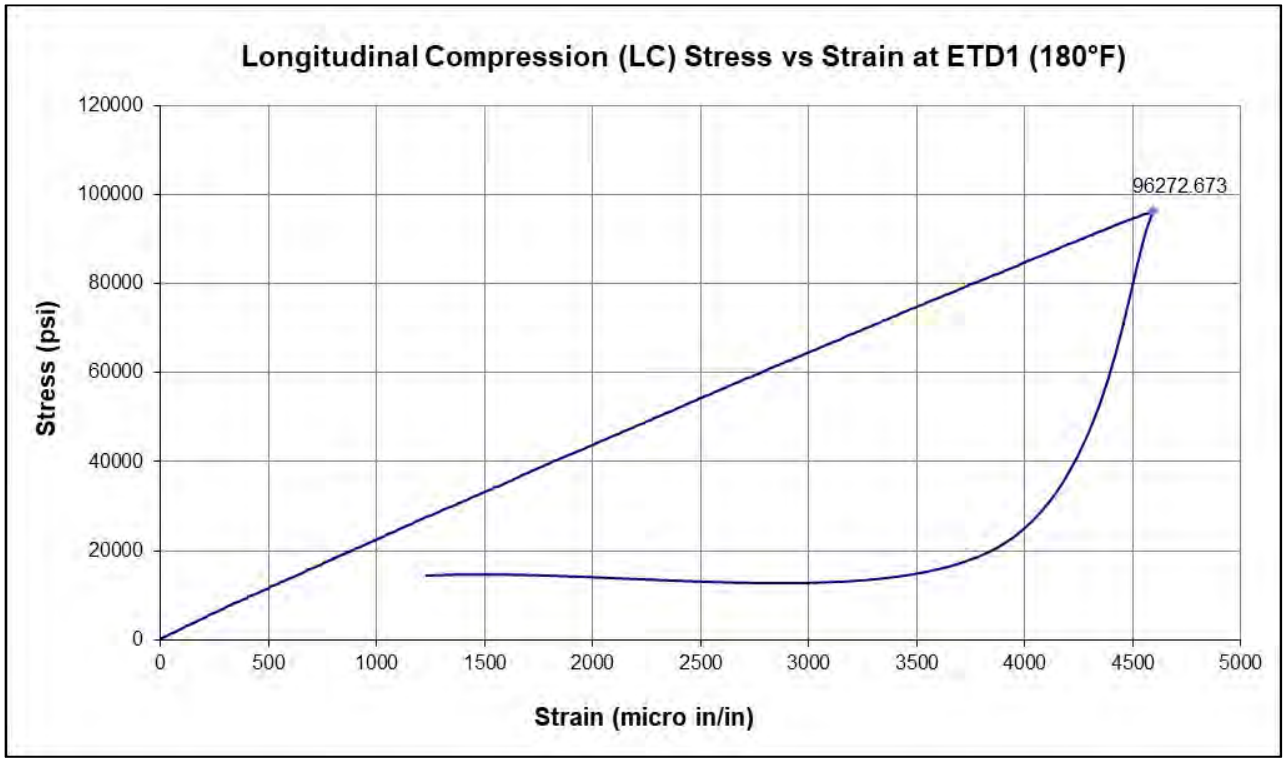

Transverse Tension (TT) Stress vs Strain at ETW1 (180°F)
4548.407
Stress (psi)
Strain (micro in/in)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000

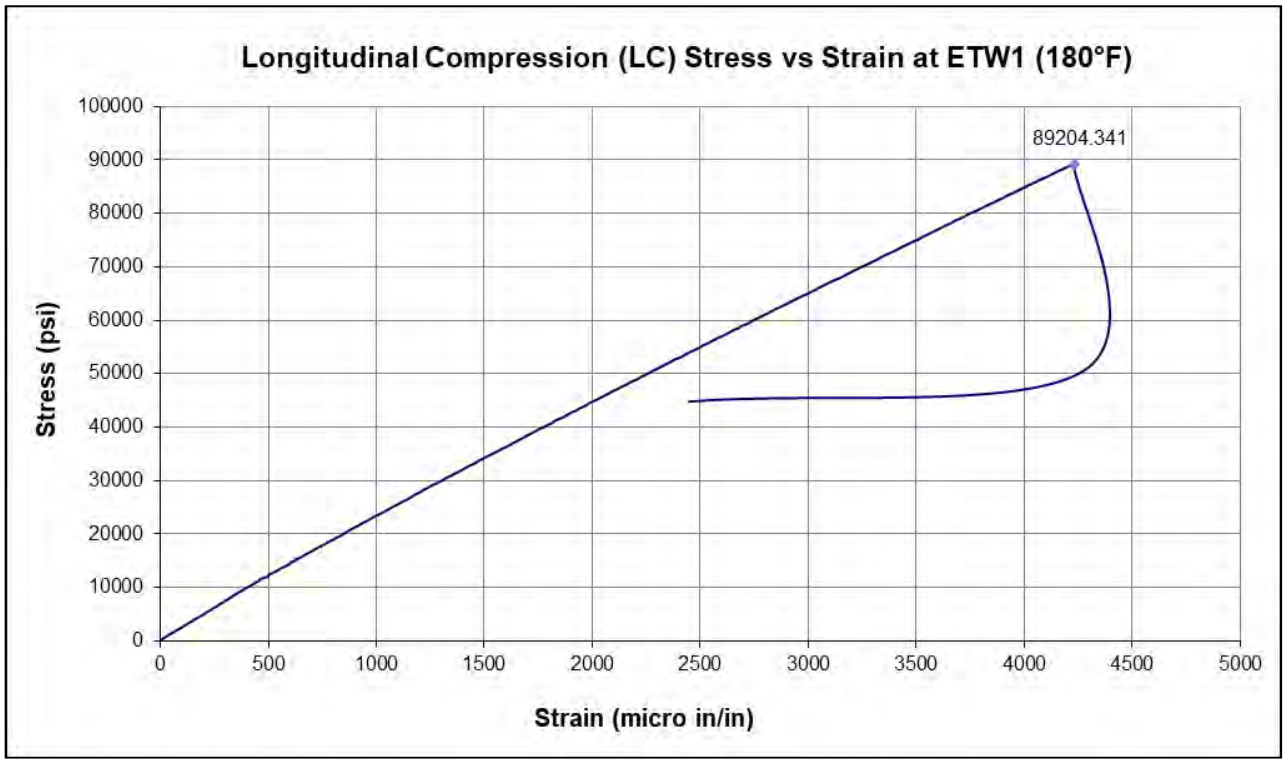

Transverse Tension (TT) Stress vs Strain at ETW2 (250°F)
Stress (psi)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
3996.976
0
1000
2000
3000
4000
5000
6000
7000
8000
Strain (micro in/in)

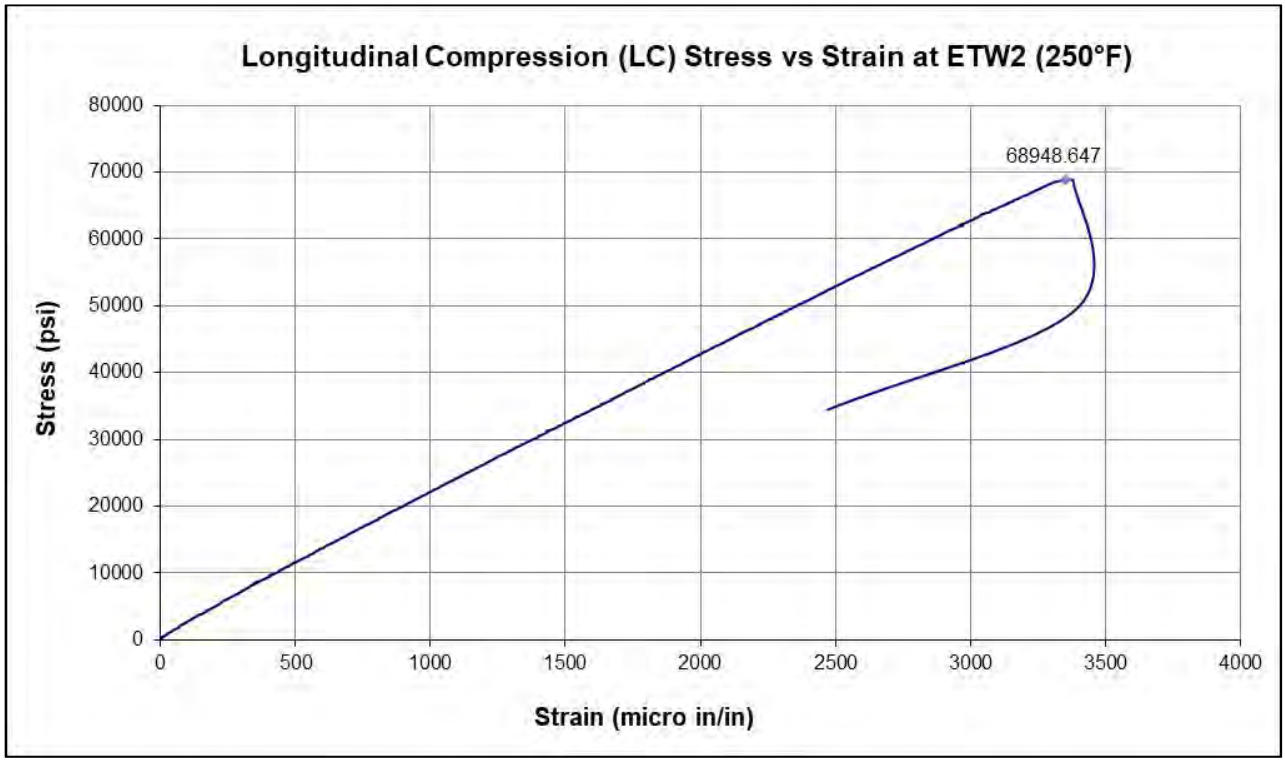
6.3 Longitudinal Compression (LC)



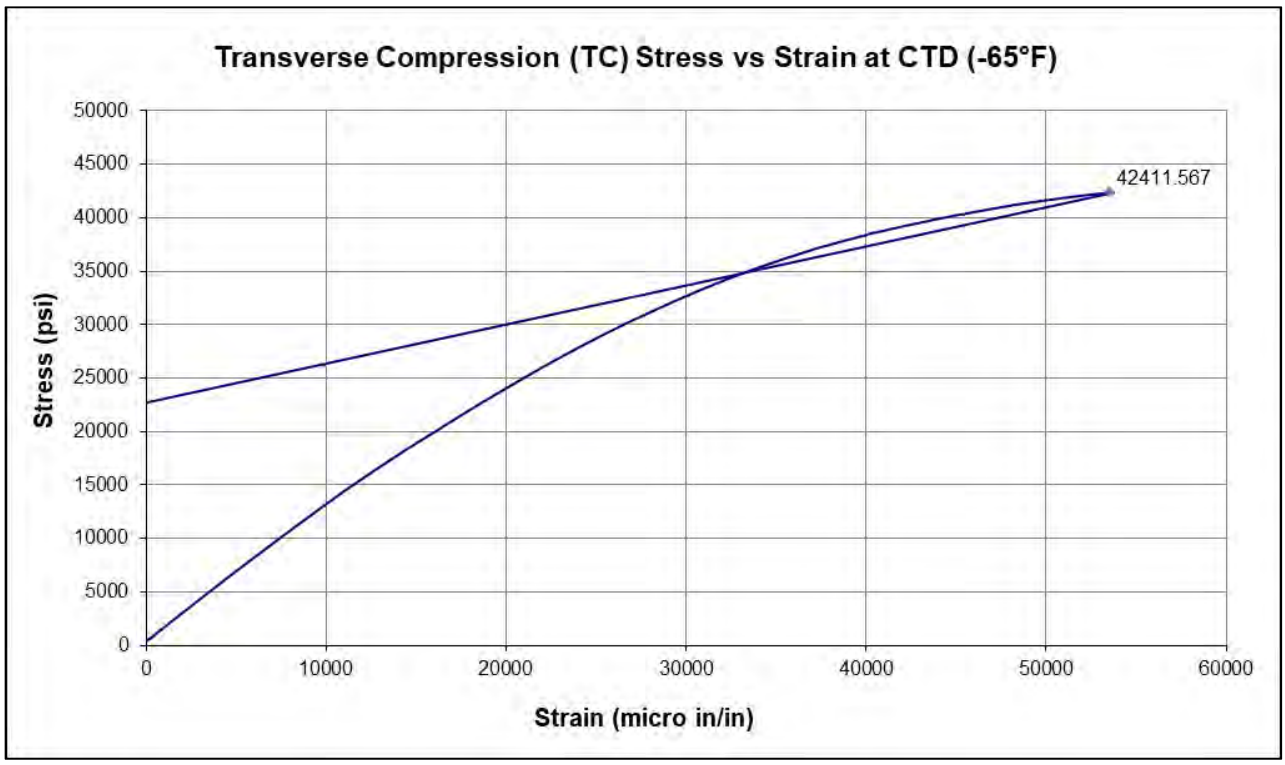


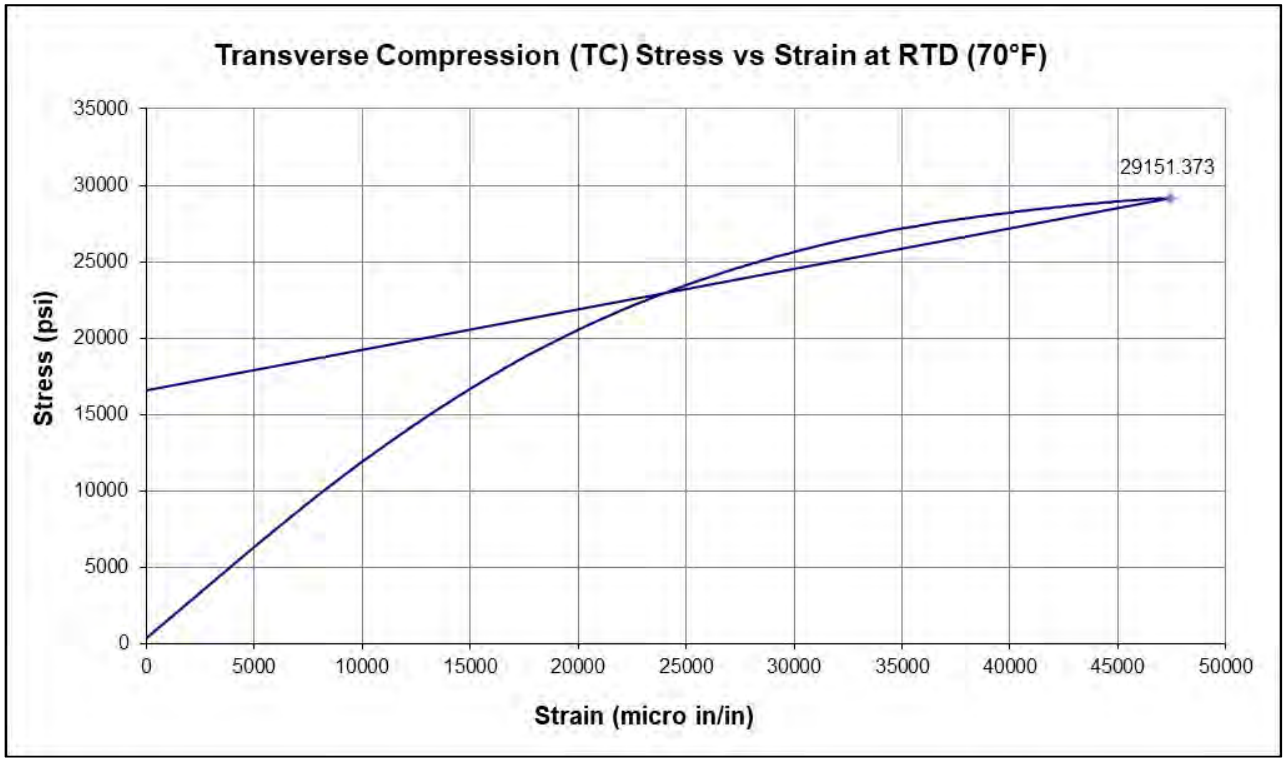

Longitudinal Compression (LC) Stress vs Strain at ETD1 (180°F)
Stress (psi)
120000
100000
80000
60000
40000
20000
0
96272.673
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Strain (micro in/in)

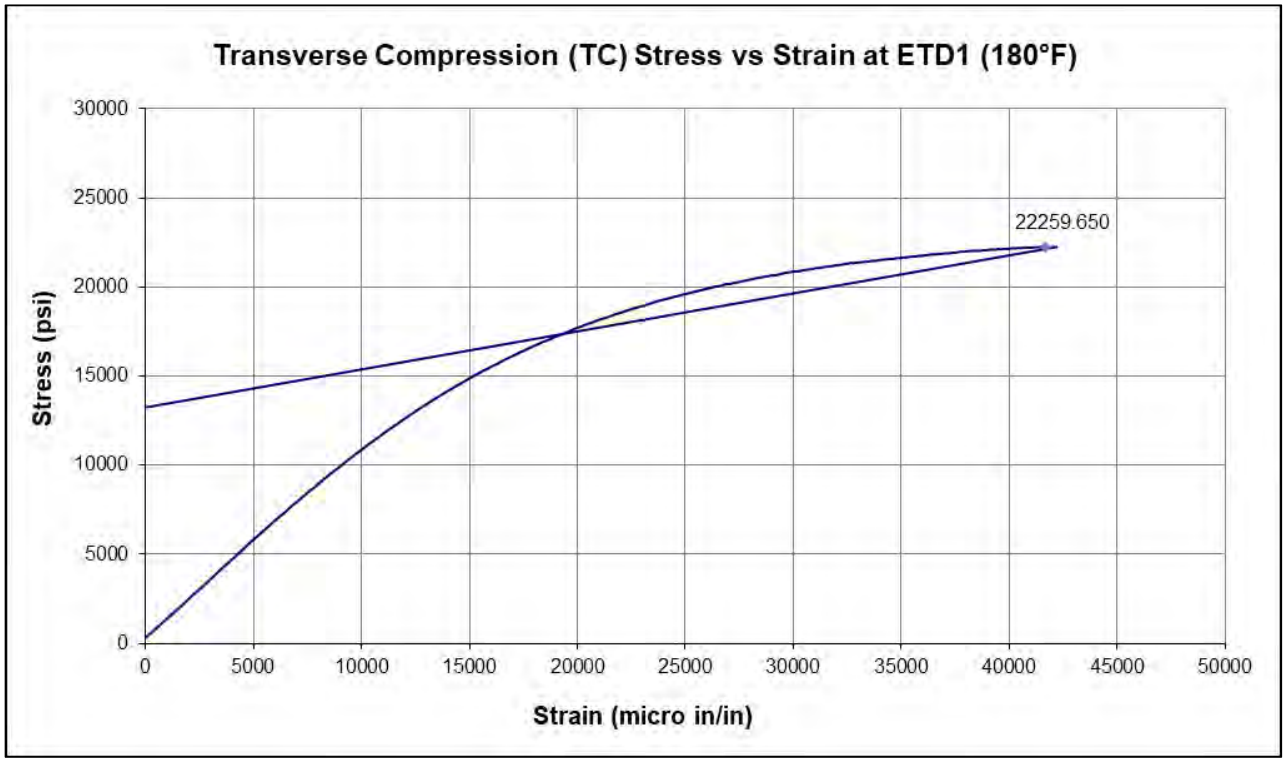

Longitudinal Compression (LC) Stress vs Strain at ETW1 (180°F)
Stress (psi)
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
89204.341
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Strain (micro in/in)

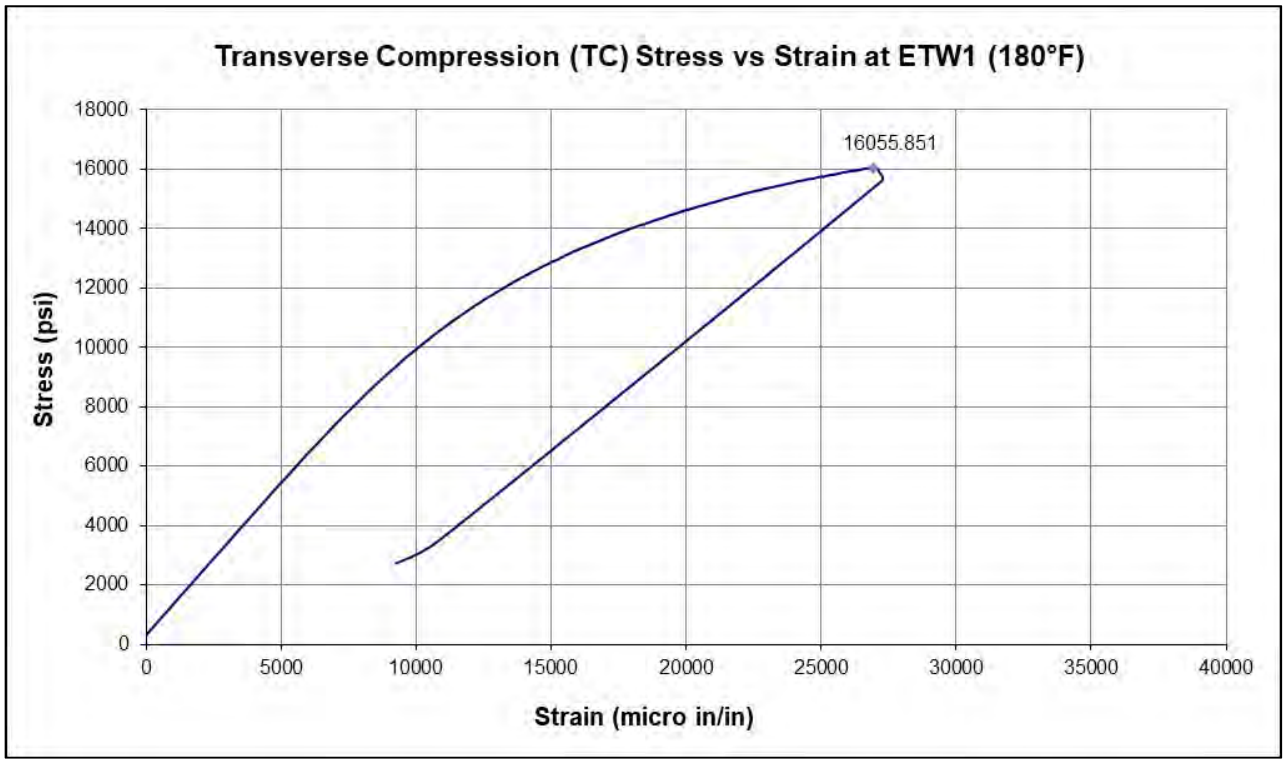

Longitudinal Compression (LC) Stress vs Strain at ETW2 (250°F)
Stress (psi)
80000
70000
60000
50000
40000
30000
20000
10000
0
68948.647
0
500
1000
1500
2000
2500
3000
3500
4000
Strain (micro in/in)

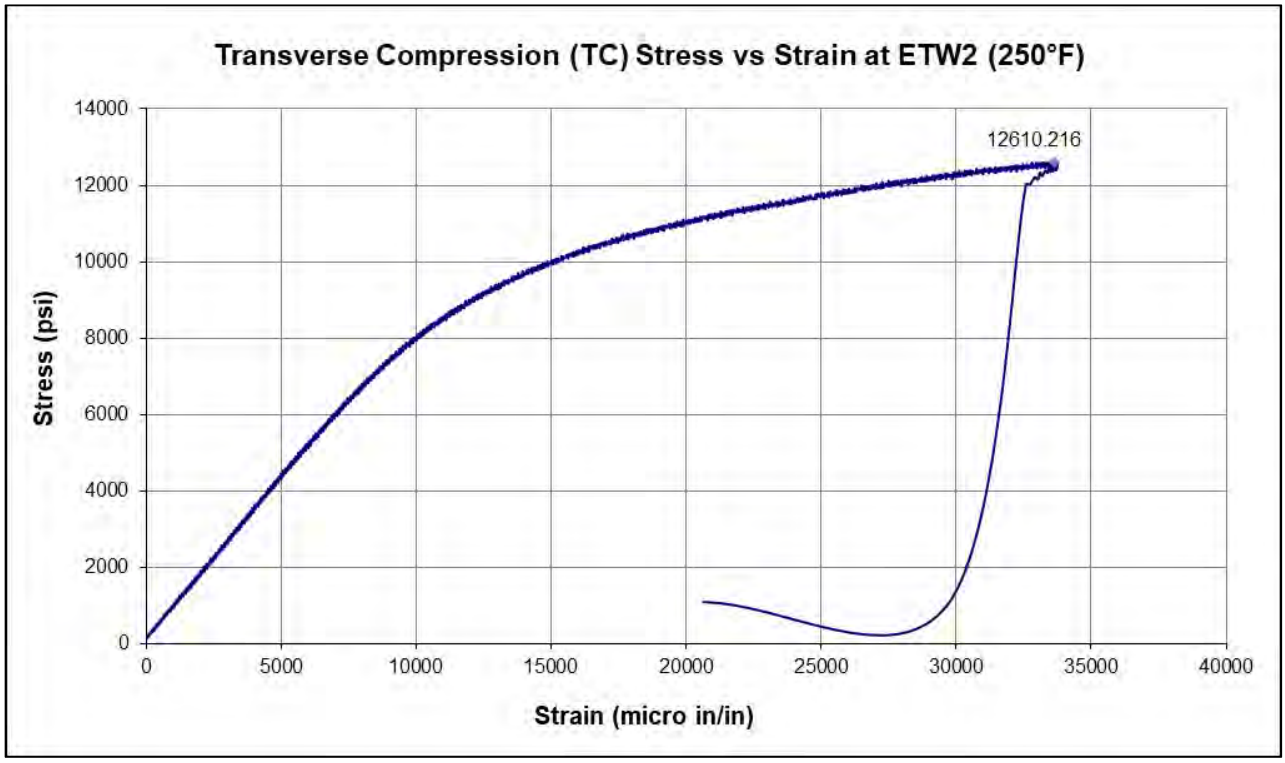
6.4 Transverse Compression (TC)



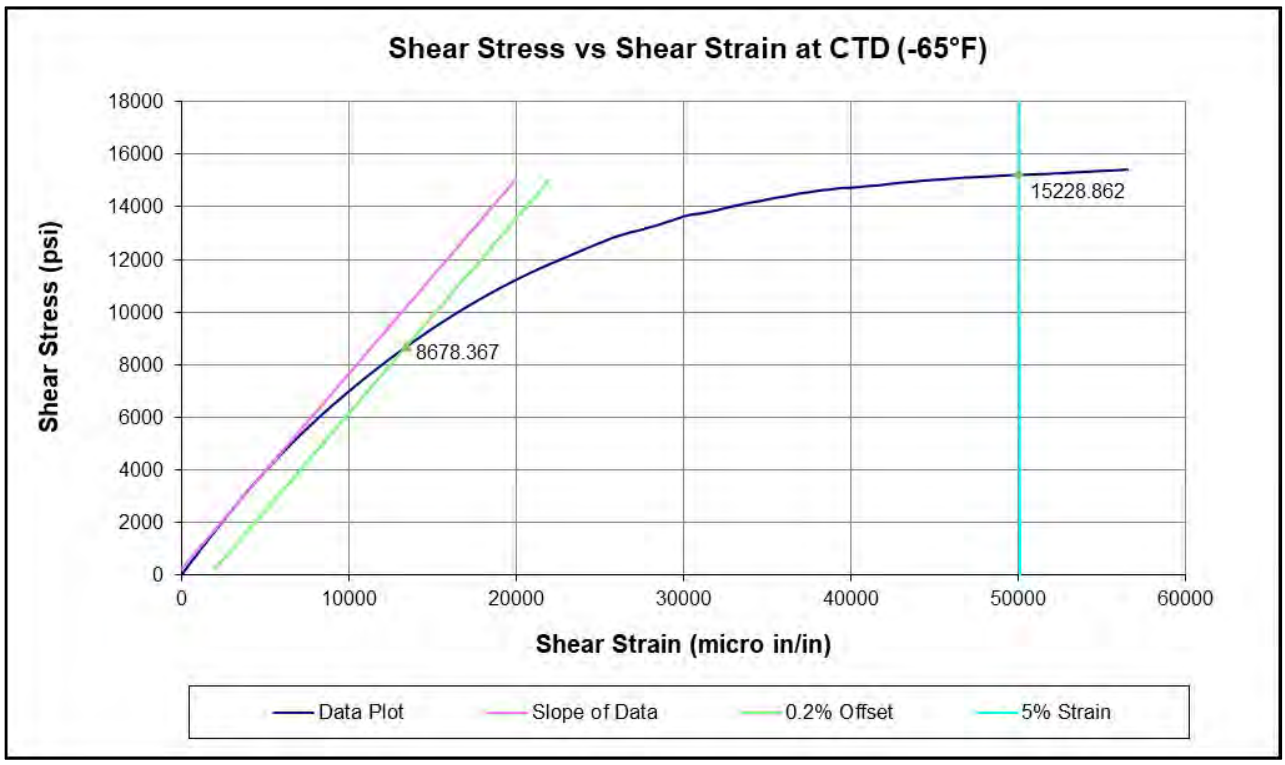


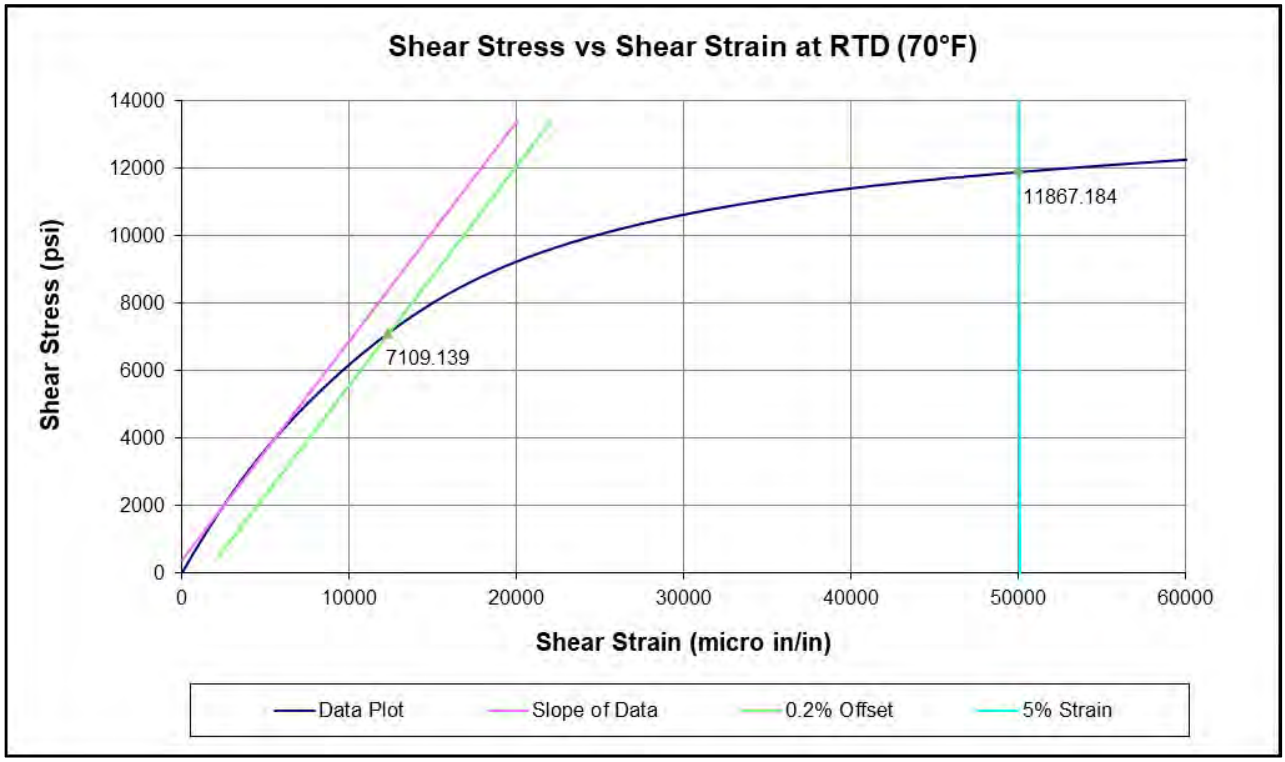

Transverse Compression (TC) Stress vs Strain at ETD1 (180°F)
Stress (psi)
Strain (micro in/in)
22259.650
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
50000

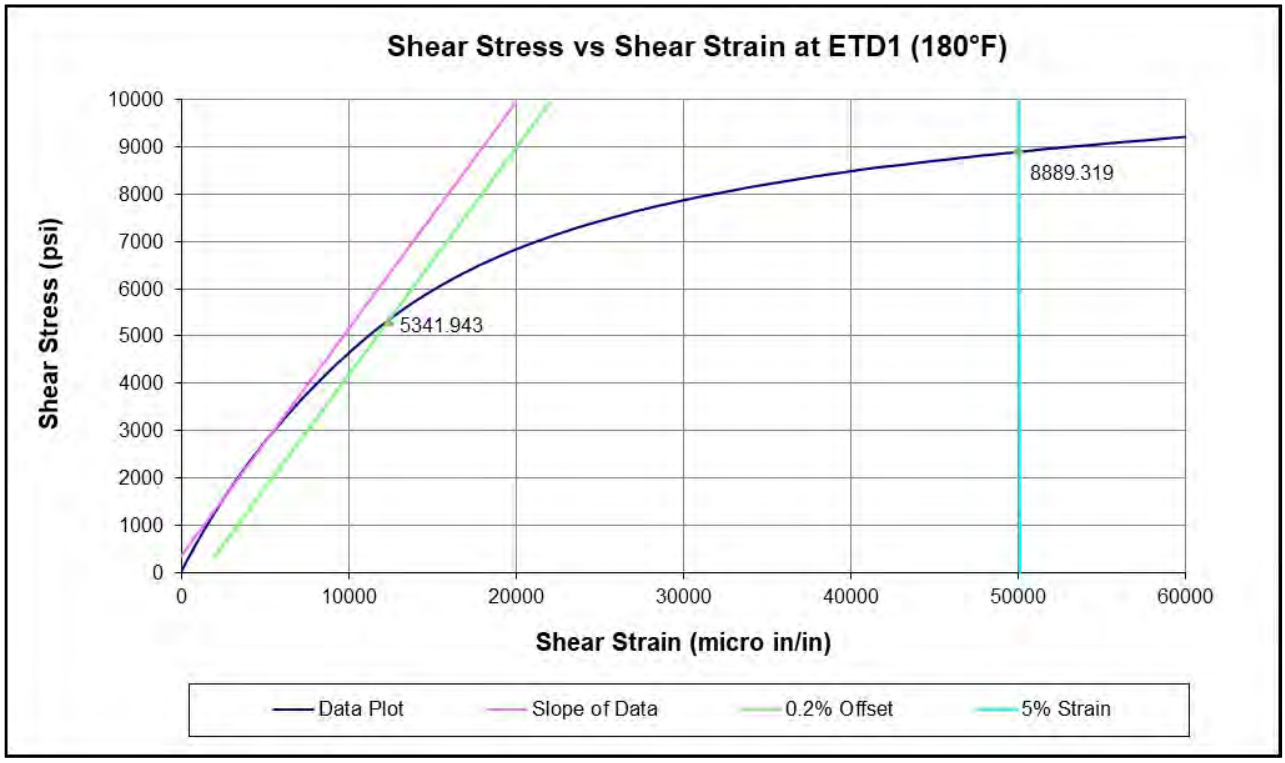

Transverse Compression (TC) Stress vs Strain at ETW1 (180°F)
Stress (psi)
Strain (micro in/in)
16055.851
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
0
5000
10000
15000
20000
25000
30000
35000
40000

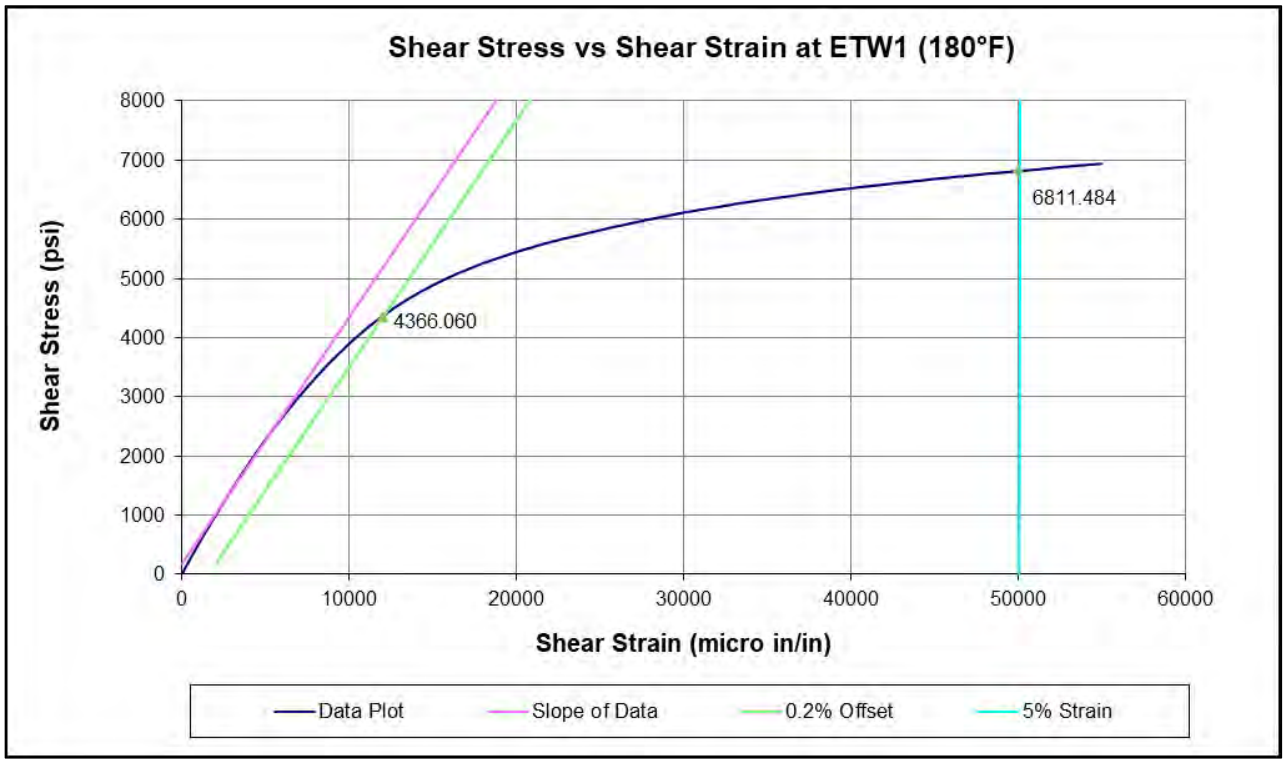

Transverse Compression (TC) Stress vs Strain at ETW2 (250°F)
Stress (psi)
Strain (micro in/in)
12610.216
0
2000
4000
6000
8000
10000
12000
14000
0
5000
10000
15000
20000
25000
30000
35000
40000

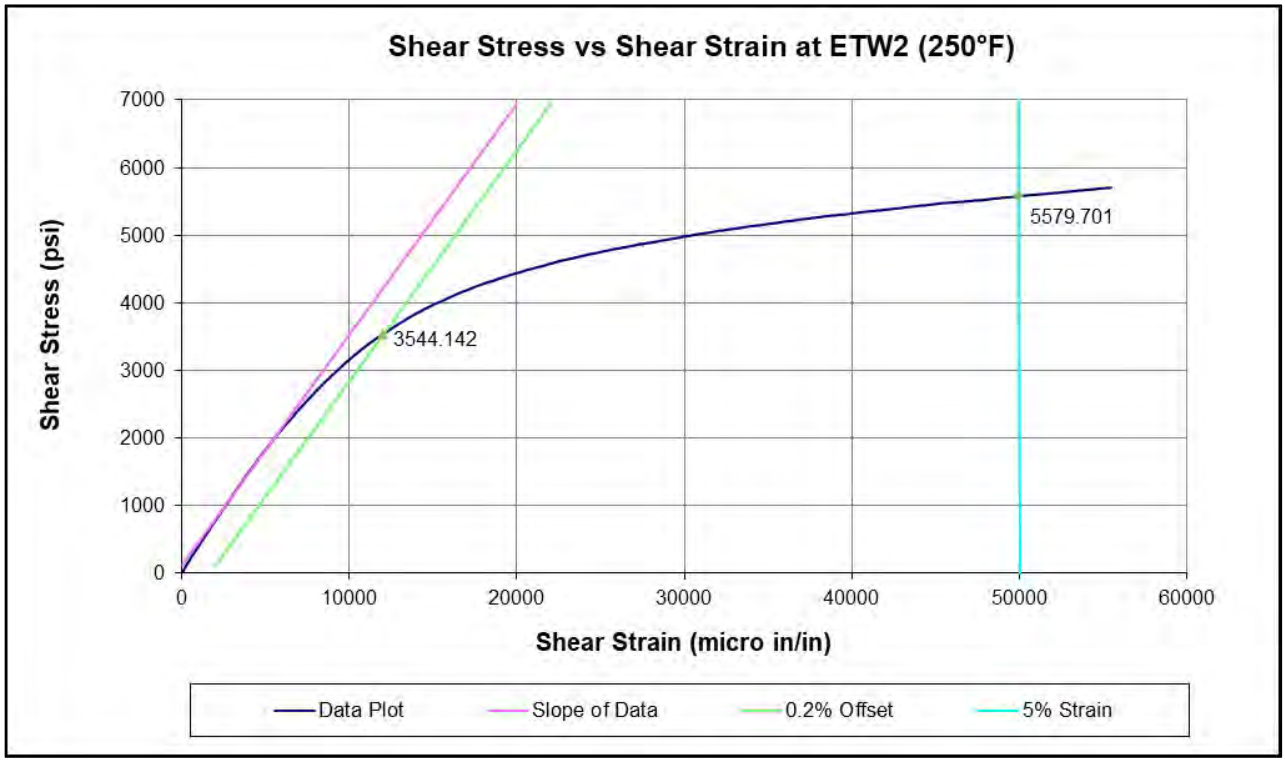
6.5 In-Plane Shear (IPS)



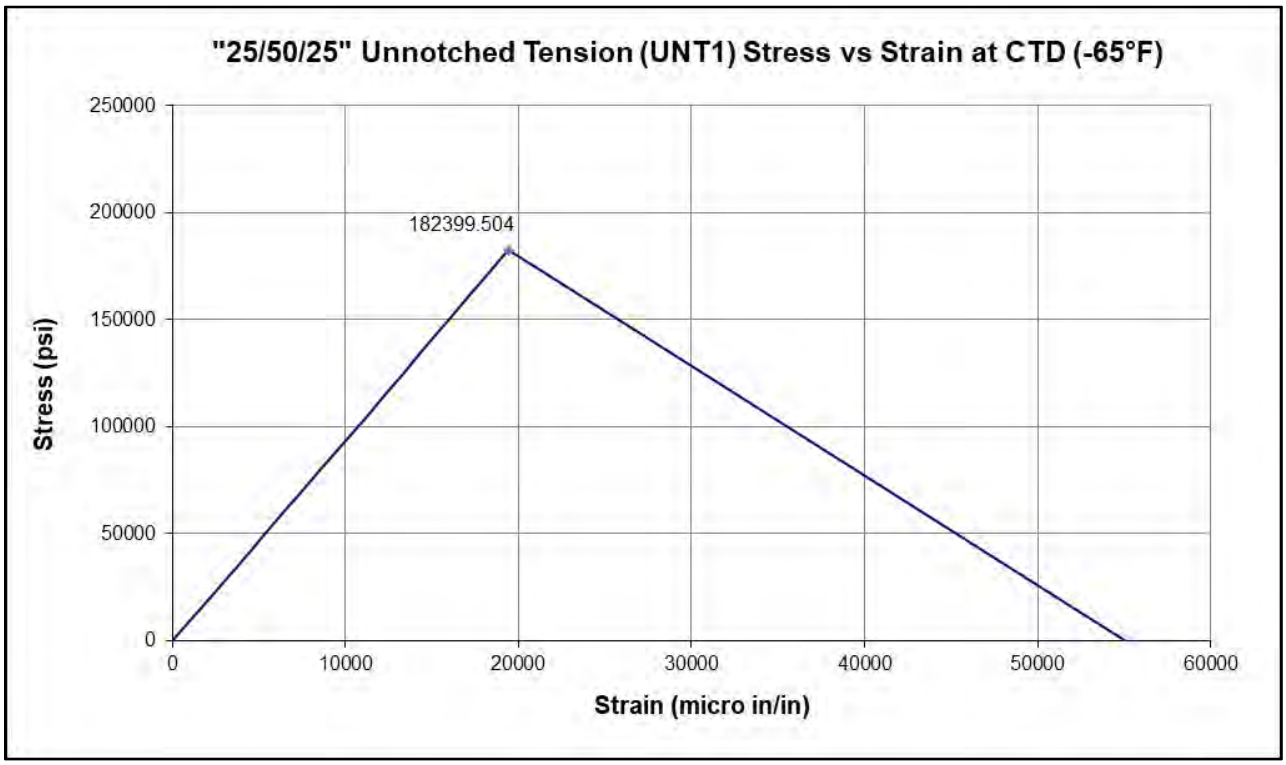


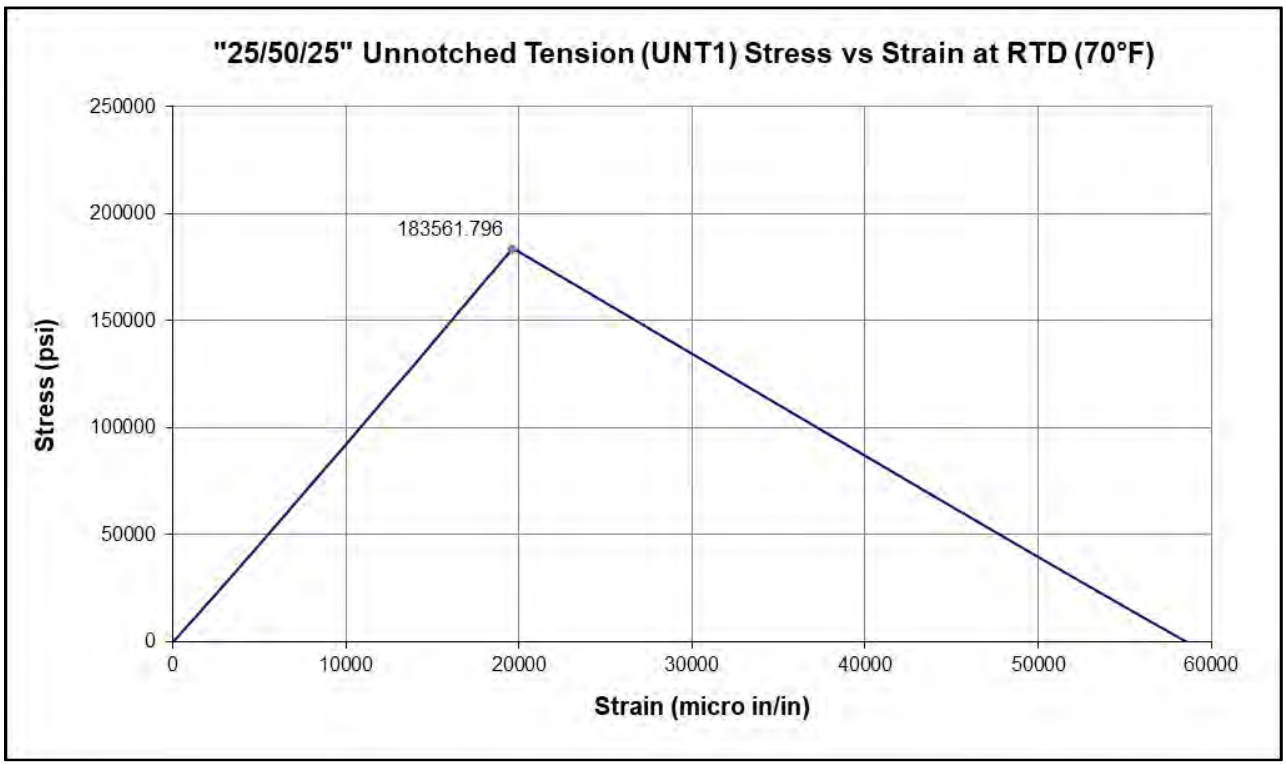

Shear Stress vs Shear Strain at ETD1 (180°F)
Shear Stress (psi)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
8889.319
5341.943
Data Plot
Slope of Data
0.2% Offset
5% Strain

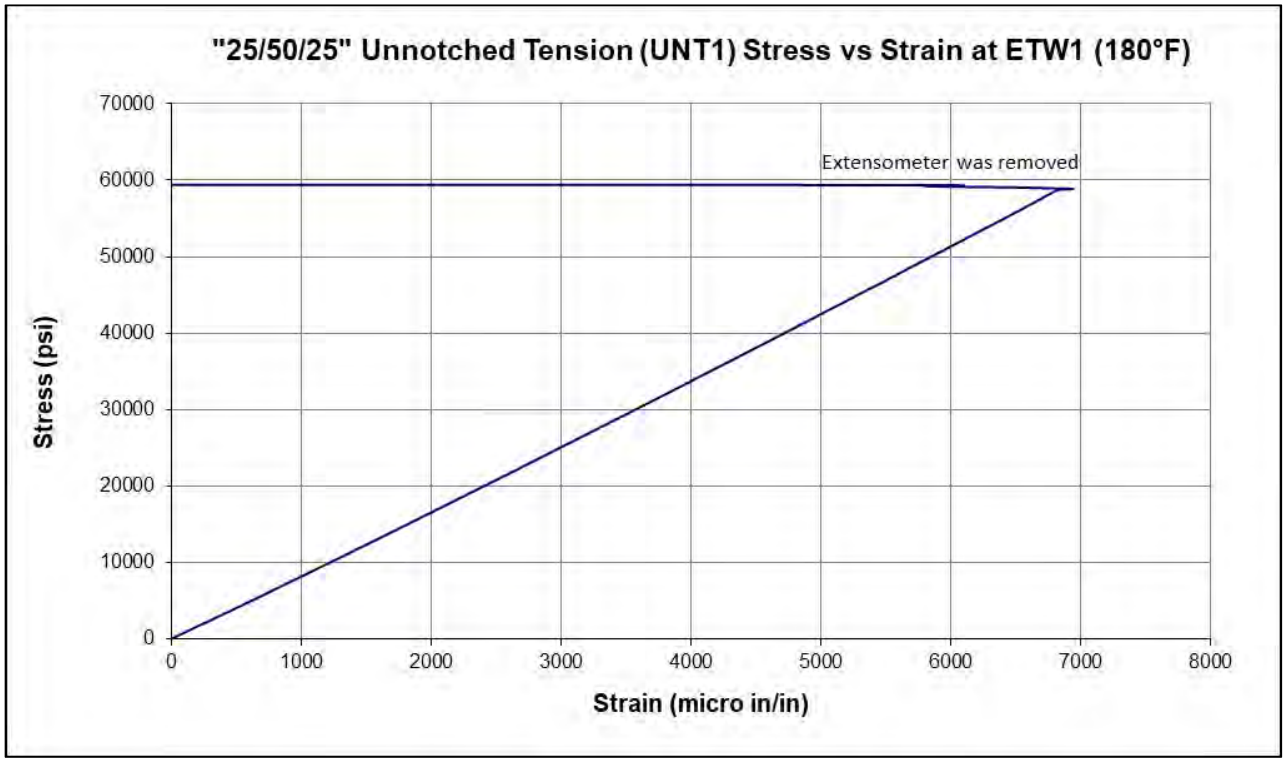

Shear Stress vs Shear Strain at ETW1 (180°F)
Shear Stress (psi)
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
6811.484
4366.060
Data Plot
Slope of Data
0.2% Offset
5% Strain

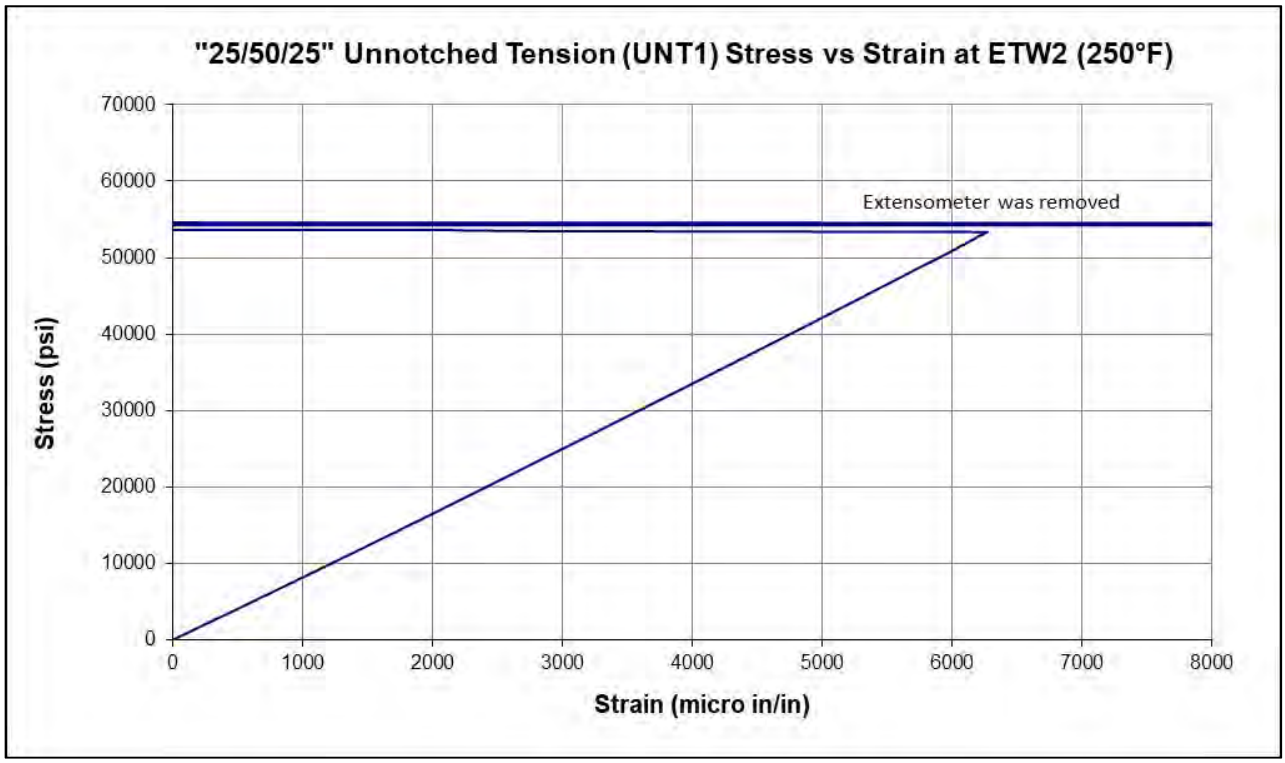

Shear Stress vs Shear Strain at ETW2 (250°F)
Shear Stress (psi)
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
3544.142
5579.701
Data Plot
Slope of Data
0.2% Offset
5% Strain

6.6 “25/50/25” Unnotched Tension 1 (UNT1)

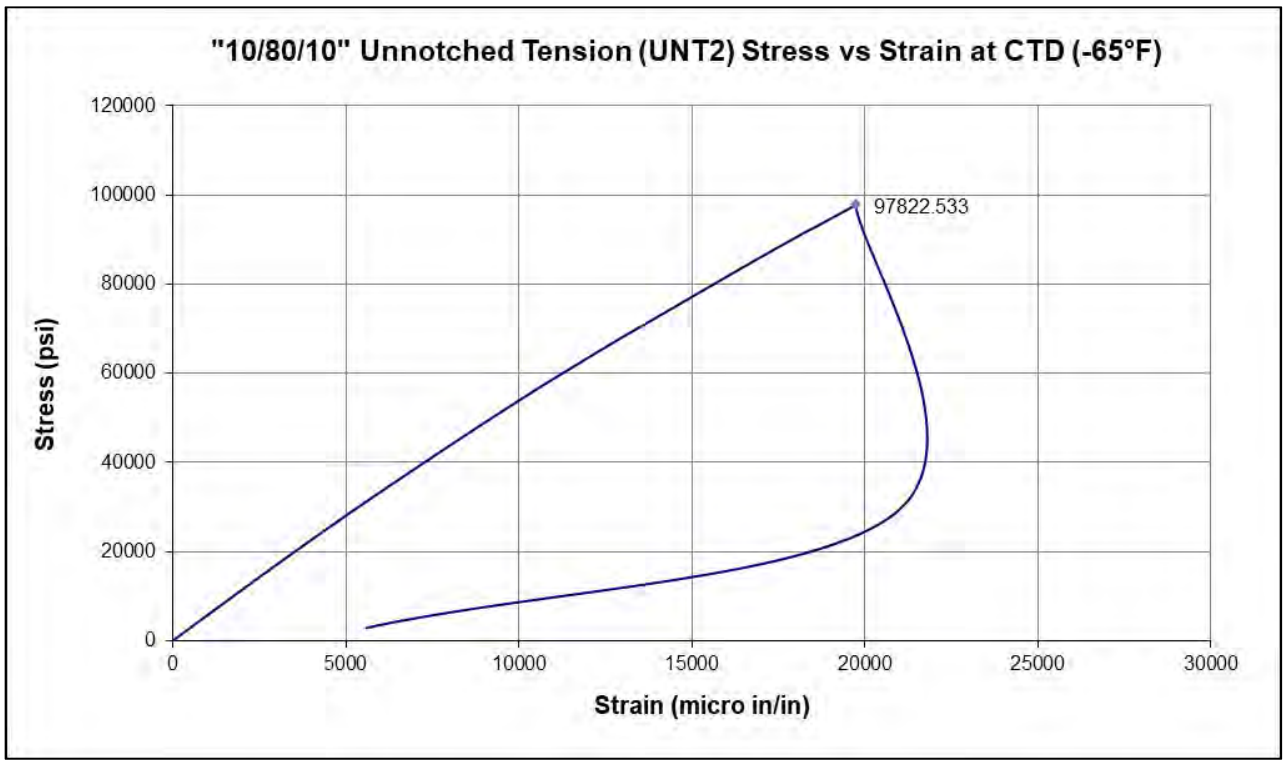


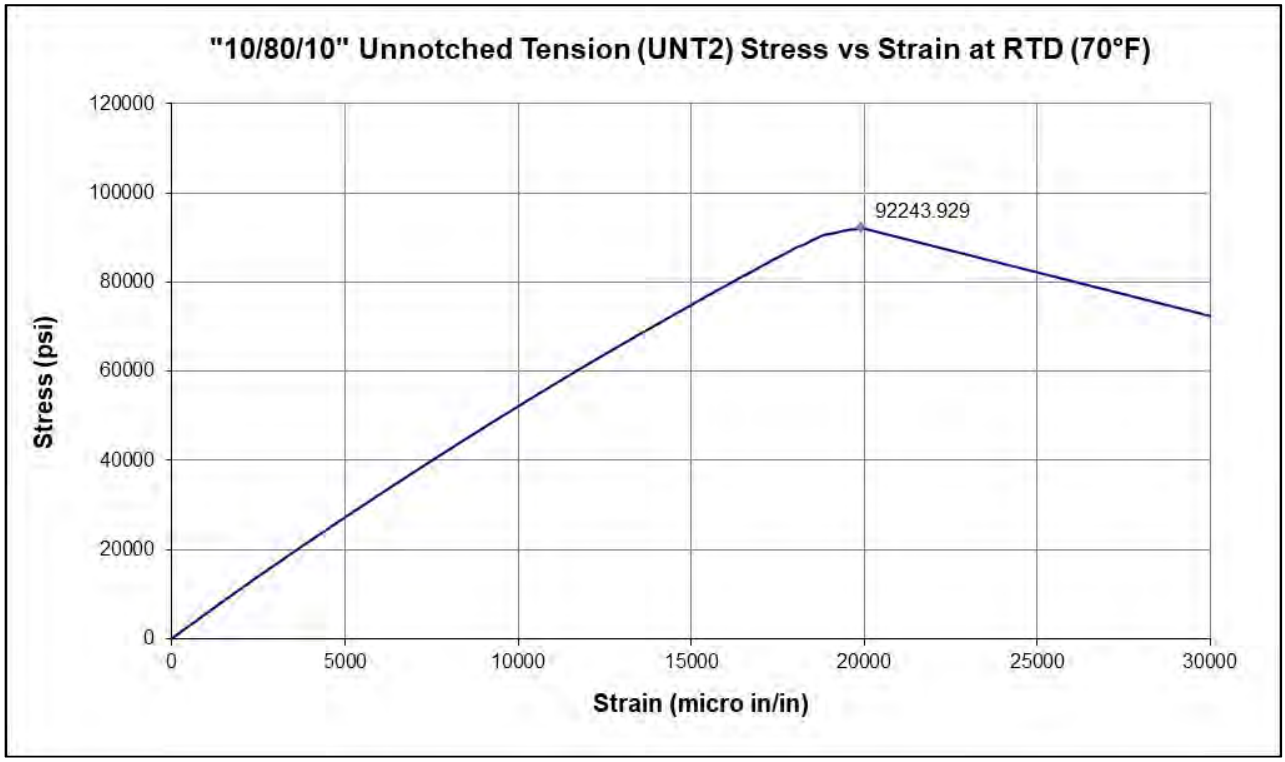


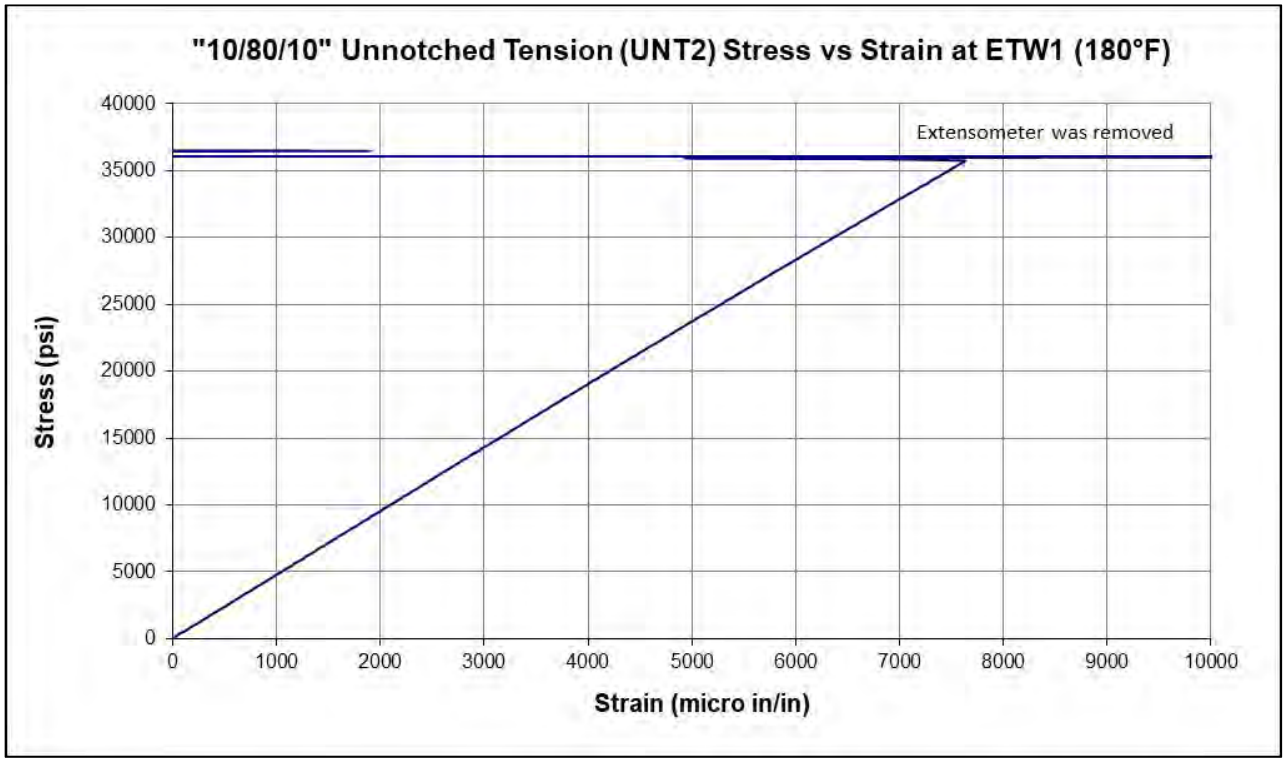

"25/50/25" Unnotched Tension (UNT1) Stress vs Strain at ETW1 (180°F)
Extensometer was removed
Stress (psi)
70000
60000
50000
40000
30000
20000
10000
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Strain (micro in/in)

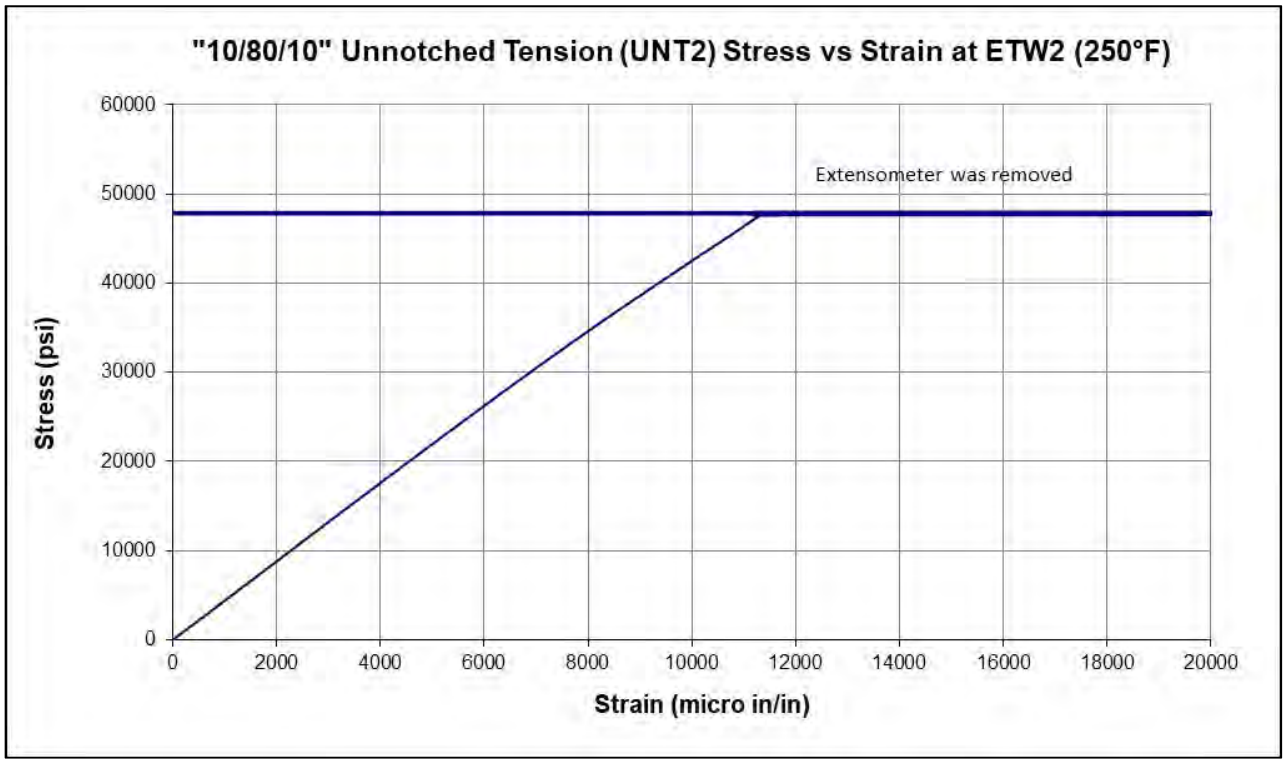

"25/50/25" Unnotched Tension (UNT1) Stress vs Strain at ETW2 (250°F)
Extensometer was removed
Stress (psi)
70000
60000
50000
40000
30000
20000
10000
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Strain (micro in/in)

6.7 “10/80/10” Unnotched Tension 2 (UNT2)

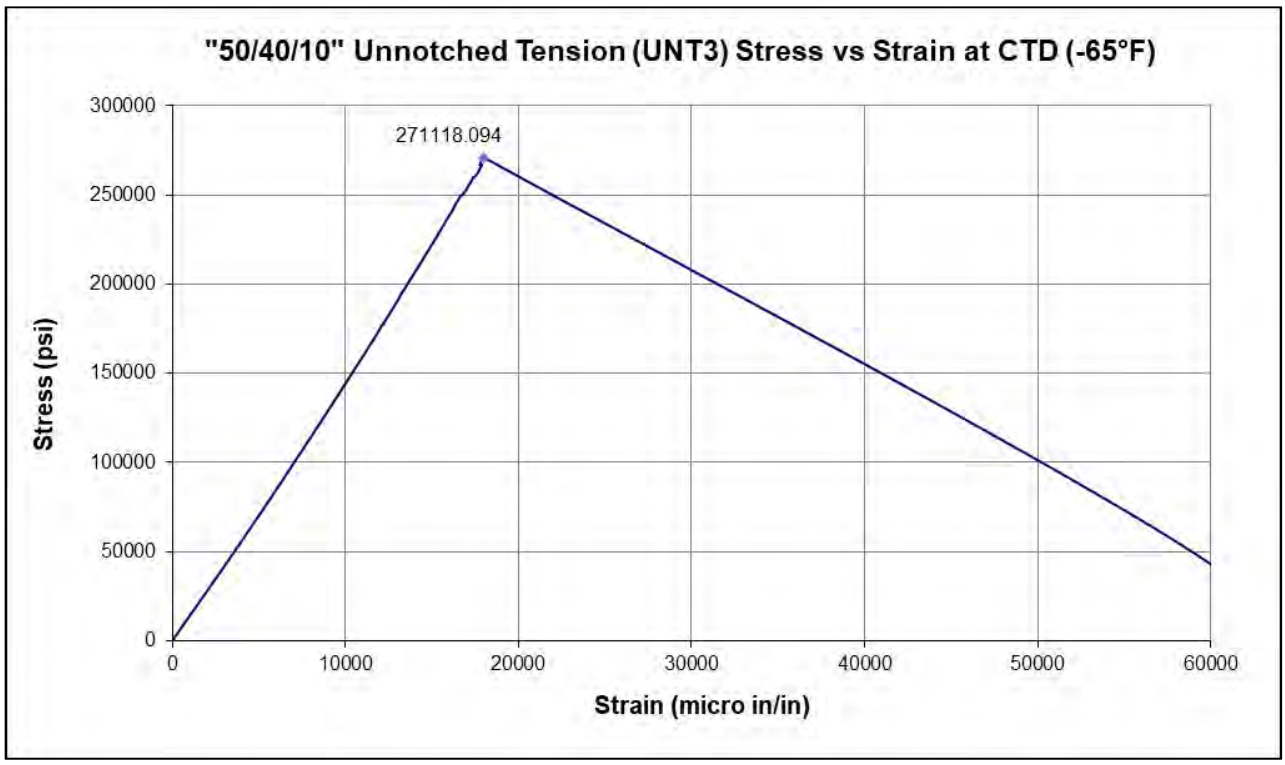


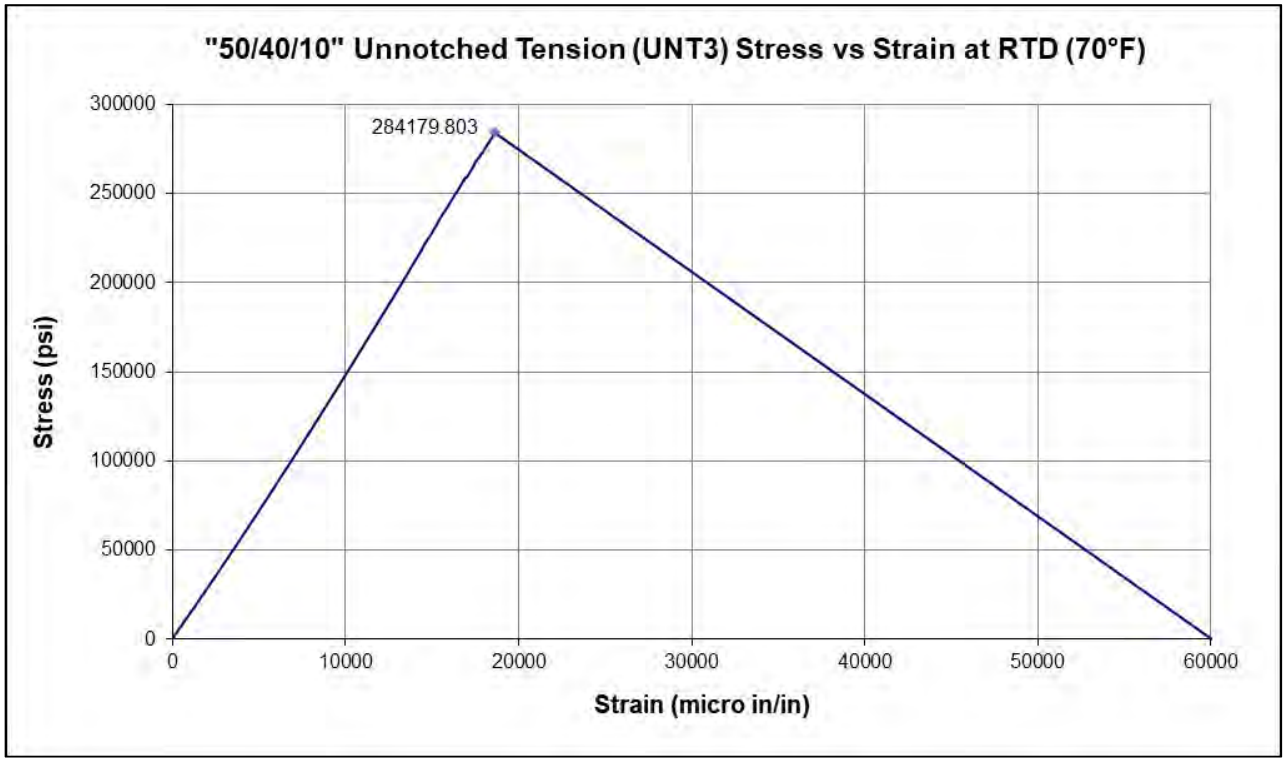


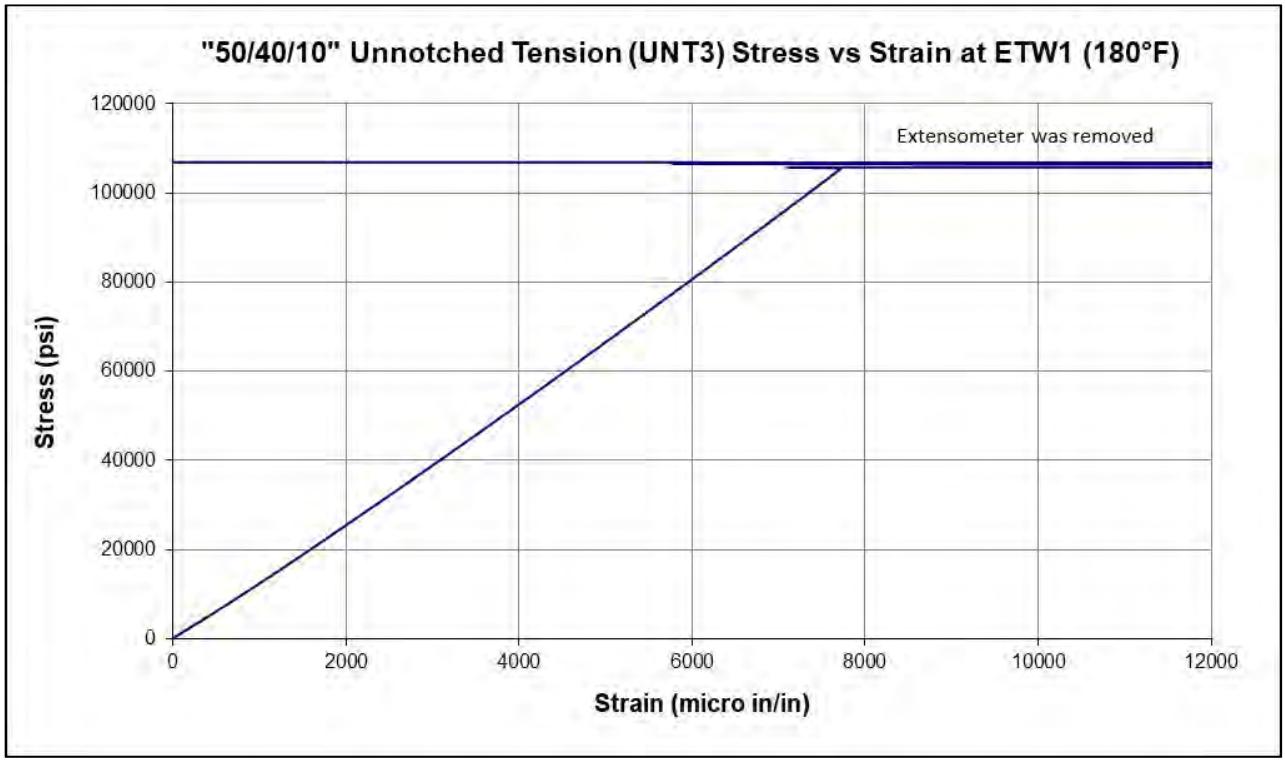

"10/80/10" Unnotched Tension (UNT2) Stress vs Strain at ETW1 (180°F)
Extensometer was removed
Stress (psi)
40000
35000
30000
25000
20000
15000
10000
5000
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Strain (micro in/in)

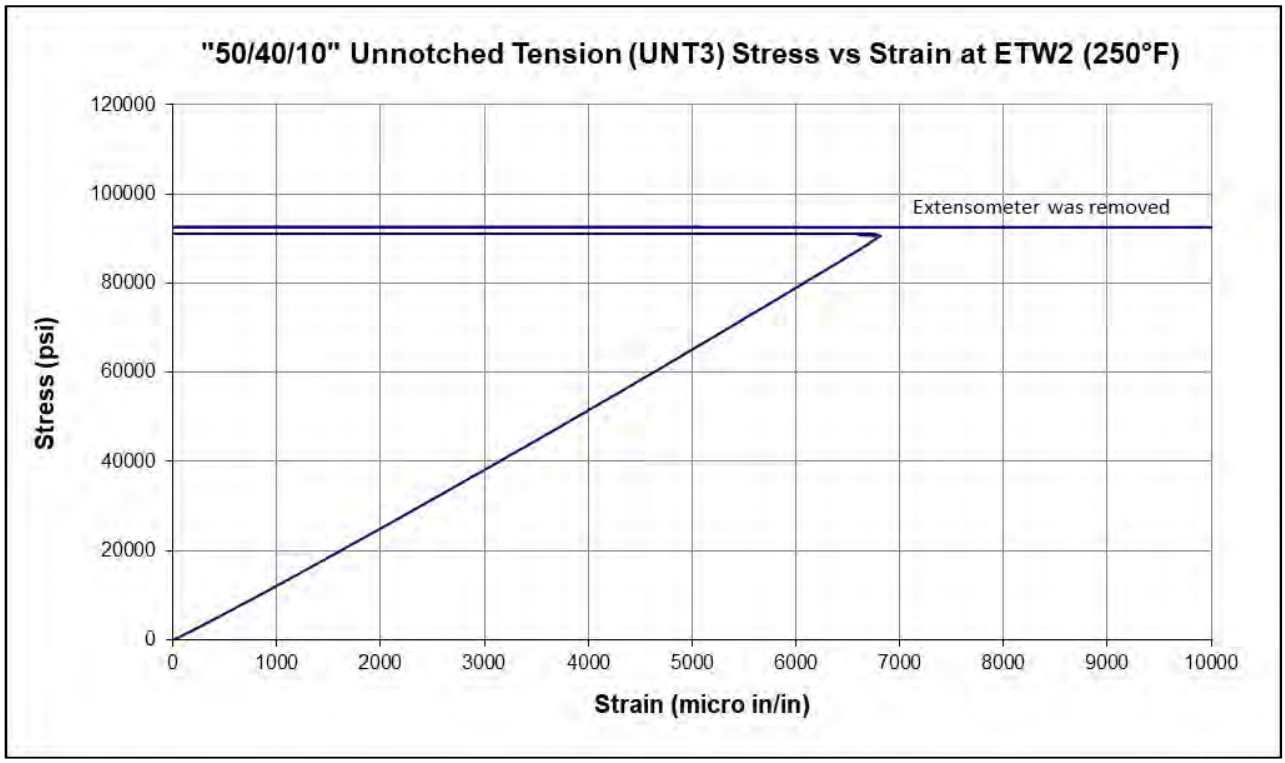

"10/80/10" Unnotched Tension (UNT2) Stress vs Strain at ETW2 (250°F)
Extensometer was removed
Stress (psi)
60000
50000
40000
30000
20000
10000
0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Strain (micro in/in)

6.8 “50/40/10” Unnotched Tension 3 (UNT3)

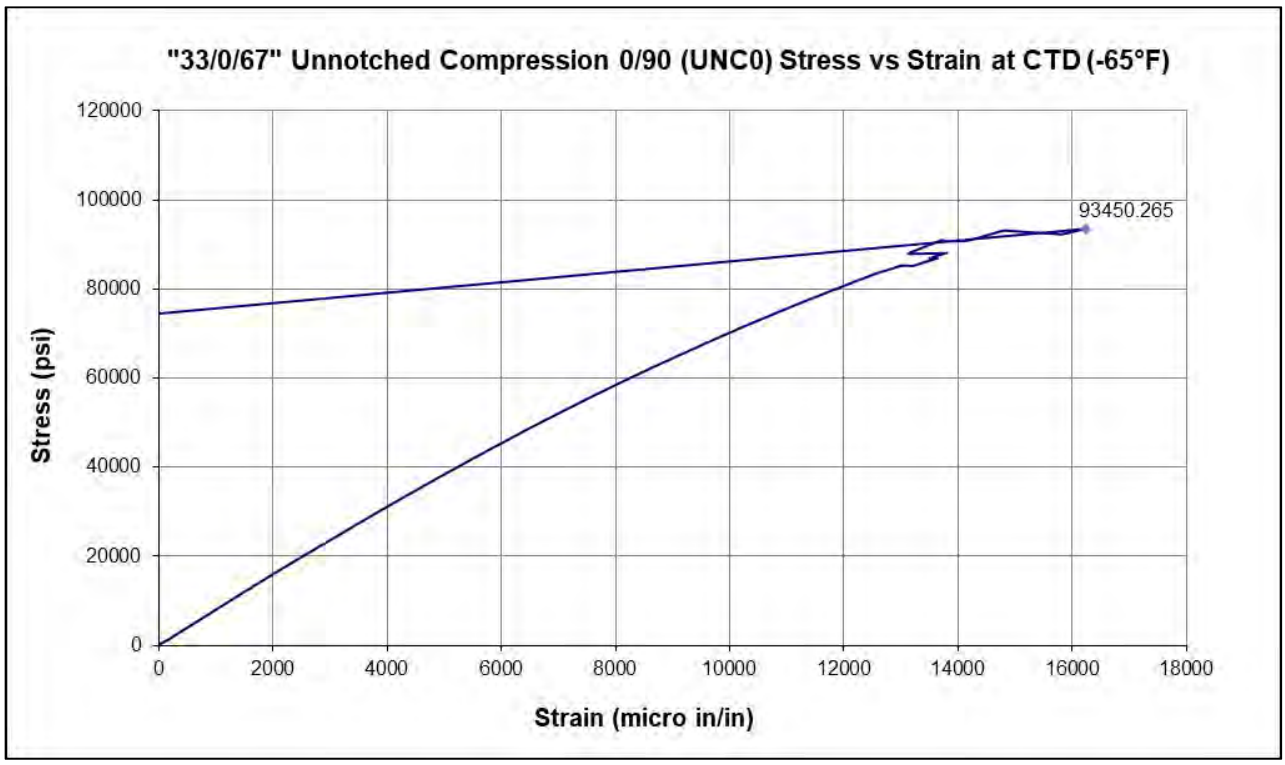


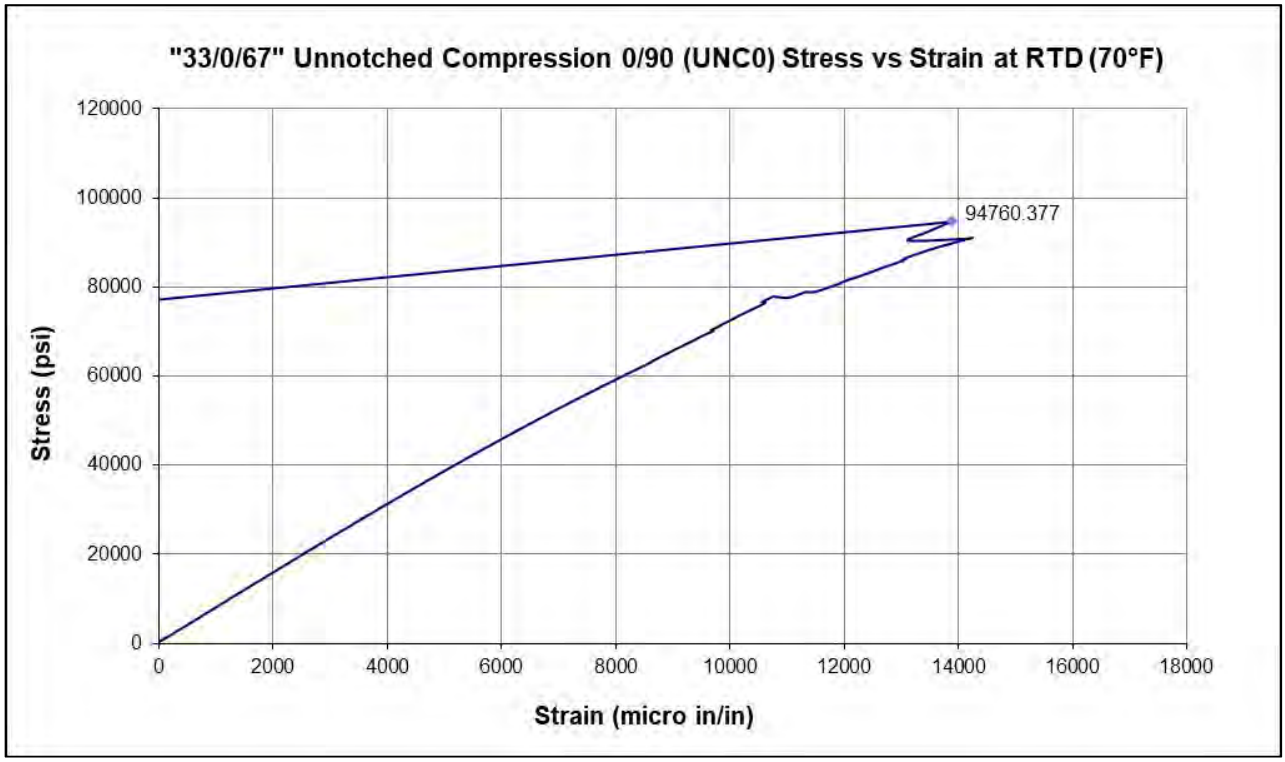


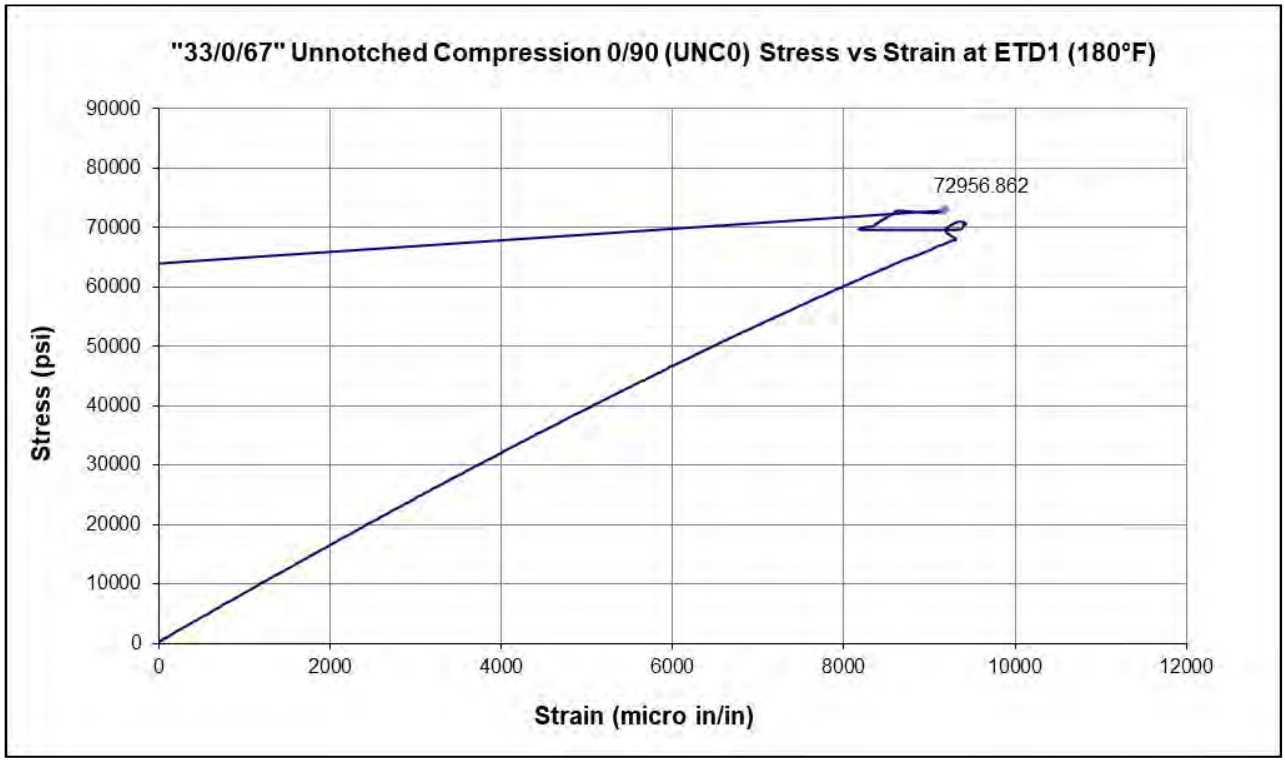

"50/40/10" Unnotched Tension (UNT3) Stress vs Strain at ETW1 (180°F)
Extensometer was removed
Stress (psi)
120000
100000
80000
60000
40000
20000
0
0
2000
4000
6000
8000
10000
12000
Strain (micro in/in)

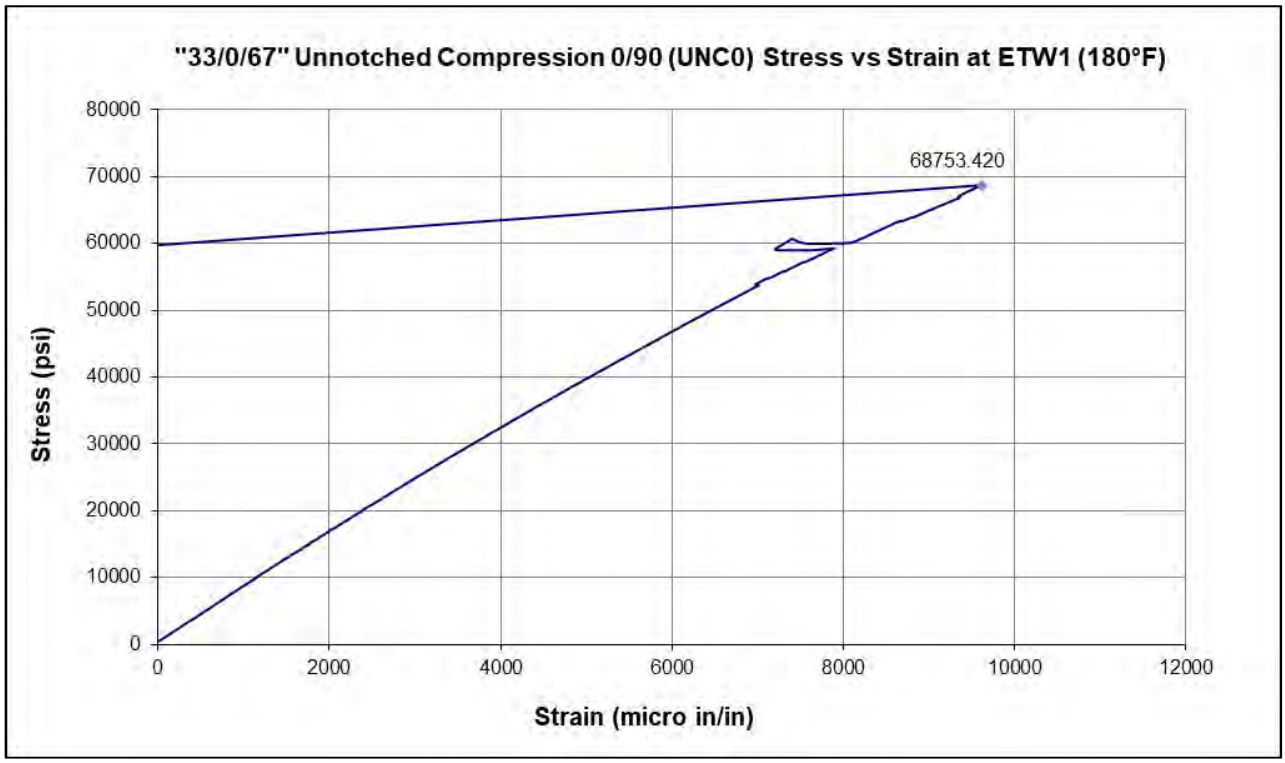

"50/40/10" Unnotched Tension (UNT3) Stress vs Strain at ETW2 (250°F)
Extensometer was removed
Stress (psi)
120000
100000
80000
60000
40000
20000
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Strain (micro in/in)

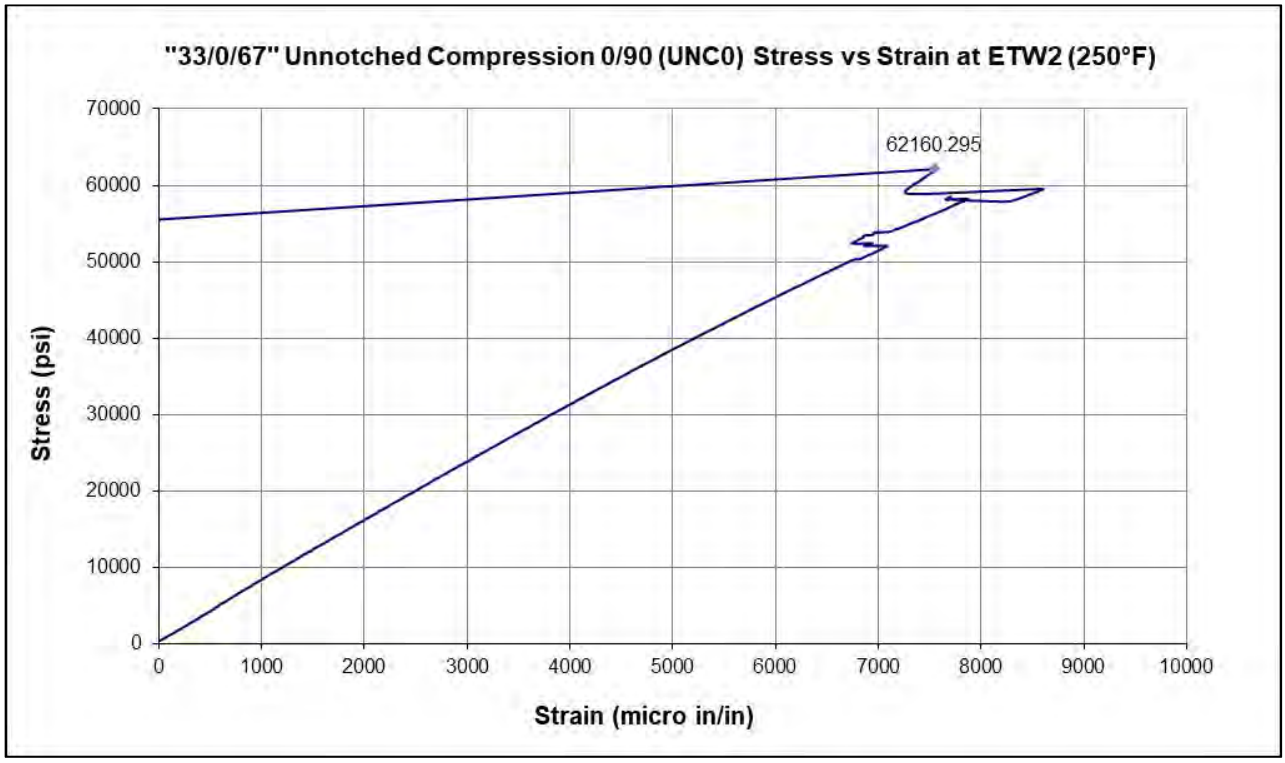
6.9 “33/0/67” Unnotched Compression 0/90 (UNC0)



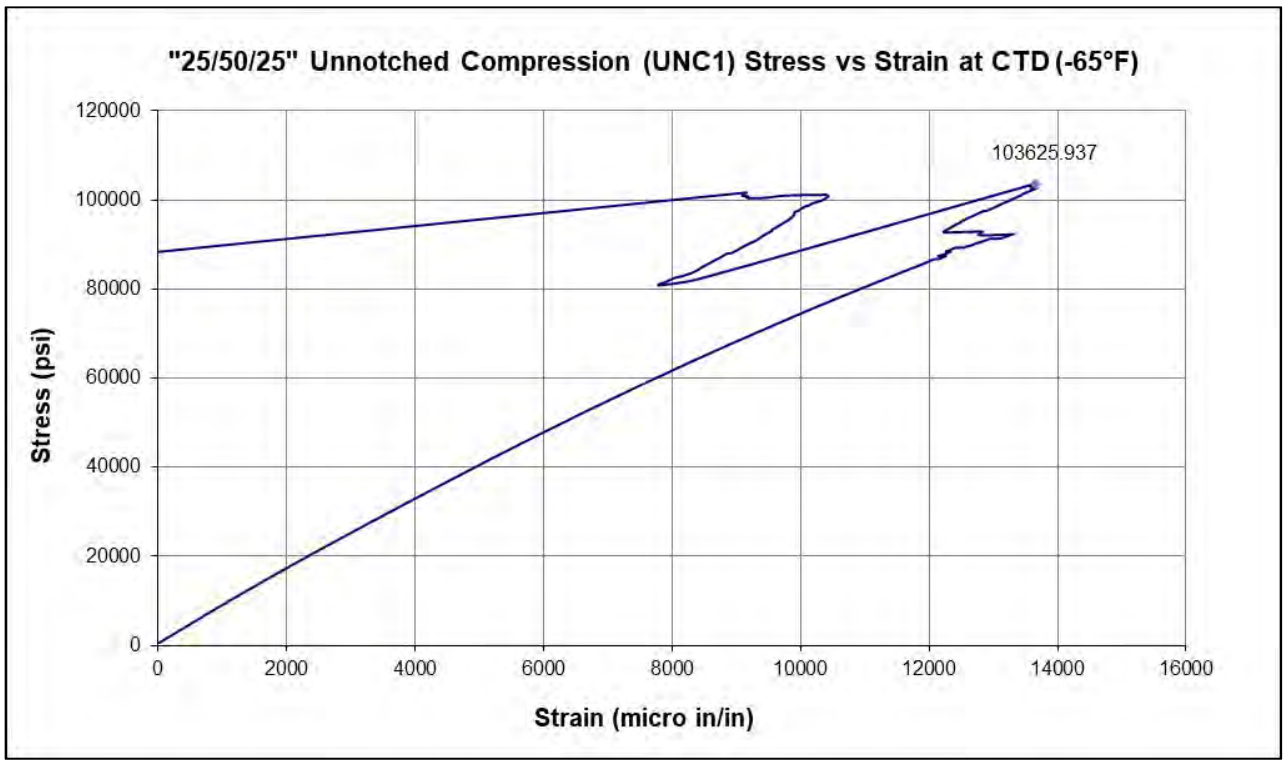


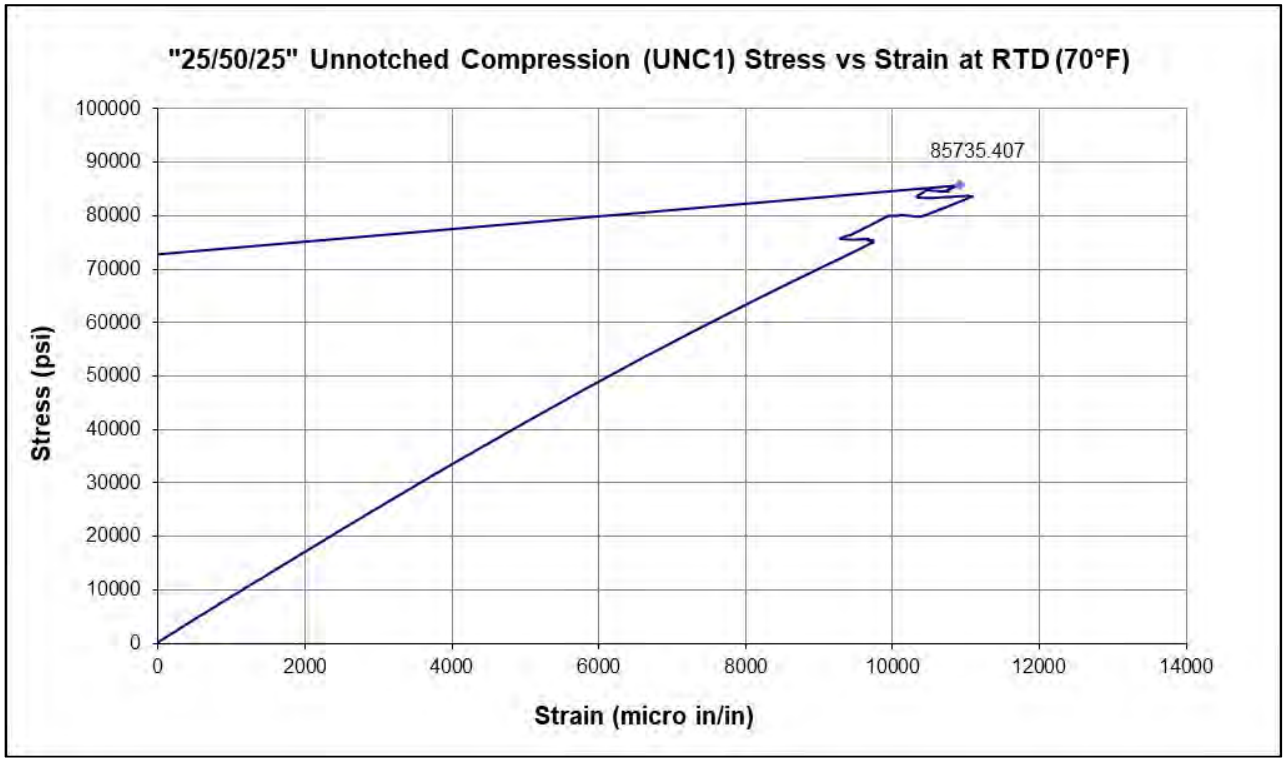

"33/0/67" Unnotched Compression 0/90 (UNC0) Stress vs Strain at ETD1 (180°F)
72956.862
Stress (psi)
Strain (micro in/in)
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
0
2000
4000
6000
8000
10000
12000

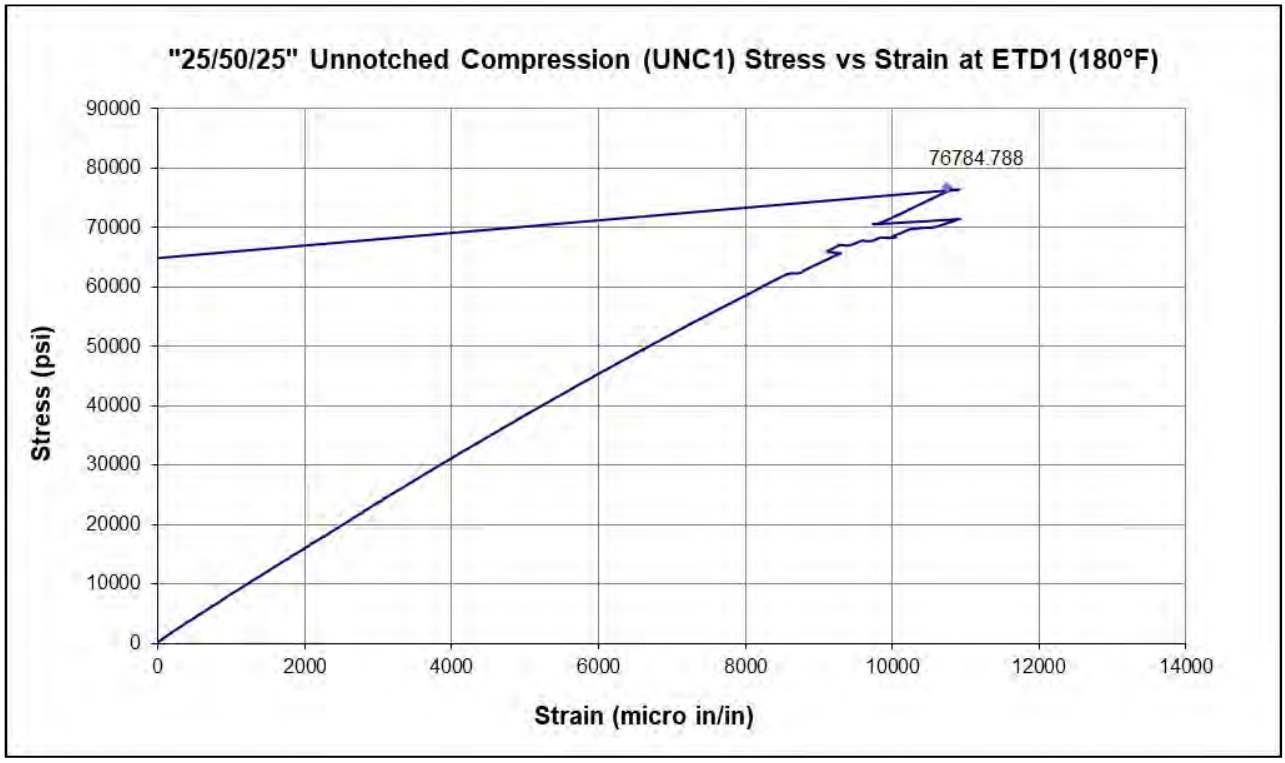

"33/0/67" Unnotched Compression 0/90 (UNC0) Stress vs Strain at ETW1 (180°F)
68753.420
Stress (psi)
Strain (micro in/in)
0
10000
20000
30000
40000
50000
60000
70000
80000
0
2000
4000
6000
8000
10000
12000

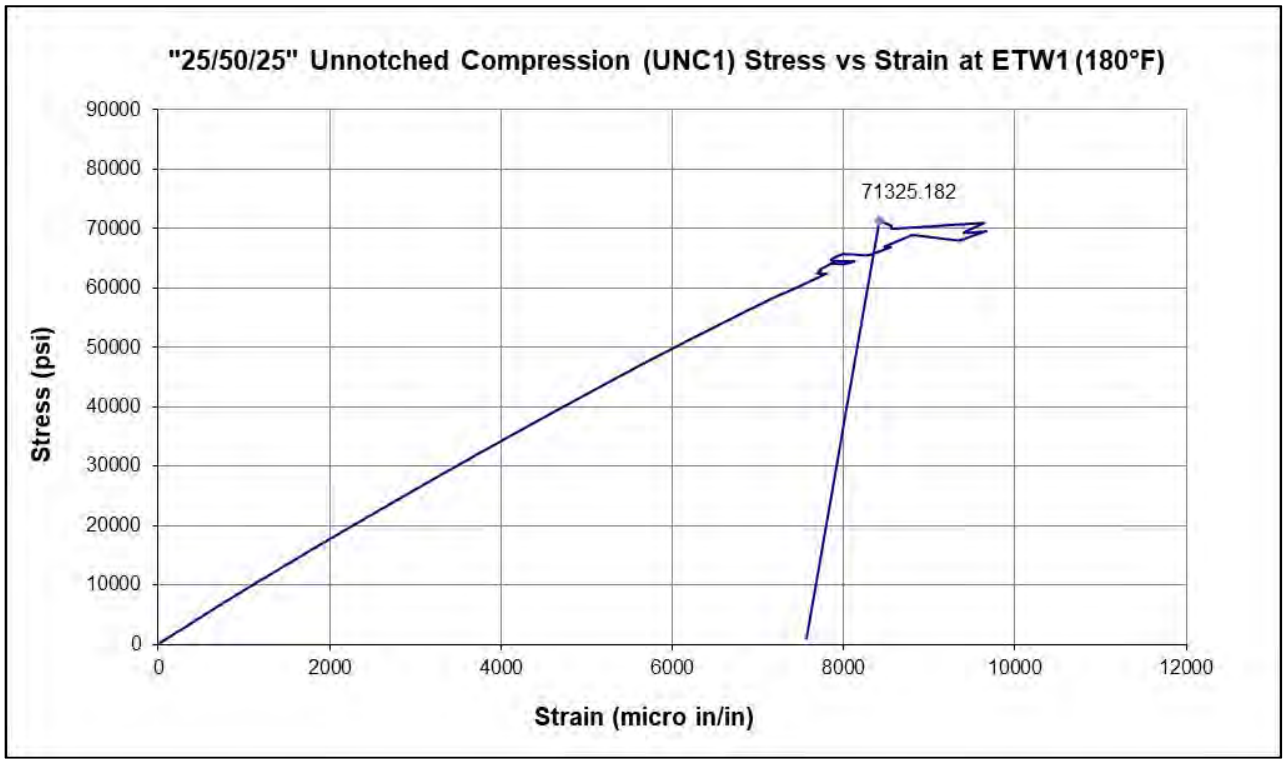

"33/0/67" Unnotched Compression 0/90 (UNC0) Stress vs Strain at ETW2 (250°F)
Stress (psi)
70000
60000
50000
40000
30000
20000
10000
0
62160.295
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Strain (micro in/in)

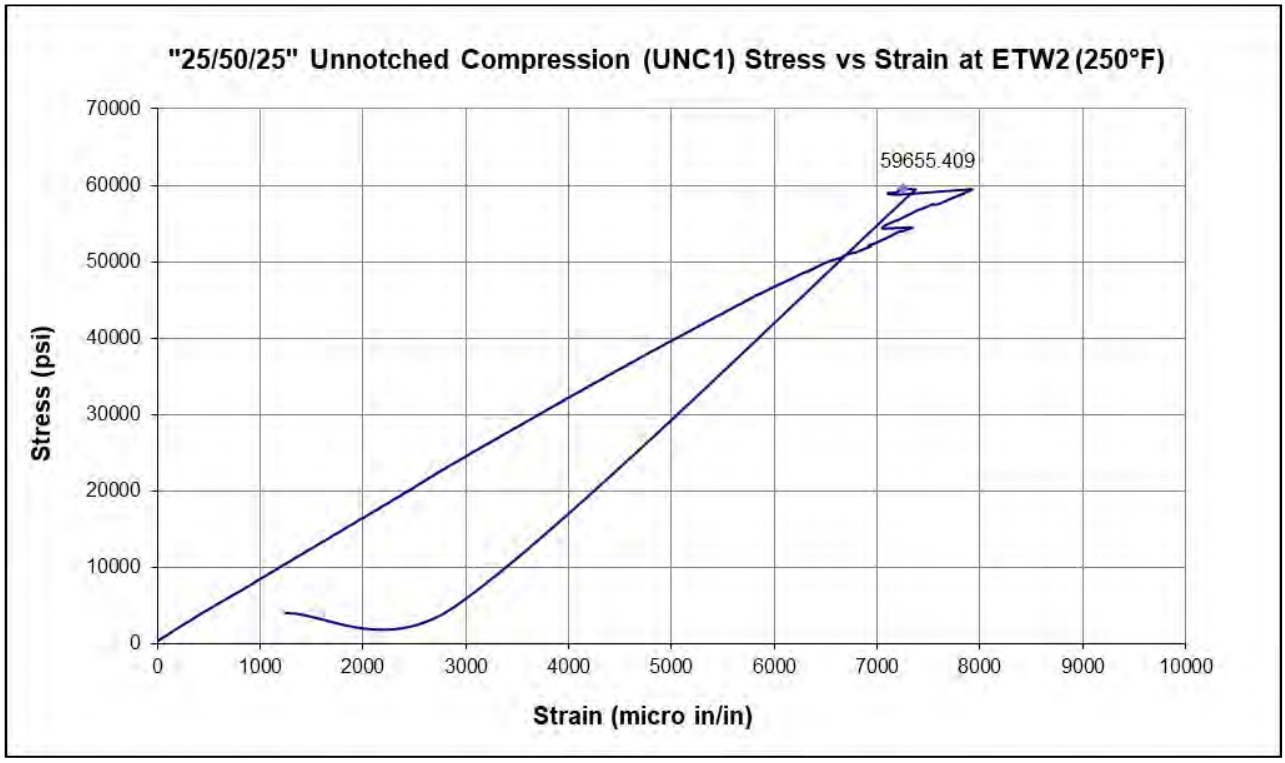
6.10 “25/50/25” Unnotched Compression 1 (UNC1)



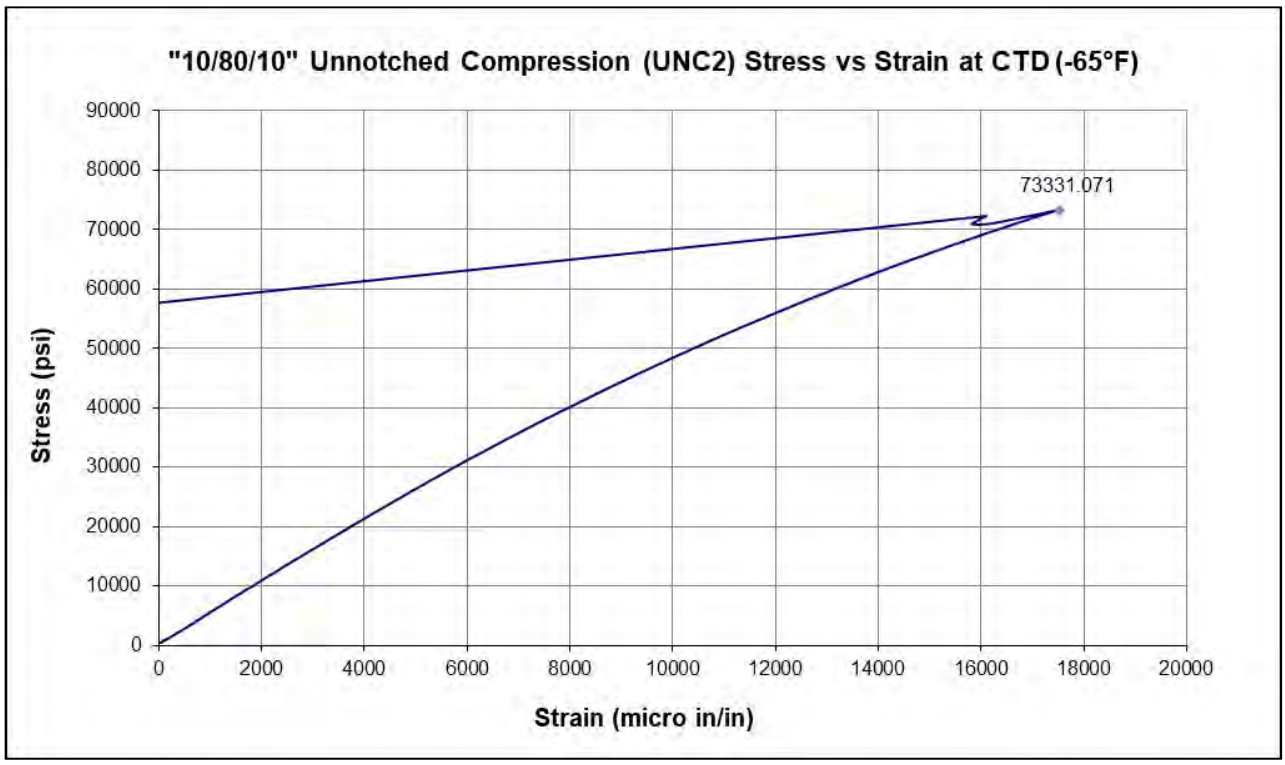


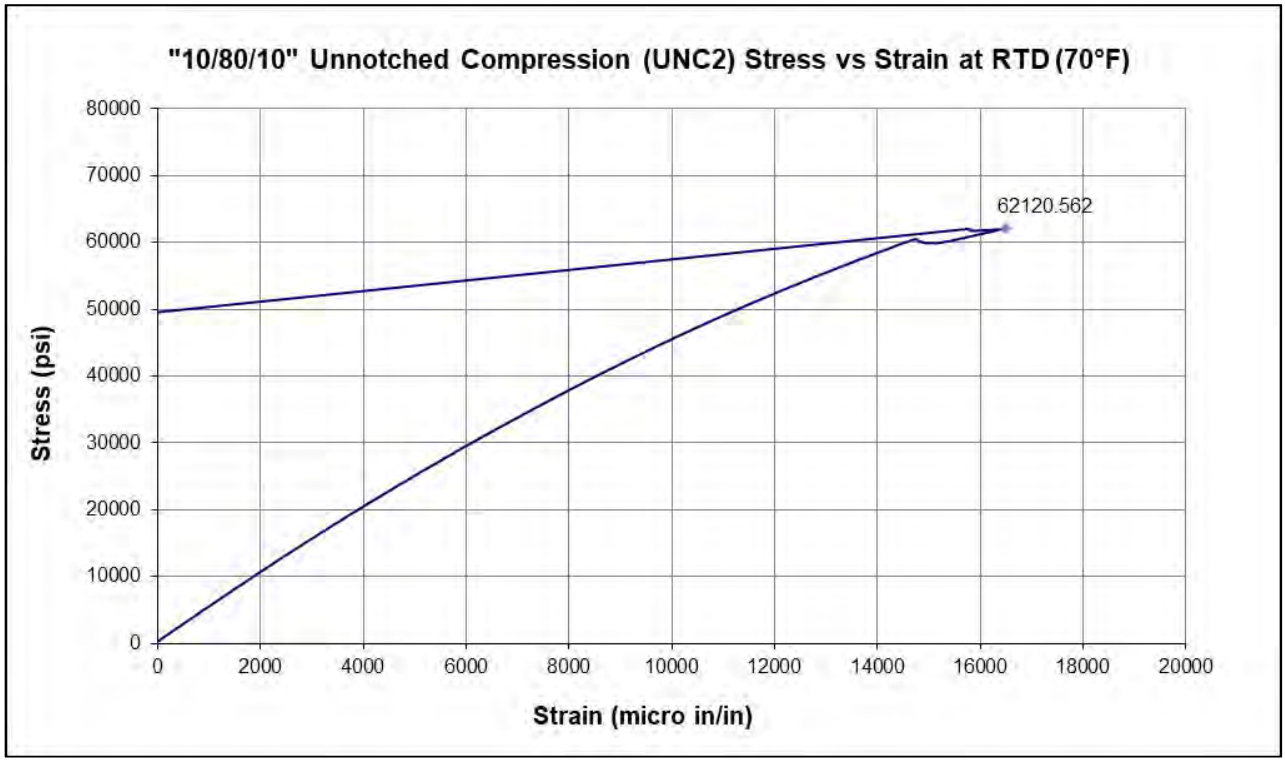

"25/50/25" Unnotched Compression (UNC1) Stress vs Strain at ETD1 (180°F)
Stress (psi)
Strain (micro in/in)
76784.788
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
0
2000
4000
6000
8000
10000
12000
14000

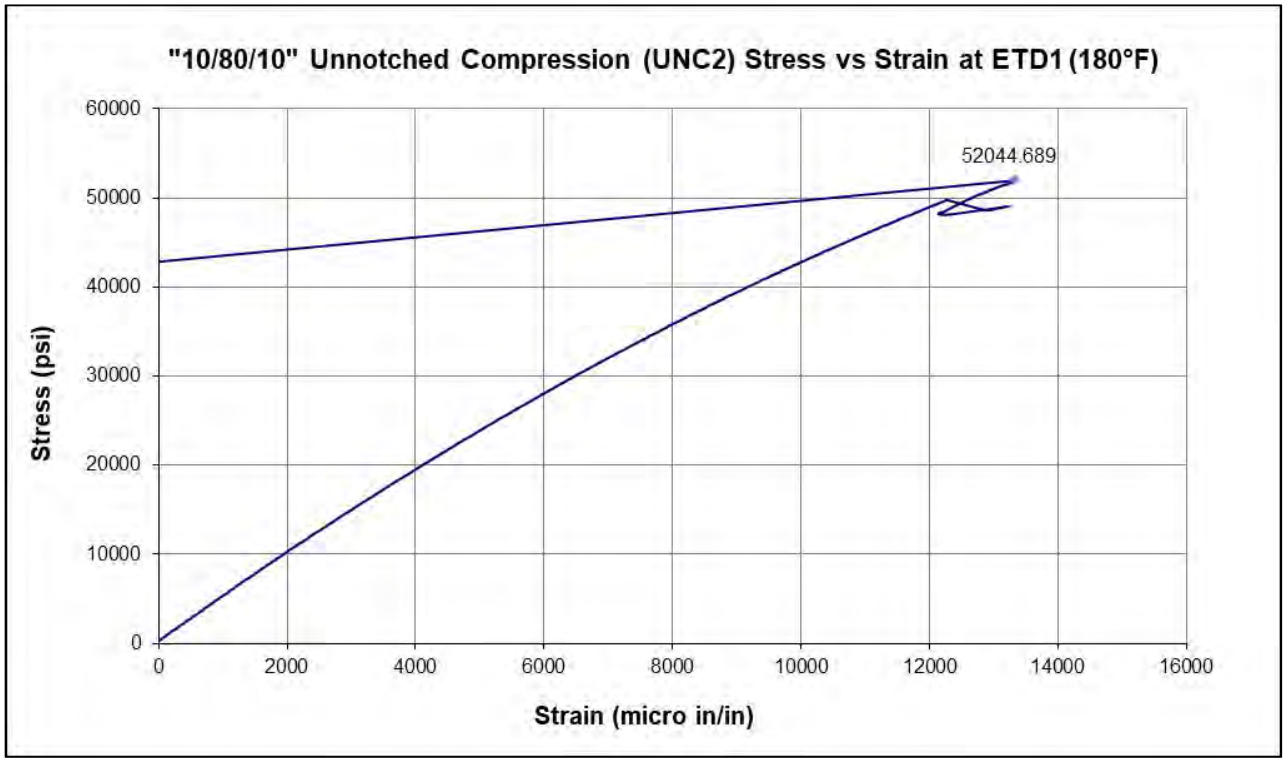

"25/50/25" Unnotched Compression (UNC1) Stress vs Strain at ETW1 (180°F)
Stress (psi)
Strain (micro in/in)
71325.182
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
0
2000
4000
6000
8000
10000
12000

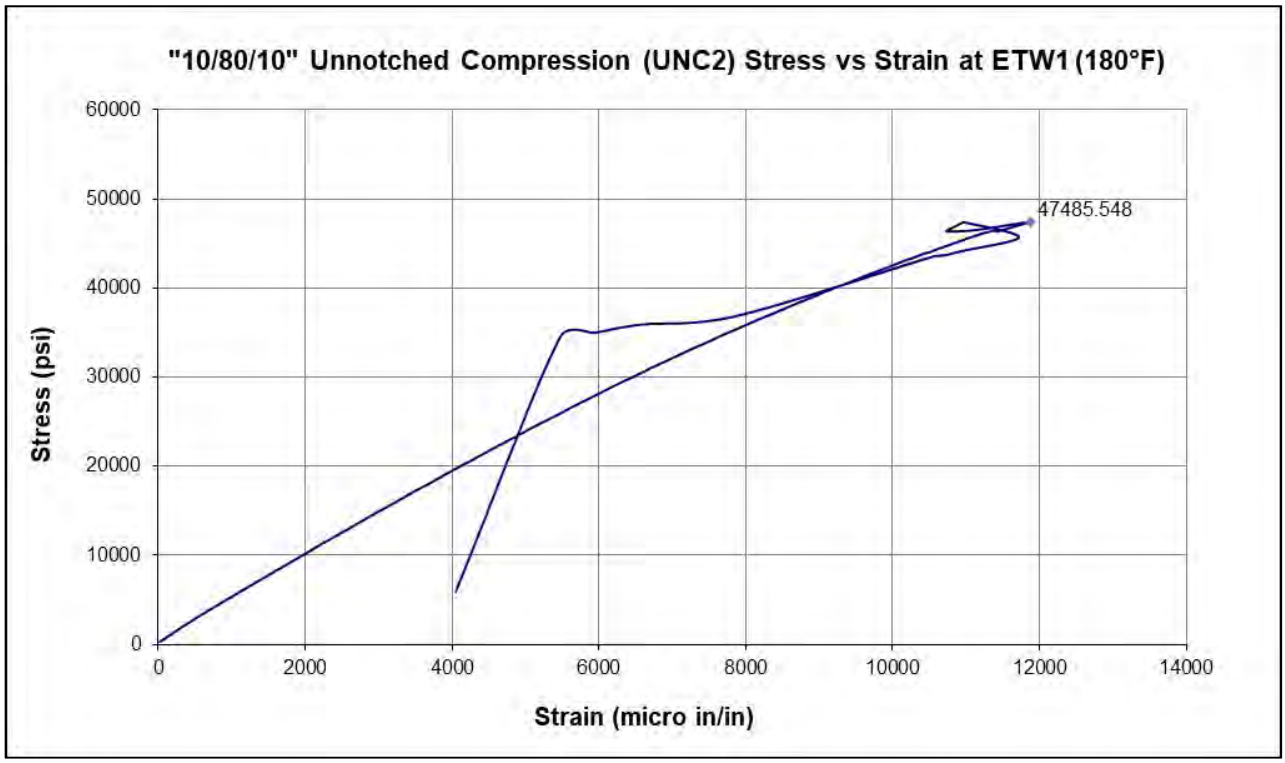

"25/50/25" Unnotched Compression (UNC1) Stress vs Strain at ETW2 (250°F)
59655.409
Stress (psi)
70000
60000
50000
40000
30000
20000
10000
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Strain (micro in/in)

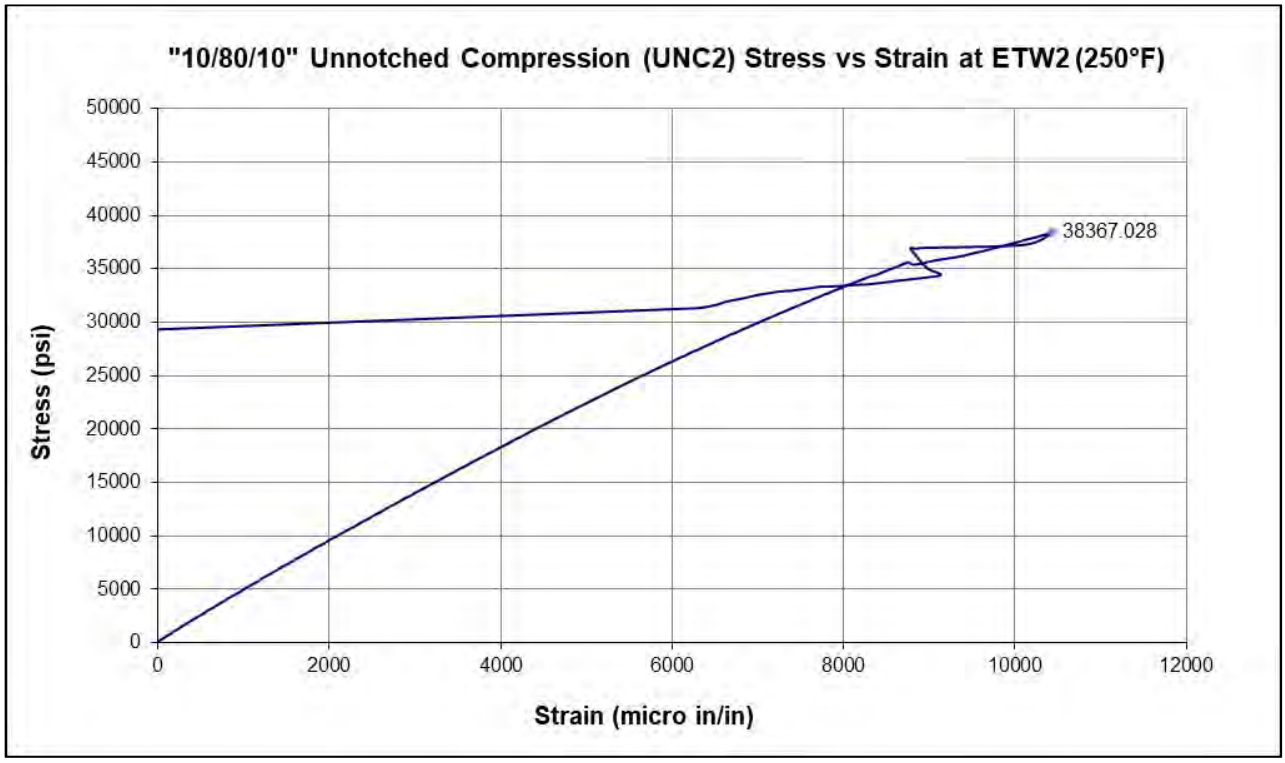
6.11 “10/80/10” Unnotched Compression 2 (UNC2)



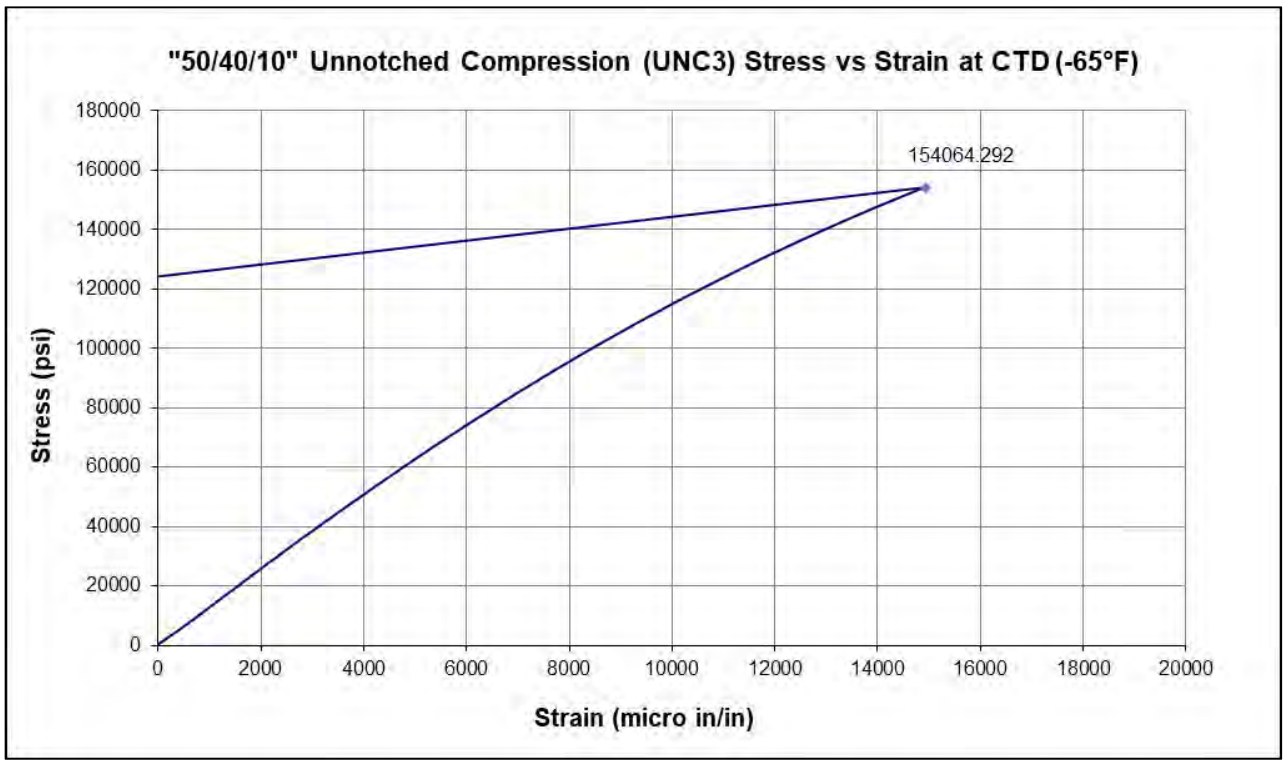


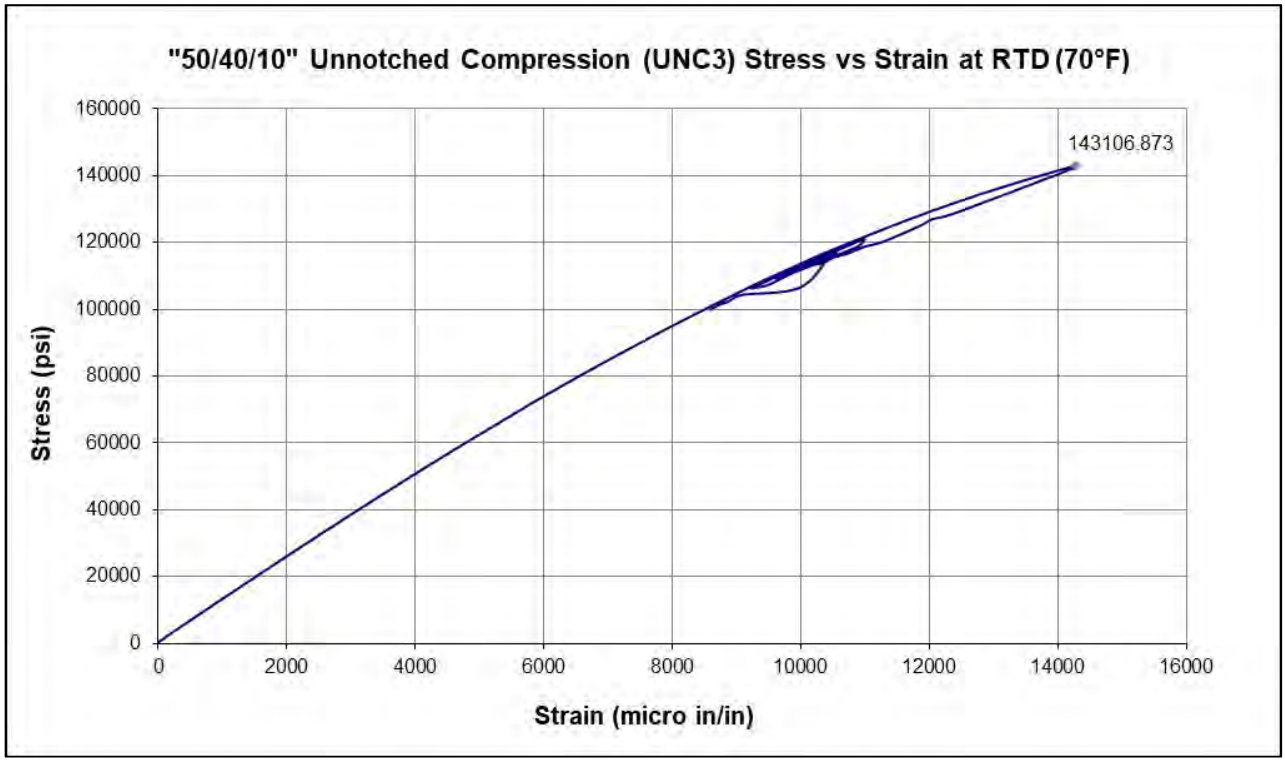

"10/80/10" Unnotched Compression (UNC2) Stress vs Strain at ETD1 (180°F)
Stress (psi)
Strain (micro in/in)
52044.689
60000
50000
40000
30000
20000
10000
0
0
2000
4000
6000
8000
10000
12000
14000
16000

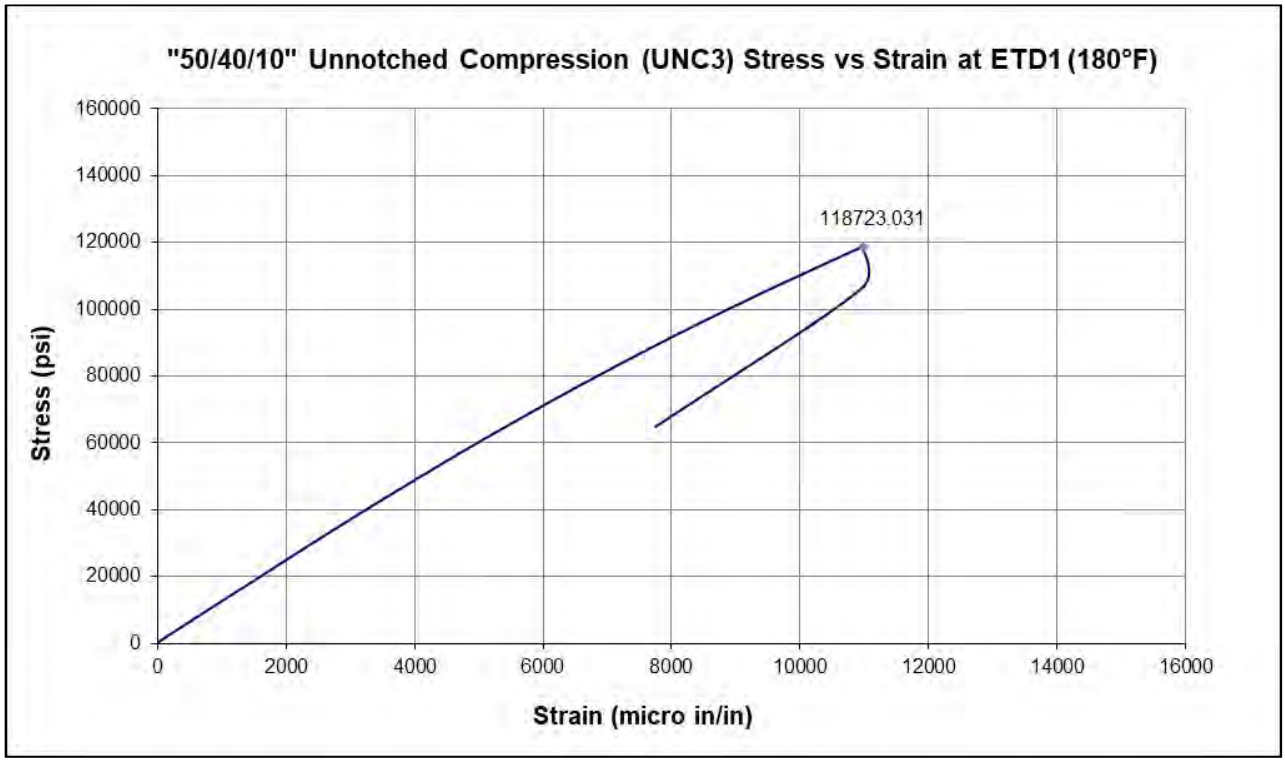

"10/80/10" Unnotched Compression (UNC2) Stress vs Strain at ETW1 (180°F)
Stress (psi)
Strain (micro in/in)
47485.548
60000
50000
40000
30000
20000
10000
0
0
2000
4000
6000
8000
10000
12000
14000

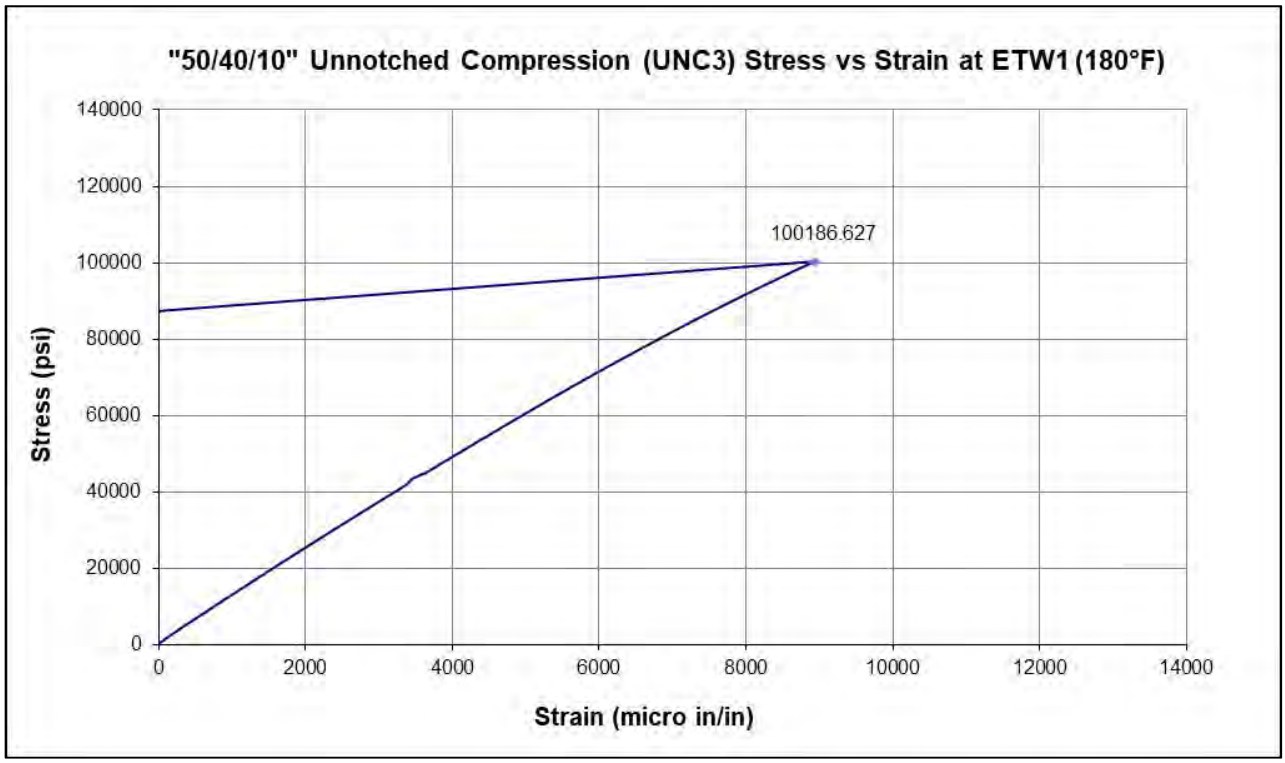

"10/80/10" Unnotched Compression (UNC2) Stress vs Strain at ETW2 (250°F)
Stress (psi)
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
0
2000
4000
6000
8000
10000
12000
Strain (micro in/in)
38367.028

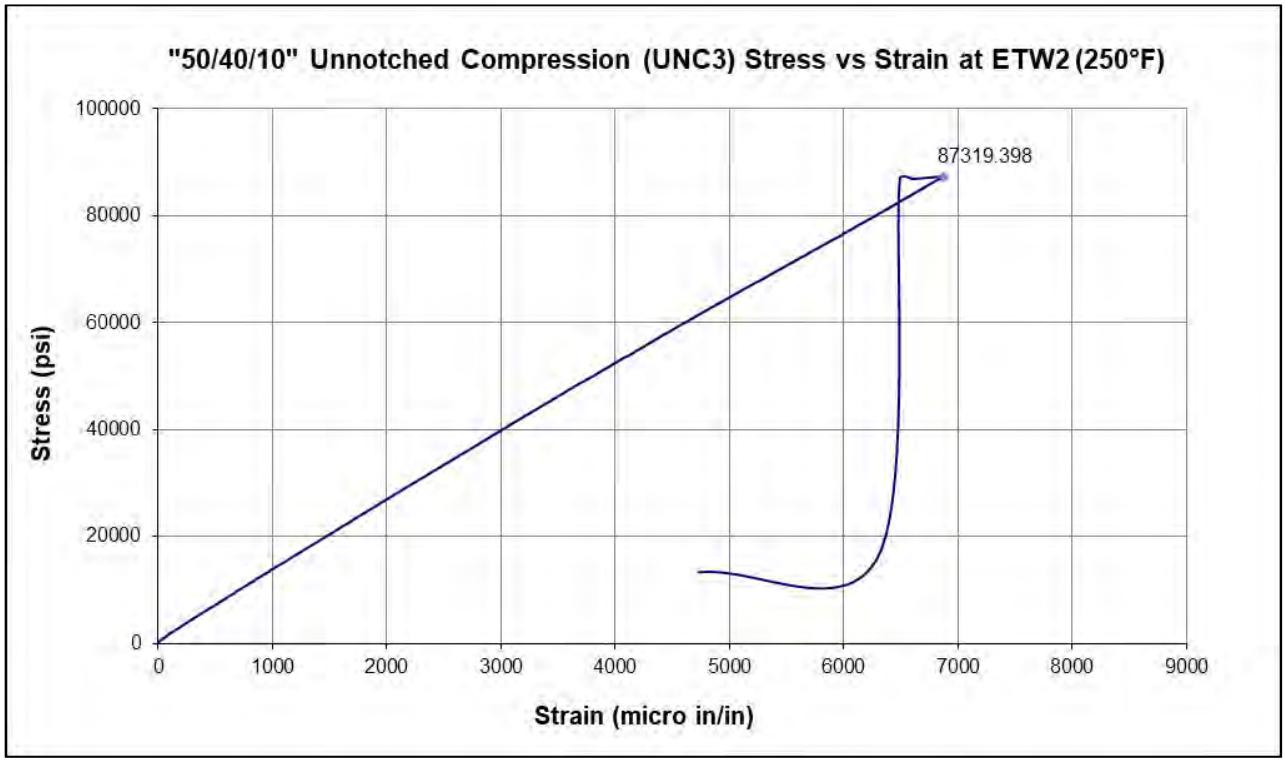
6.12 “50/40/10” Unnotched Compression 3 (UNC3)






"50/40/10" Unnotched Compression (UNC3) Stress vs Strain at ETD1 (180°F)
Stress (psi)
Strain (micro in/in)
118723.031
160000
140000
120000
100000
80000
60000
40000
20000
0
0
2000
4000
6000
8000
10000
12000
14000
16000


"50/40/10" Unnotched Compression (UNC3) Stress vs Strain at ETW1 (180°F)
Stress (psi)
Strain (micro in/in)
100186.627
140000
120000
100000
80000
60000
40000
20000
0
0
2000
4000
6000
8000
10000
12000
14000

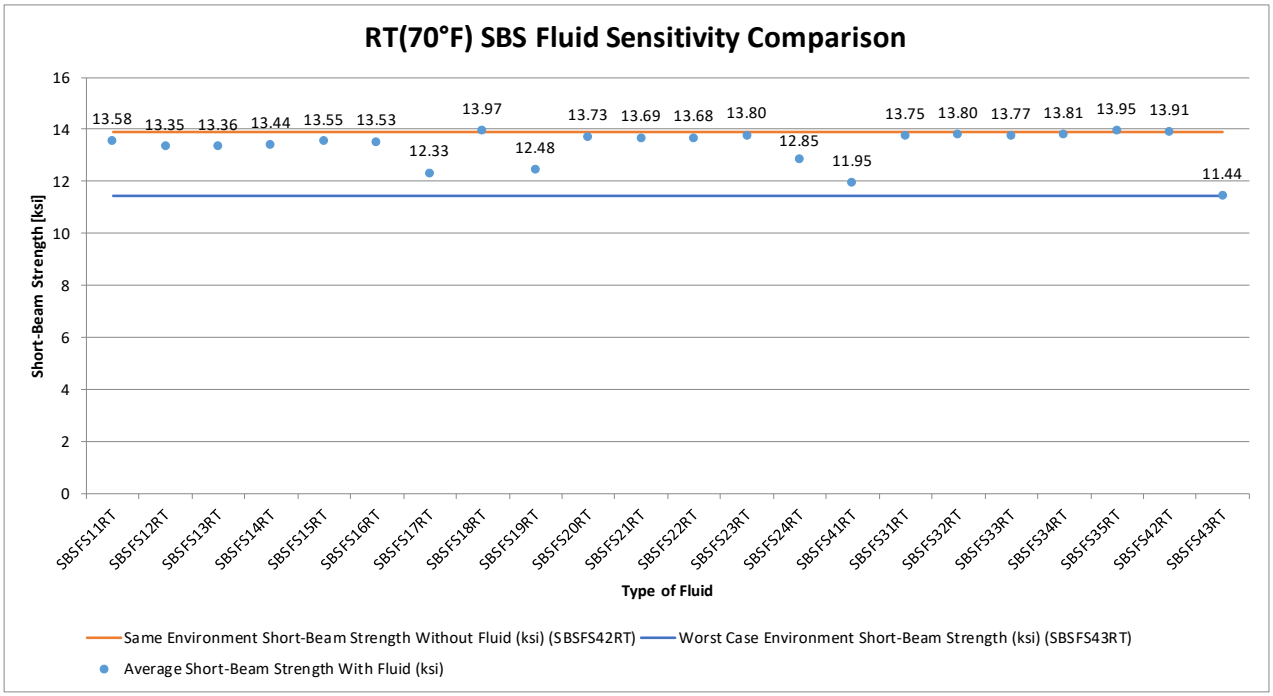

"50/40/10" Unnotched Compression (UNC3) Stress vs Strain at ETW2 (250°F)
Stress (psi)
100000
80000
60000
40000
20000
0
87319.398
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Strain (micro in/in)

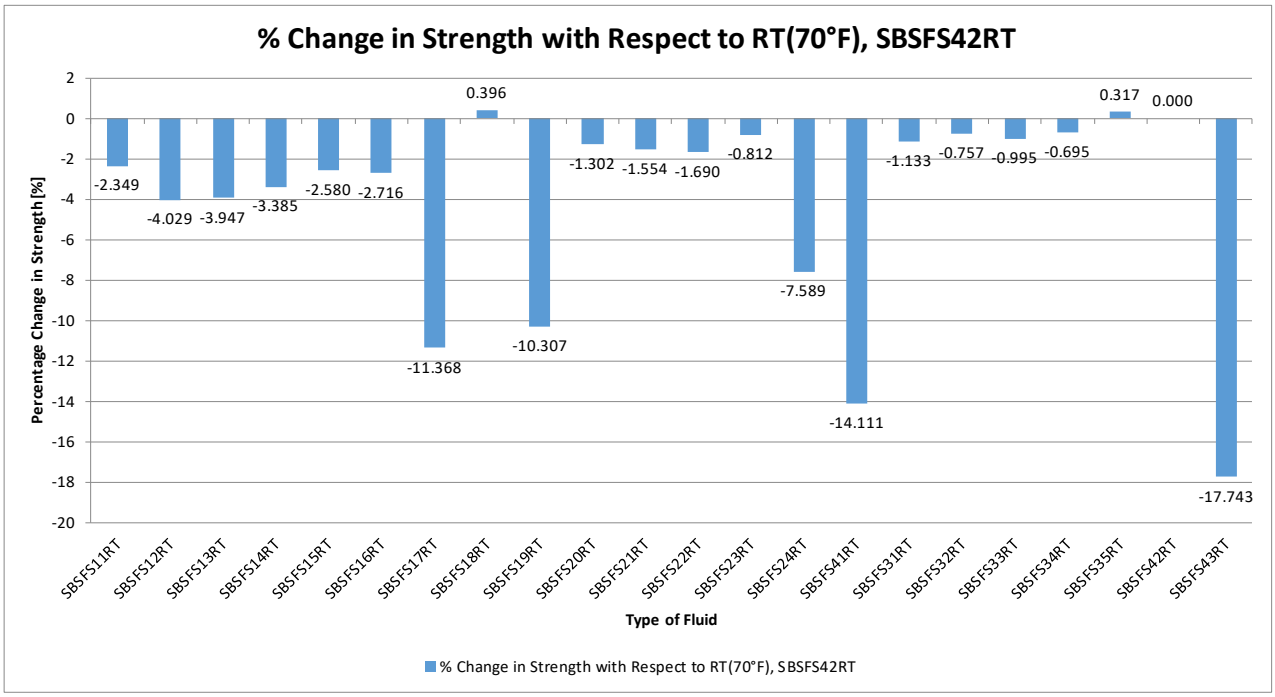
7. Fluid Sensitivity Comparison

7.1 Short Beam Strength Fluid Sensitivity (SBSFS)

7.1.1 SBSFS Room Temperature Test Data

Code	Type of Fluid	Exposure
SBSFS11RT	100 Low Lead Fuel	90 days min @ 70°F±10°F
SBSFS12RT	Jet A Fuel	
SBSFS13RT	MIL-PRF-5606 Hydraulic Oil	
SBSFS14RT	MIL-PRF-83282 Hydraulic Oil	
SBSFS15RT	MIL-PRF-7808 Engine Oil	
SBSFS16RT	MIL-PRF-23699 Engine Oil	
SBSFS17RT	Sea Water	
SBSFS18RT	Skydrol LD-4	
SBSFS19RT	50% Water with 50% Skydrol LD-4	
SBSFS20RT	MIL-PRF-87252 PAO Cooling Fluid	
SBSFS21RT	E85 Fuel (Alternate aircraft fuel)	
SBSFS22RT	SAE AMS 2629 Jet Reference Fluid	
SBSFS23RT	MIL-PRF-87257B Hydraulic Oil	
SBSFS24RT	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
SBSFS41RT	Distilled Water	
SBSFS31RT	MEK washing fluid	90 mins @ 70°F±10°F
SBSFS32RT	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
SBSFS33RT	De-icing Fluid SAE AMS 1428 (Type II)	
SBSFS34RT	De-icing Fluid SAE AMS 1428 (Type IV)	
SBSFS35RT	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
SBSFS42RT	Dry	Per section 6.1 Test Plan NTP 3800Q1
SBSFS43RT	85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1


RT(70°F) SBS Fluid Sensitivity Comparison
Short-Beam Strength [ksi]
16
14
12
10
8
6
4
2
0
13.58
13.35
13.36
13.44
13.55
13.53
12.33
13.97
12.48
13.73
13.69
13.68
13.80
12.85
11.95
13.75
13.80
13.77
13.81
13.95
13.91
11.44
SBSFS11RT
SBSFS12RT
SBSFS13RT
SBSFS14RT
SBSFS15RT
SBSFS16RT
SBSFS17RT
SBSFS18RT
SBSFS19RT
SBSFS20RT
SBSFS21RT
SBSFS22RT
SBSFS23RT
SBSFS24RT
SBSFS41RT
SBSFS31RT
SBSFS32RT
SBSFS33RT
SBSFS34RT
SBSFS35RT
SBSFS42RT
SBSFS43RT
Type of Fluid
Same Environment Short-Beam Strength Without Fluid (ksi) (SBSFS42RT)
Worst Case Environment Short-Beam Strength (ksi) (SBSFS43RT)
Average Short-Beam Strength With Fluid (ksi)


% Change in Strength with Respect to RT(70°F), SBSFS42RT
Percentage Change in Strength [%]
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-2.349
-4.029
-3.947
-3.385
-2.580
-2.716
-11.368
0.396
-10.307
-1.302
-1.554
-1.690
-0.812
-7.589
-14.111
-1.133
-0.757
-0.995
-0.695
0.317
0.000
-17.743
SBSFS11RT
SBSFS12RT
SBSFS13RT
SBSFS14RT
SBSFS15RT
SBSFS16RT
SBSFS17RT
SBSFS18RT
SBSFS19RT
SBSFS20RT
SBSFS21RT
SBSFS22RT
SBSFS23RT
SBSFS24RT
SBSFS41RT
SBSFS31RT
SBSFS32RT
SBSFS33RT
SBSFS34RT
SBSFS35RT
SBSFS42RT
SBSFS43RT
Type of Fluid
% Change in Strength with Respect to RT(70°F), SBSFS42RT

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

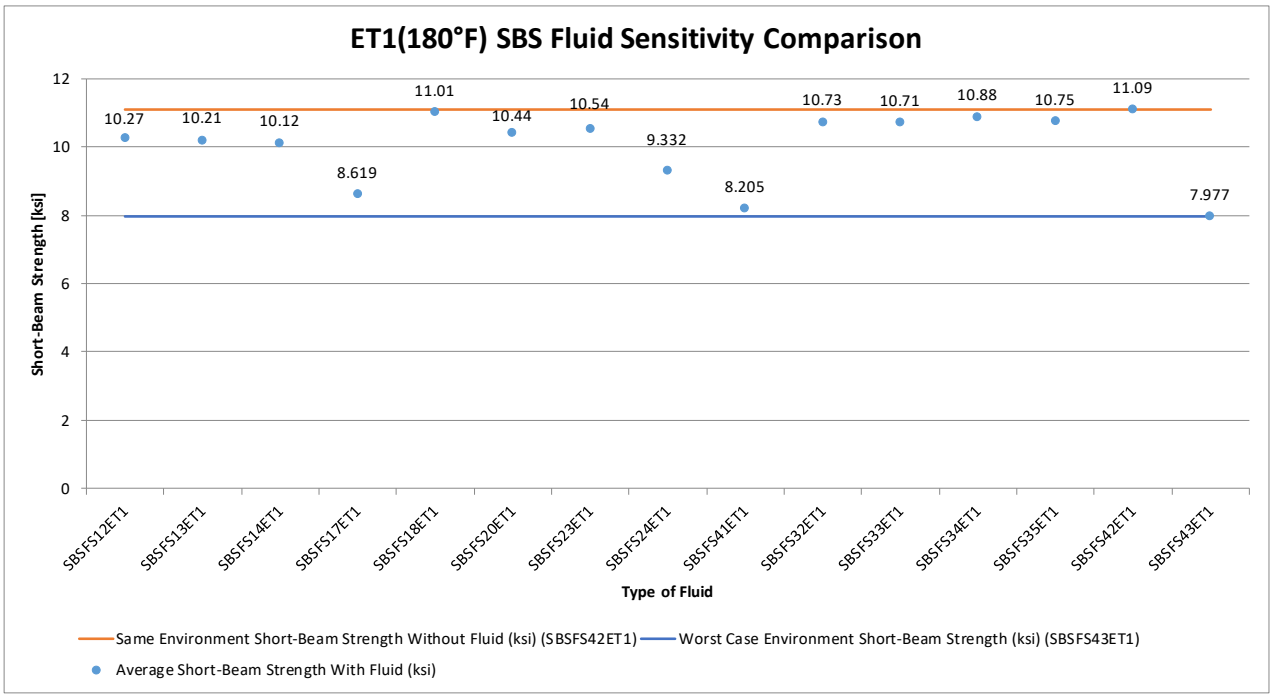
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Average Strength [ksi]	Failure Mode
	TCDQA111FS11RT	A	C1	1	1	13.52	0.1525	32	0.004765		ILS, INELASTIC DEFORMATION
	TCDQA112FS11RT	A	C1	1	1	13.67	0.1525	32	0.004766		ILS, INELASTIC DEFORMATION
SBSFS11RT	TCDQA113FS11RT	A	C1	1	1	13.62	0.1537	32	0.004802	13.58	ILS, INELASTIC DEFORMATION
	TCDQA114FS11RT	A	C1	1	1	13.49	0.1540	32	0.004814		ILS, INELASTIC DEFORMATION
	TCDQA115FS11RT	A	C1	1	1	13.63	0.1536	32	0.004800		ILS, INELASTIC DEFORMATION
	TCDQA112FS12RT	A	C1	1	1	13.76	0.1494	32	0.004670		ILS, INELASTIC DEFORMATION
	TCDQA113FS12RT	A	C1	1	1	13.16	0.1532	32	0.004786		ILS, INELASTIC DEFORMATION
SBSFS12RT	TCDQA114FS12RT	A	C1	1	1	13.25	0.1539	32	0.004809	13.35	ILS, INELASTIC DEFORMATION
	TCDQA115FS12RT	A	C1	1	1	13.40	0.1519	32	0.004746		ILS, INELASTIC DEFORMATION
	TCDQA116FS12RT	A	C1	1	1	13.19	0.1530	32	0.004782		ILS, INELASTIC DEFORMATION
	TCDQA111FS13RT	A	C1	1	1	13.36	0.1542	32	0.004819		ILS, INELASTIC DEFORMATION
	TCDQA112FS13RT	A	C1	1	1	13.36	0.1523	32	0.004758		ILS, INELASTIC DEFORMATION
SBSFS13RT	TCDQA113FS13RT	A	C1	1	1	13.32	0.1541	32	0.004815	13.36	ILS, INELASTIC DEFORMATION
	TCDQA114FS13RT	A	C1	1	1	13.31	0.1543	32	0.004823		ILS, INELASTIC DEFORMATION
	TCDQA115FS13RT	A	C1	1	1	13.45	0.1549	32	0.004841		ILS, INELASTIC DEFORMATION
	TCDQA111FS14RT	A	C1	1	1	13.73	0.1584	32	0.004948		ILS, INELASTIC DEFORMATION
	TCDQA113FS14RT	A	C1	1	1	13.31	0.1546	32	0.004831		ILS, INELASTIC DEFORMATION
SBSFS14RT	TCDQA114FS14RT	A	C1	1	1	13.13	0.1550	32	0.004844	13.44	ILS, INELASTIC DEFORMATION
	TCDQA115FS14RT	A	C1	1	1	13.36	0.1547	32	0.004834		ILS, INELASTIC DEFORMATION
	TCDQA116FS14RT	A	C1	1	1	13.65	0.1572	32	0.004914		ILS, INELASTIC DEFORMATION
	TCDQA111FS15RT	A	C1	1	1	13.68	0.1562	32	0.004882		ILS, INELASTIC DEFORMATION
	TCDQA112FS15RT	A	C1	1	1	13.56	0.1590	32	0.004968		ILS, INELASTIC DEFORMATION
SBSFS15RT	TCDQA113FS15RT	A	C1	1	1	13.34	0.1584	32	0.004950	13.55	ILS, INELASTIC DEFORMATION
	TCDQA114FS15RT	A	C1	1	1	13.49	0.1566	32	0.004894		ILS, INELASTIC DEFORMATION
	TCDQA115FS15RT	A	C1	1	1	13.69	0.1574	32	0.004919		ILS, INELASTIC DEFORMATION
	TCDQA111FS16RT	A	C1	1	1	13.68	0.1580	32	0.004936		ILS, INELASTIC DEFORMATION
	TCDQA112FS16RT	A	C1	1	1	13.54	0.1566	32	0.004895		ILS, INELASTIC DEFORMATION
SBSFS16RT	TCDQA113FS16RT	A	C1	1	1	13.53	0.1572	32	0.004911	13.53	ILS, INELASTIC DEFORMATION
	TCDQA114FS16RT	A	C1	1	1	13.40	0.1610	32	0.005032		ILS, INELASTIC DEFORMATION
	TCDQA115FS16RT	A	C1	1	1	13.51	0.1580	32	0.004939		ILS, INELASTIC DEFORMATION
	TCDQA111FS17RT	A	C1	1	1	12.33	0.1602	32	0.005005		ILS, INELASTIC DEFORMATION
	TCDQA112FS17RT	A	C1	1	1	12.36	0.1584	32	0.004950		ILS, INELASTIC DEFORMATION
SBSFS17RT	TCDQA113FS17RT	A	C1	1	1	12.29	0.1589	32	0.004965	12.33	ILS, INELASTIC DEFORMATION
	TCDQA114FS17RT	A	C1	1	1	12.35	0.1585	32	0.004953		ILS, INELASTIC DEFORMATION
	TCDQA115FS17RT	A	C1	1	1	12.32	0.1583	32	0.004946		ILS, INELASTIC DEFORMATION
	TCDQA111FS18RT	A	C1	1	1	14.05	0.1603	32	0.005009		ILS, INELASTIC DEFORMATION
	TCDQA112FS18RT	A	C1	1	1	14.16	0.1582	32	0.004945		ILS, INELASTIC DEFORMATION
SBSFS18RT	TCDQA113FS18RT	A	C1	1	1	13.88	0.1582	32	0.004944	13.97	ILS, INELASTIC DEFORMATION
	TCDQA114FS18RT	A	C1	1	1	13.92	0.1580	32	0.004938		ILS, INELASTIC DEFORMATION
	TCDQA115FS18RT	A	C1	1	1	13.82	0.1579	32	0.004934		ILS, INELASTIC DEFORMATION
	TCDQA111FS19RT	A	C1	1	1	12.46	0.1584	32	0.004948		ILS, INELASTIC DEFORMATION
	TCDQA112FS19RT	A	C1	1	1	12.52	0.1581	32	0.004941		ILS, INELASTIC DEFORMATION
SBSFS19RT	TCDQA113FS19RT	A	C1	1	1	12.49	0.1566	32	0.004893	12.48	ILS, INELASTIC DEFORMATION
	TCDQA114FS19RT	A	C1	1	1	12.41	0.1585	32	0.004952		ILS, INELASTIC DEFORMATION
	TCDQA115FS19RT	A	C1	1	1	12.50	0.1577	32	0.004929		ILS, INELASTIC DEFORMATION
	TCDQA111FS20RT	A	C1	1	1	13.69	0.1606	32	0.005020		ILS, INELASTIC DEFORMATION
	TCDQA112FS20RT	A	C1	1	1	13.74	0.1597	32	0.004992		ILS, INELASTIC DEFORMATION
SBSFS20RT	TCDQA113FS20RT	A	C1	1	1	13.81	0.1607	32	0.005022	13.73	ILS, INELASTIC DEFORMATION
	TCDQA115FS20RT	A	C1	1	1	13.63	0.1595	32	0.004985		ILS, INELASTIC DEFORMATION
	TCDQA116FS20RT	A	C1	1	1	13.78	0.1576	32	0.004926		ILS, INELASTIC DEFORMATION
	TCDQA111FS21RT	A	C1	1	1	13.82	0.1603	32	0.005009		ILS, INELASTIC DEFORMATION
	TCDQA112FS21RT	A	C1	1	1	13.61	0.1593	32	0.004977		ILS, INELASTIC DEFORMATION
SBSFS21RT	TCDQA113FS21RT	A	C1	1	1	13.69	0.1608	32	0.005026	13.69	ILS, INELASTIC DEFORMATION
	TCDQA114FS21RT	A	C1	1	1	13.70	0.1594	32	0.004980		ILS, INELASTIC DEFORMATION
	TCDQA115FS21RT	A	C1	1	1	13.65	0.1604	32	0.005014		ILS, INELASTIC DEFORMATION
	TCDQA111FS22RT	A	C1	1	1	13.78	0.1595	32	0.004984		ILS, INELASTIC DEFORMATION
	TCDQA112FS22RT	A	C1	1	1	13.83	0.1592	32	0.004975		ILS, INELASTIC DEFORMATION
SBSFS22RT	TCDQA113FS22RT	A	C1	1	1	13.82	0.1593	32	0.004979	13.68	ILS, INELASTIC DEFORMATION
	TCDQA114FS22RT	A	C1	1	1	13.52	0.1615	32	0.005046		ILS, INELASTIC DEFORMATION
	TCDQA115FS22RT	A	C1	1	1	13.43	0.1599	32	0.004997		ILS, INELASTIC DEFORMATION
	TCDQA111FS23RT	A	C1	1	1	13.77	0.1474	32	0.004605		ILS, INELASTIC DEFORMATION
	TCDQA112FS23RT	A	C1	1	1	13.87	0.1520	32	0.004750		ILS, INELASTIC DEFORMATION
SBSFS23RT	TCDQA113FS23RT	A	C1	1	1	13.69	0.1473	32	0.004604	13.80	ILS, INELASTIC DEFORMATION
	TCDQA114FS23RT	A	C1	1	1	13.86	0.1475	32	0.004609		ILS, INELASTIC DEFORMATION
	TCDQA115FS23RT	A	C1	1	1	13.79	0.1583	32	0.004946		ILS, INELASTIC DEFORMATION
	TCDQA111FS24RT	A	C1	1	1	12.87	0.1579	32	0.004933		ILS, INELASTIC DEFORMATION
	TCDQA112FS24RT	A	C1	1	1	12.80	0.1563	32	0.004883		ILS, INELASTIC DEFORMATION
SBSFS24RT	TCDQA113FS24RT	A	C1	1	1	12.71	0.1581	32	0.004942	12.85	ILS, INELASTIC DEFORMATION
	TCDQA114FS24RT	A	C1	1	1	13.01	0.1580	32	0.004936		ILS, INELASTIC DEFORMATION
	TCDQA115FS24RT	A	C1	1	1	12.89	0.1578	32	0.004931		ILS, INELASTIC DEFORMATION

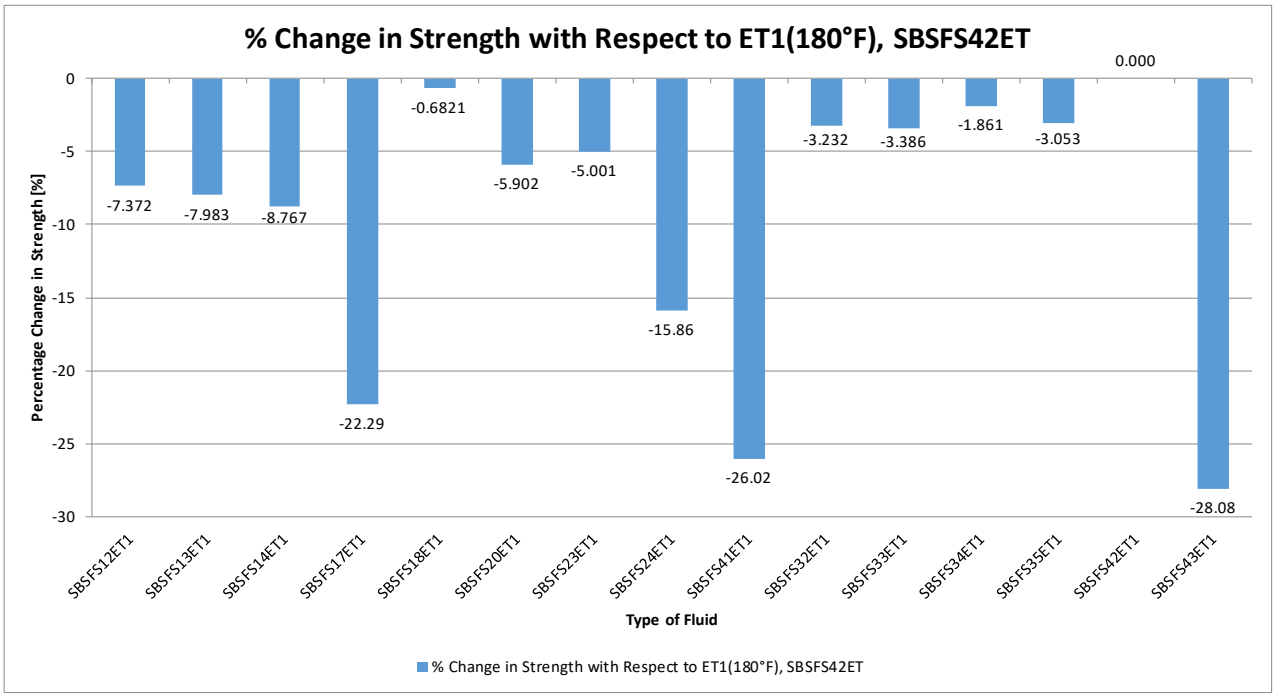
	TCDQA111FS41RT	A	C1	1	1	11.89	0.1521	32	0.004754		ILS, INELASTIC DEFORMATION
	TCDQA112FS41RT	A	C1	1	1	11.98	0.1534	32	0.004793		ILS, INELASTIC DEFORMATION
SBSFS41RT	TCDQA113FS41RT	A	C1	1	1	11.88	0.1534	32	0.004794	11.95	ILS, INELASTIC DEFORMATION
	TCDQA114FS41RT	A	C1	1	1	12.05	0.1529	32	0.004778		ILS, INELASTIC DEFORMATION
	TCDQA117FS41RT	A	C1	1	1	11.94	0.1524	32	0.004764		ILS, INELASTIC DEFORMATION
	TCDQA111FS31RT	A	C1	1	1	13.64	0.1598	32	0.004994		ILS, INELASTIC DEFORMATION
	TCDQA112FS31RT	A	C1	1	1	13.93	0.1596	32	0.004986		ILS, INELASTIC DEFORMATION
SBSFS31RT	TCDQA113FS31RT	A	C1	1	1	13.58	0.1585	32	0.004953	13.75	ILS, INELASTIC DEFORMATION
	TCDQA114FS31RT	A	C1	1	1	13.80	0.1585	32	0.004952		ILS, INELASTIC DEFORMATION
	TCDQA115FS31RT	A	C1	1	1	13.80	0.1585	32	0.004952		ILS, INELASTIC DEFORMATION
	TCDQA112FS32RT	A	C1	1	1	13.76	0.1584	32	0.004950		ILS, INELASTIC DEFORMATION
	TCDQA113FS32RT	A	C1	1	1	13.81	0.1581	32	0.004940		ILS, INELASTIC DEFORMATION
SBSFS32RT	TCDQA114FS32RT	A	C1	1	1	13.92	0.1579	32	0.004933	13.80	ILS, INELASTIC DEFORMATION
	TCDQA115FS32RT	A	C1	1	1	13.68	0.1575	32	0.004922		ILS, INELASTIC DEFORMATION
	TCDQA116FS32RT	A	C1	1	1	13.85	0.1584	32	0.004950		ILS, INELASTIC DEFORMATION
	TCDQA111FS33RT	A	C1	1	1	13.60	0.1576	32	0.004925		ILS, INELASTIC DEFORMATION
	TCDQA112FS33RT	A	C1	1	1	13.83	0.1581	32	0.004940		ILS, INELASTIC DEFORMATION
SBSFS33RT	TCDQA113FS33RT	A	C1	1	1	13.87	0.1577	32	0.004928	13.77	ILS, INELASTIC DEFORMATION
	TCDQA114FS33RT	A	C1	1	1	13.90	0.1573	32	0.004915		ILS, INELASTIC DEFORMATION
	TCDQA115FS33RT	A	C1	1	1	13.65	0.1572	32	0.004913		ILS, INELASTIC DEFORMATION
	TCDQA111FS34RT	A	C1	1	1	13.81	0.1572	32	0.004913		ILS, INELASTIC DEFORMATION
	TCDQA112FS34RT	A	C1	1	1	13.75	0.1565	32	0.004891		ILS, INELASTIC DEFORMATION
SBSFS34RT	TCDQA113FS34RT	A	C1	1	1	13.90	0.1563	32	0.004884	13.81	ILS, INELASTIC DEFORMATION
	TCDQA114FS34RT	A	C1	1	1	13.81	0.1566	32	0.004893		ILS, INELASTIC DEFORMATION
	TCDQA115FS34RT	A	C1	1	1	13.80	0.1564	32	0.004888		ILS, INELASTIC DEFORMATION
	TCDQA111FS35RT	A	C1	1	1	14.00	0.1550	32	0.004845		ILS, INELASTIC DEFORMATION
	TCDQA112FS35RT	A	C1	1	1	13.80	0.1521	32	0.004752		ILS, INELASTIC DEFORMATION
SBSFS35RT	TCDQA113FS35RT	A	C1	1	1	13.86	0.1546	32	0.004832	13.95	ILS, INELASTIC DEFORMATION
	TCDQA114FS35RT	A	C1	1	1	13.96	0.1545	32	0.004828		ILS, INELASTIC DEFORMATION
	TCDQA115FS35RT	A	C1	1	1	14.15	0.1549	32	0.004840		ILS, INELASTIC DEFORMATION
	TCDQA111FS42RT	A	C1	1	1	13.68	0.1519	32	0.004745		ILS, INELASTIC DEFORMATION
	TCDQA112FS42RT	A	C1	1	1	13.64	0.1531	32	0.004784		ILS, INELASTIC DEFORMATION
SBSFS42RT	TCDQA115FS42RT	A	C1	1	1	14.08	0.1509	32	0.004714	13.91	ILS, INELASTIC DEFORMATION
	TCDQA116FS42RT	A	C1	1	1	14.14	0.1521	32	0.004753		ILS, INELASTIC DEFORMATION
	TCDQA117FS42RT	A	C1	1	1	14.02	0.1522	32	0.004756		ILS, INELASTIC DEFORMATION
	TCDQA111FS43RT	A	C1	1	1	11.74	0.1496	32	0.004674		ILS, INELASTIC DEFORMATION
	TCDQA112FS43RT	A	C1	1	1	11.41	0.1513	32	0.004727		ILS, INELASTIC DEFORMATION
SBSFS43RT	TCDQA113FS43RT	A	C1	1	1	11.40	0.1510	32	0.004720	11.44	ILS, INELASTIC DEFORMATION
	TCDQA114FS43RT	A	C1	1	1	11.24	0.1511	32	0.004721		ILS, INELASTIC DEFORMATION
	TCDQA115FS43RT	A	C1	1	1	11.41	0.1508	32	0.004711		ILS, INELASTIC DEFORMATION

7.1.2 SBSFS Elevated Temperature Test Data

7.1.2.1 SBSFS ET1(180°F) Data

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


ET1(180°F) SBS Fluid Sensitivity Comparison
Short-Beam Strength [ksi]
12
10
8
6
4
2
0
10.27
10.21
10.12
8.619
11.01
10.44
10.54
9.332
8.205
10.73
10.71
10.88
10.75
11.09
7.977
SBSFS12ET1
SBSFS13ET1
SBSFS14ET1
SBSFS17ET1
SBSFS18ET1
SBSFS20ET1
SBSFS23ET1
SBSFS24ET1
SBSFS41ET1
SBSFS32ET1
SBSFS33ET1
SBSFS34ET1
SBSFS35ET1
SBSFS42ET1
SBSFS43ET1
Type of Fluid
Same Environment Short-Beam Strength Without Fluid (ksi) (SBSFS42ET1)
Worst Case Environment Short-Beam Strength (ksi) (SBSFS43ET1)
Average Short-Beam Strength With Fluid (ksi)

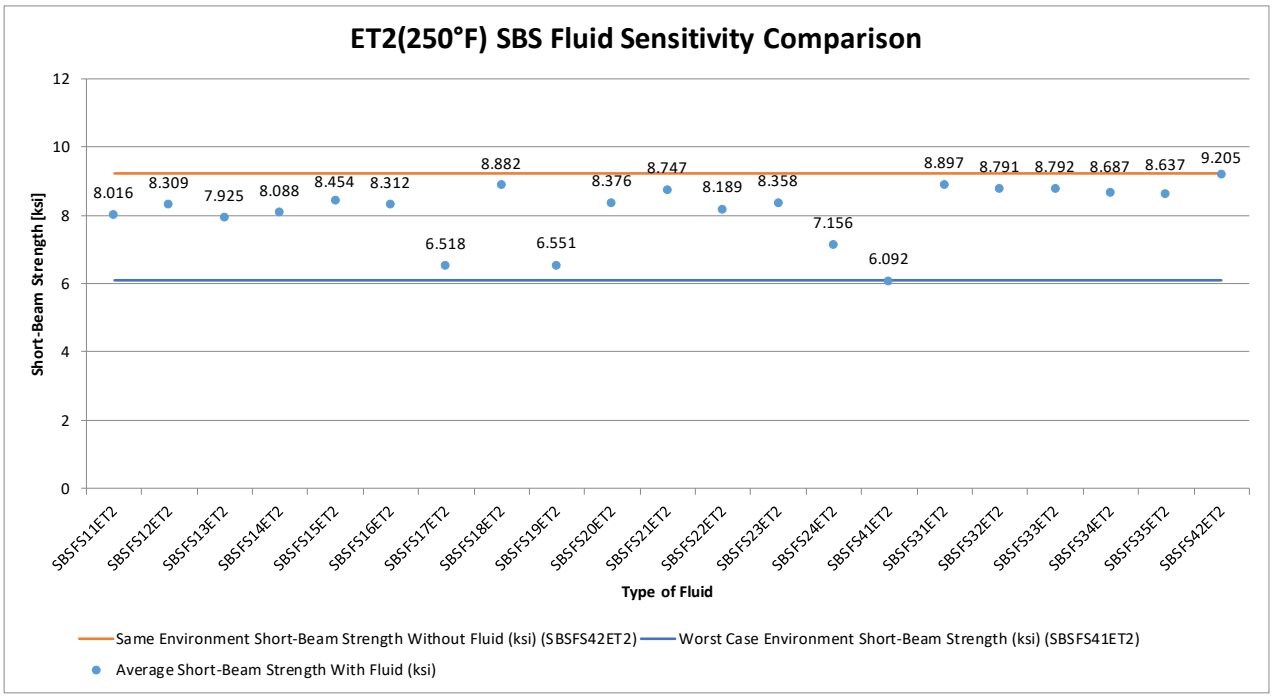

% Change in Strength with Respect to ET1(180°F), SBSFS42ET
Percentage Change in Strength [%]
0
-5
-10
-15
-20
-25
-30
-7.372
-7.983
-8.767
-22.29
-0.6821
-5.902
-5.001
-15.86
-26.02
-3.232
-3.386
-1.861
-3.053
0.000
-28.08
SBSFS12ET1
SBSFS13ET1
SBSFS14ET1
SBSFS17ET1
SBSFS18ET1
SBSFS20ET1
SBSFS23ET1
SBSFS24ET1
SBSFS41ET1
SBSFS32ET1
SBSFS33ET1
SBSFS34ET1
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SBSFS42ET1
SBSFS43ET1
Type of Fluid
% Change in Strength with Respect to ET1(180°F), SBSFS42ET

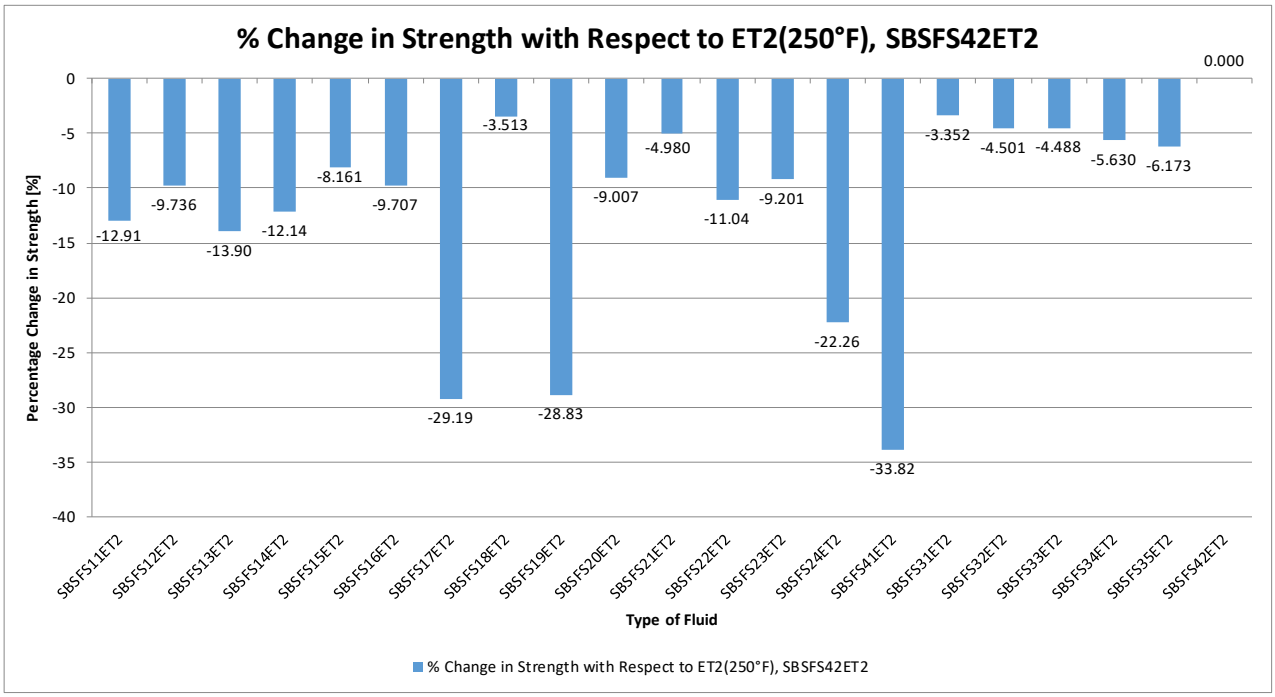
Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--ET1(180°F) Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Average Strength [ksi]	Failure Mode
	TCDQA111FS12ET1	A	C1	1	1	10.27	0.1525	32	0.004766		ILS
	TCDQA112FS12ET1	A	C1	1	1	10.64	0.1529	32	0.004779		ILS
SBSFS12ET1	TCDQA113FS12ET1	A	C1	1	1	10.01	0.1539	32	0.004808	10.27	ILS
	TCDQA114FS12ET1	A	C1	1	1	10.19	0.1518	32	0.004745		ILS
	TCDQA116FS12ET1	A	C1	1	1	10.24	0.1531	32	0.004785		ILS
	TCDQA111FS13ET1	A	C1	1	1	10.32	0.1543	32	0.004821		ILS
	TCDQA112FS13ET1	A	C1	1	1	10.60	0.1546	32	0.004831		ILS
SBSFS13ET1	TCDQA113FS13ET1	A	C1	1	1	10.06	0.1535	32	0.004796	10.21	ILS
	TCDQA115FS13ET1	A	C1	1	1	9.966	0.1539	32	0.004810		ILS
	TCDQA116FS13ET1	A	C1	1	1	10.09	0.1528	32	0.004773		ILS
	TCDQA111FS14ET1	A	C1	1	1	10.16	0.1536	32	0.004798		ILS
	TCDQA112FS14ET1	A	C1	1	1	10.19	0.1554	32	0.004855		ILS
SBSFS14ET1	TCDQA114FS14ET1	A	C1	1	1	9.909	0.1531	32	0.004784	10.12	ILS
	TCDQA115FS14ET1	A	C1	1	1	10.26	0.1549	32	0.004840		ILS
	TCDQA116FS14ET1	A	C1	1	1	10.07	0.1551	32	0.004847		ILS
	TCDQA111FS17ET1	A	C1	1	1	8.351	0.1583	32	0.004947		ILS
	TCDQA112FS17ET1	A	C1	1	1	8.418	0.1583	32	0.004946		ILS
SBSFS17ET1	TCDQA113FS17ET1	A	C1	1	1	8.618	0.1592	32	0.004976	8.619	ILS
	TCDQA114FS17ET1	A	C1	1	1	8.881	0.1579	32	0.004933		ILS
	TCDQA117FS17ET1	A	C1	1	1	8.826	0.1581	32	0.004941		ILS
	TCDQA111FS18ET1	A	C1	1	1	11.20	0.1576	32	0.004924		ILS
	TCDQA112FS18ET1	A	C1	1	1	10.98	0.1580	32	0.004938		ILS
SBSFS18ET1	TCDQA113FS18ET1	A	C1	1	1	10.82	0.1581	32	0.004940	11.01	ILS
	TCDQA114FS18ET1	A	C1	1	1	11.08	0.1583	32	0.004947		ILS
	TCDQA115FS18ET1	A	C1	1	1	10.99	0.1578	32	0.004932		ILS
	TCDQA111FS20ET1	A	C1	1	1	10.36	0.1595	32	0.004985		ILS
	TCDQA112FS20ET1	A	C1	1	1	10.41	0.1596	32	0.004986		ILS
SBSFS20ET1	TCDQA113FS20ET1	A	C1	1	1	10.42	0.1593	32	0.004978	10.44	ILS
	TCDQA115FS20ET1	A	C1	1	1	10.53	0.1595	32	0.004985		ILS
	TCDQA116FS20ET1	A	C1	1	1	10.46	0.1597	32	0.004990		ILS
	TCDQA111FS23ET1	A	C1	1	1	10.53	0.1583	32	0.004948		ILS
	TCDQA112FS23ET1	A	C1	1	1	10.63	0.1582	32	0.004943		ILS
SBSFS23ET1	TCDQA113FS23ET1	A	C1	1	1	10.57	0.1584	32	0.004951	10.54	ILS
	TCDQA114FS23ET1	A	C1	1	1	10.41	0.1579	32	0.004934		ILS
	TCDQA115FS23ET1	A	C1	1	1	10.53	0.1580	32	0.004939		ILS
	TCDQA111FS24ET1	A	C1	1	1	9.353	0.1583	32	0.004947		ILS
	TCDQA114FS24ET1	A	C1	1	1	9.292	0.1581	32	0.004942		ILS
SBSFS24ET1	TCDQA115FS24ET1	A	C1	1	1	9.326	0.1584	32	0.004948	9.332	ILS
	TCDQA116FS24ET1	A	C1	1	1	9.419	0.1583	32	0.004946		ILS
	TCDQA117FS24ET1	A	C1	1	1	9.267	0.1582	32	0.004945		ILS
	TCDQA111FS41ET1	A	C1	1	1	8.212	0.1530	32	0.004780		ILS
	TCDQA112FS41ET1	A	C1	1	1	8.191	0.1524	32	0.004762		ILS
SBSFS41ET1	TCDQA113FS41ET1	A	C1	1	1	8.307	0.1537	32	0.004804	8.205	ILS
	TCDQA115FS41ET1	A	C1	1	1	8.207	0.1536	32	0.004800		ILS
	TCDQA116FS41ET1	A	C1	1	1	8.106	0.1529	32	0.004779		ILS
	TCDQA111FS32ET1	A	C1	1	1	10.39	0.1581	32	0.004940		ILS
	TCDQA112FS32ET1	A	C1	1	1	10.65	0.1582	32	0.004944		ILS
SBSFS32ET1	TCDQA113FS32ET1	A	C1	1	1	10.89	0.1582	32	0.004943	10.73	ILS
	TCDQA114FS32ET1	A	C1	1	1	10.95	0.1583	32	0.004948		ILS
	TCDQA115FS32ET1	A	C1	1	1	10.77	0.1560	32	0.004874		ILS
	TCDQA111FS33ET1	A	C1	1	1	10.71	0.1577	32	0.004928		ILS
	TCDQA112FS33ET1	A	C1	1	1	10.72	0.1573	32	0.004917		ILS
SBSFS33ET1	TCDQA113FS33ET1	A	C1	1	1	10.73	0.1575	32	0.004921	10.71	ILS
	TCDQA114FS33ET1	A	C1	1	1	10.83	0.1570	32	0.004907		ILS
	TCDQA115FS33ET1	A	C1	1	1	10.59	0.1565	32	0.004892		ILS
	TCDQA111FS34ET1	A	C1	1	1	10.74	0.1567	32	0.004897		ILS
	TCDQA112FS34ET1	A	C1	1	1	10.82	0.1568	32	0.004900		ILS
SBSFS34ET1	TCDQA113FS34ET1	A	C1	1	1	10.92	0.1555	32	0.004858	10.88	ILS
	TCDQA114FS34ET1	A	C1	1	1	10.93	0.1558	32	0.004868		ILS
	TCDQA115FS34ET1	A	C1	1	1	11.02	0.1561	32	0.004879		ILS
	TCDQA111FS35ET1	A	C1	1	1	10.62	0.1537	32	0.004803		ILS
	TCDQA112FS35ET1	A	C1	1	1	11.05	0.1545	32	0.004829		ILS
SBSFS35ET1	TCDQA113FS35ET1	A	C1	1	1	10.69	0.1540	32	0.004813	10.75	ILS, COMPRESSION
	TCDQA114FS35ET1	A	C1	1	1	10.82	0.1552	32	0.004850		ILS
	TCDQA117FS35ET1	A	C1	1	1	10.58	0.1536	32	0.004800		ILS
	TCDQA111FS42ET1	A	C1	1	1	11.03	0.1525	32	0.004766		ILS, INELASTIC DEFORMATION
	TCDQA112FS42ET1	A	C1	1	1	11.01	0.1519	32	0.004748		ILS, INELASTIC DEFORMATION
SBSFS42ET1	TCDQA113FS42ET1	A	C1	1	1	11.03	0.1514	32	0.004730	11.09	ILS, INELASTIC DEFORMATION
	TCDQA114FS42ET1	A	C1	1	1	11.13	0.1514	32	0.004730		ILS, INELASTIC DEFORMATION
	TCDQA115FS42ET1	A	C1	1	1	11.24	0.1514	32	0.004732		ILS, INELASTIC DEFORMATION
	TCDQA111FS43ET1	A	C1	1	1	8.028	0.1504	32	0.004699		ILS, INELASTIC DEFORMATION
	TCDQA112FS43ET1	A	C1	1	1	7.960	0.1506	32	0.004707		ILS, INELASTIC DEFORMATION
SBSFS43ET1	TCDQA113FS43ET1	A	C1	1	1	7.999	0.1509	32	0.004716	7.977	ILS, INELASTIC DEFORMATION
	TCDQA114FS43ET1	A	C1	1	1	7.954	0.1509	32	0.004716		ILS, INELASTIC DEFORMATION
	TCDQA115FS43ET1	A	C1	1	1	7.943	0.1507	32	0.004710		ILS, INELASTIC DEFORMATION

7.1.2.2 SBSFS ET2(250°F) Data

Code	Type of Fluid	Exposure
SBSFS11ET2	100 Low lead Fuel	90 days min @ 70°F±10°F
SBSFS12ET2	Jet A Fuel	
SBSFS13ET2	MIL-PRF-5606 Hydraulic Oil	
SBSFS14ET2	MIL-PRF-83282 Hydraulic Oil	
SBSFS15ET2	MIL-PRF-7808 Engine Oil	
SBSFS16ET2	MIL-PRF-23699 Engine Oil	
SBSFS17ET2	Sea Water	
SBSFS18ET2	Skydrol LD-4	
SBSFS19ET2	50% Water with 50% Skydrol LD-4	
SBSFS20ET2	MIL-PRF-87252 PAO Cooling Fluid	
SBSFS21ET2	E85 Fuel (Alternate aircraft fuel)	
SBSFS22ET2	SAE AMS 2629 Jet Reference Fluid	
SBSFS23ET2	MIL-PRF-87257B Hydraulic Oil	
SBSFS24ET2	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
SBSFS41ET2	Distilled Water	
SBSFS31ET2	MEK washing fluid	90 mins @ 70°F±10°F
SBSFS32ET2	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
SBSFS33ET2	De-icing Fluid SAE AMS 1428 (Type II)	
SBSFS34ET2	De-icing Fluid SAE AMS 1428 (Type IV)	
SBSFS35ET2	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
SBSFS42ET2	Dry	Per section 6.1 Test Plan NTP 3800Q1


ET2(250°F) SBS Fluid Sensitivity Comparison
Short-Beam Strength [ksi]
12
10
8
6
4
2
0
8.016
8.309
7.925
8.088
8.454
8.312
6.518
8.882
6.551
8.376
8.747
8.189
8.358
7.156
6.092
8.897
8.791
8.792
8.687
8.637
9.205
SBSFS11ET2
SBSFS12ET2
SBSFS13ET2
SBSFS14ET2
SBSFS15ET2
SBSFS16ET2
SBSFS17ET2
SBSFS18ET2
SBSFS19ET2
SBSFS20ET2
SBSFS21ET2
SBSFS22ET2
SBSFS23ET2
SBSFS24ET2
SBSFS41ET2
SBSFS31ET2
SBSFS32ET2
SBSFS33ET2
SBSFS34ET2
SBSFS35ET2
SBSFS42ET2
Type of Fluid
Same Environment Short-Beam Strength Without Fluid (ksi) (SBSFS42ET2)
Worst Case Environment Short-Beam Strength (ksi) (SBSFS41ET2)
Average Short-Beam Strength With Fluid (ksi)

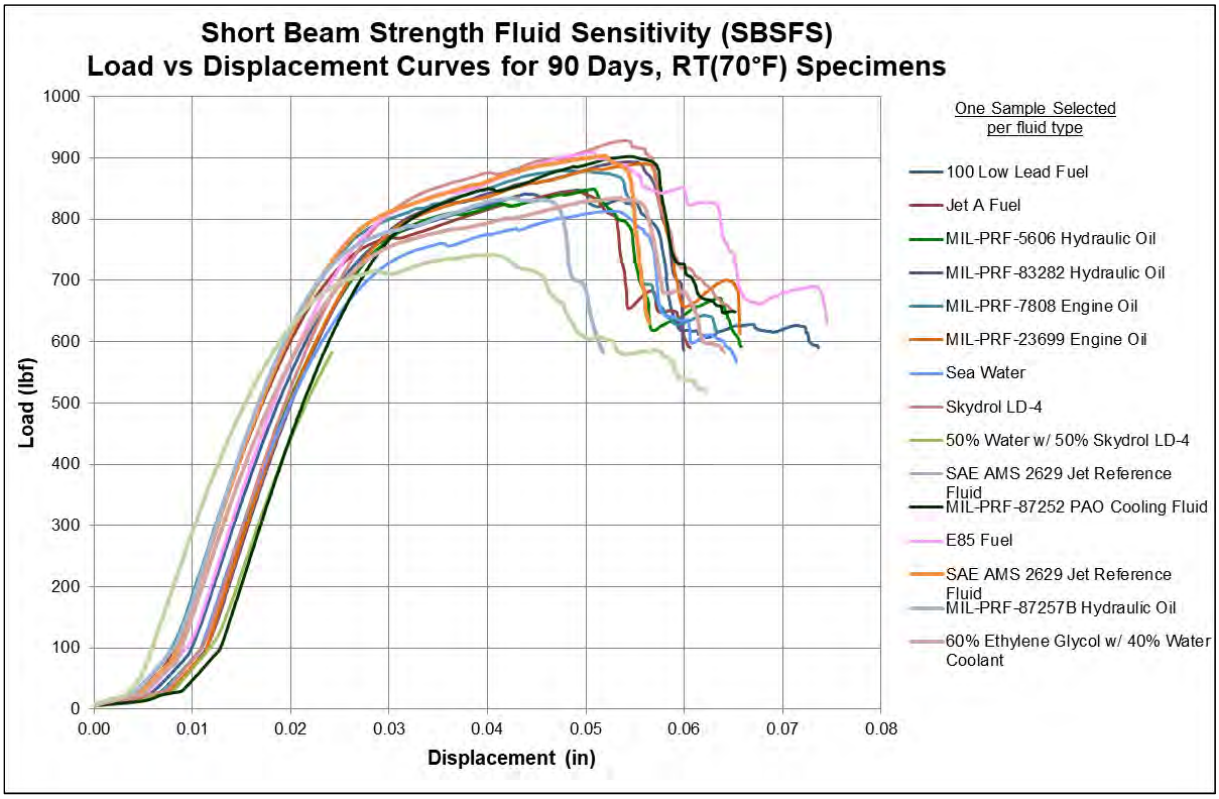

% Change in Strength with Respect to ET2(250°F), SBSFS42ET2
Percentage Change in Strength [%]
0
-5
-10
-15
-20
-25
-30
-35
-40
-12.91
-9.736
-13.90
-12.14
-8.161
-9.707
-29.19
-3.513
-28.83
-9.007
-4.980
-11.04
-9.201
-22.26
-33.82
-3.352
-4.501
-4.488
-5.630
-6.173
0.000
SBSFS11ET2
SBSFS12ET2
SBSFS13ET2
SBSFS14ET2
SBSFS15ET2
SBSFS16ET2
SBSFS17ET2
SBSFS18ET2
SBSFS19ET2
SBSFS20ET2
SBSFS21ET2
SBSFS22ET2
SBSFS23ET2
SBSFS24ET2
SBSFS41ET2
SBSFS31ET2
SBSFS32ET2
SBSFS33ET2
SBSFS34ET2
SBSFS35ET2
SBSFS42ET2
Type of Fluid
% Change in Strength with Respect to ET2(250°F), SBSFS42ET2

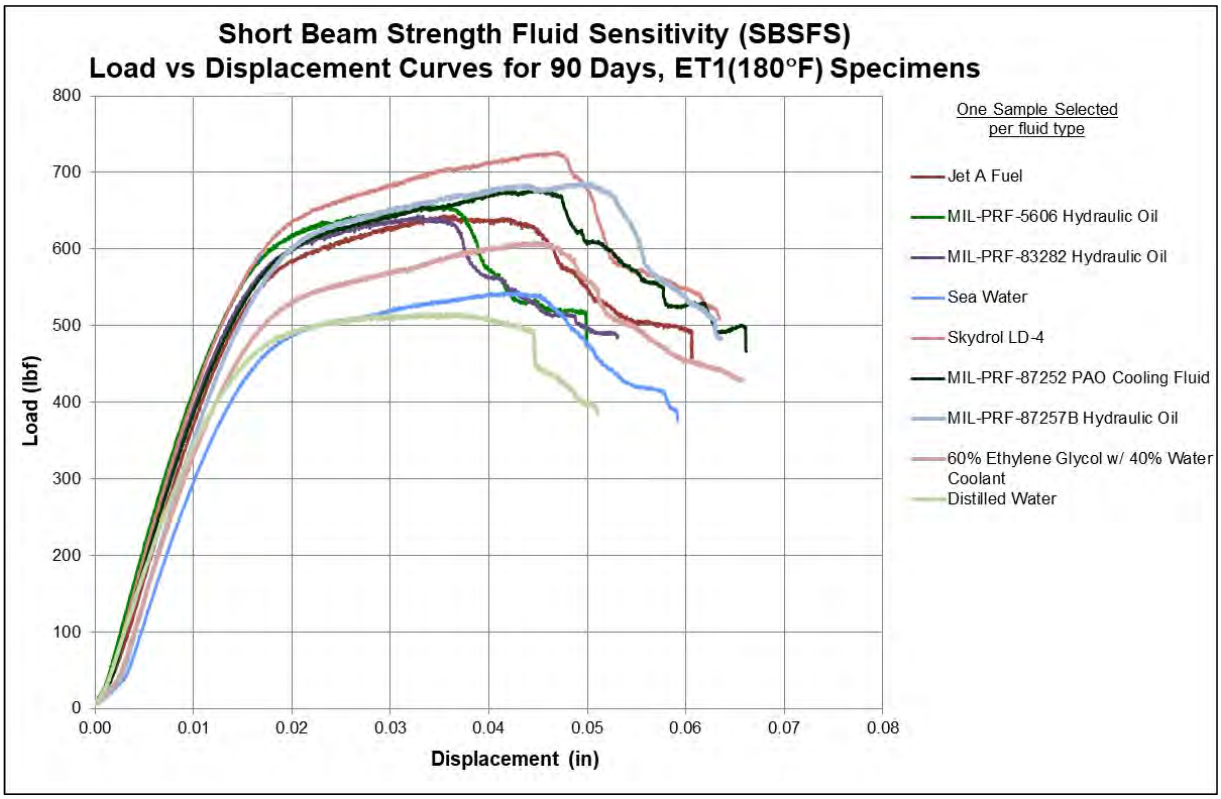
Fluid Sensitivity Screening
Short Beam Strength Properties (SBSFS)--ET2(250°F)Strength
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

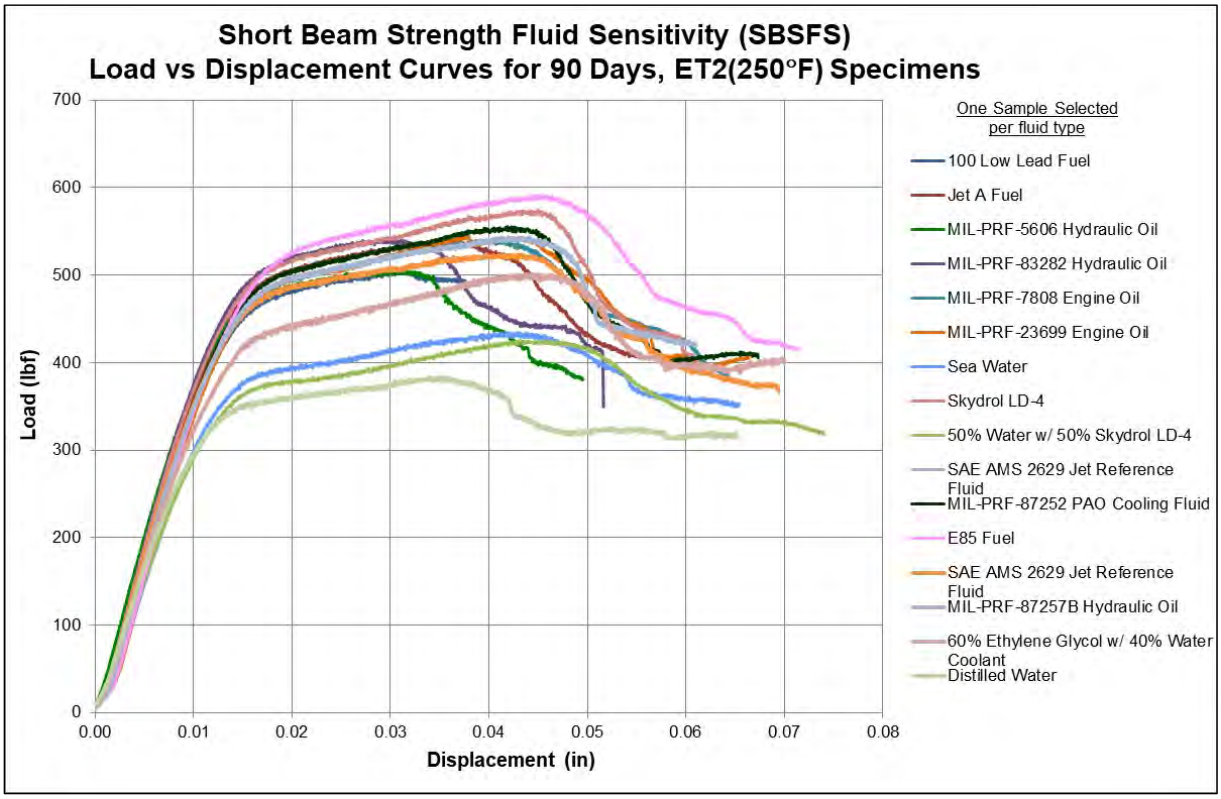
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	Average Strength [ksi]	Failure Mode
	TCDQA111FS11ET2	A	C1	1	1	8.057	0.1522	32	0.00476		ILS
	TCDQA112FS11ET2	A	C1	1	1	8.038	0.1526	32	0.00477		ILS
SBSFS11ET2	TCDQA113FS11ET2	A	C1	1	1	8.012	0.1525	32	0.00477	8.016	ILS
	TCDQA114FS11ET2	A	C1	1	1	7.988	0.1526	32	0.00477		ILS
	TCDQA115FS11ET2	A	C1	1	1	7.988	0.1533	32	0.00479		ILS
	TCDQA111FS12ET2	A	C1	1	1	8.561	0.1532	32	0.00479		ILS
	TCDQA112FS12ET2	A	C1	1	1	8.438	0.1513	32	0.00473		ILS
SBSFS12ET2	TCDQA113FS12ET2	A	C1	1	1	8.244	0.1518	32	0.00474	8.309	ILS
	TCDQA114FS12ET2	A	C1	1	1	8.138	0.1522	32	0.00476		ILS
	TCDQA115FS12ET2	A	C1	1	1	8.163	0.1522	32	0.00476		ILS
	TCDQA111FS13ET2	A	C1	1	1	7.933	0.1549	32	0.00484		ILS
	TCDQA112FS13ET2	A	C1	1	1	7.784	0.1531	32	0.00478		ILS
SBSFS13ET2	TCDQA113FS13ET2	A	C1	1	1	8.214	0.1544	32	0.00482	7.925	ILS
	TCDQA114FS13ET2	A	C1	1	1	7.918	0.1540	32	0.00481		ILS
	TCDQA116FS13ET2	A	C1	1	1	7.779	0.1536	32	0.00480		ILS
	TCDQA111FS14ET2	A	C1	1	1	8.470	0.1549	32	0.00484		ILS
	TCDQA112FS14ET2	A	C1	1	1	8.242	0.1550	32	0.00484		ILS
SBSFS14ET2	TCDQA114FS14ET2	A	C1	1	1	8.007	0.1529	32	0.00478	8.088	ILS
	TCDQA115FS14ET2	A	C1	1	1	7.911	0.1538	32	0.00480		ILS
	TCDQA116FS14ET2	A	C1	1	1	7.811	0.1528	32	0.00478		ILS
	TCDQA111FS15ET2	A	C1	1	1	8.373	0.1567	32	0.00490		ILS
	TCDQA112FS15ET2	A	C1	1	1	8.421	0.1578	32	0.00493		ILS
SBSFS15ET2	TCDQA113FS15ET2	A	C1	1	1	8.452	0.1574	32	0.00492	8.454	ILS
	TCDQA114FS15ET2	A	C1	1	1	8.518	0.1588	32	0.00496		ILS
	TCDQA116FS15ET2	A	C1	1	1	8.506	0.1597	32	0.00499		ILS
	TCDQA111FS16ET2	A	C1	1	1	8.386	0.1577	32	0.00493		ILS
	TCDQA113FS16ET2	A	C1	1	1	8.387	0.1573	32	0.00491		ILS
SBSFS16ET2	TCDQA115FS16ET2	A	C1	1	1	8.182	0.1584	32	0.00495	8.312	ILS
	TCDQA116FS16ET2	A	C1	1	1	8.328	0.1585	32	0.00495		ILS
	TCDQA117FS16ET2	A	C1	1	1	8.276	0.1571	32	0.00491		ILS
	TCDQA111FS17ET2	A	C1	1	1	6.662	0.1584	32	0.00495		ILS
	TCDQA112FS17ET2	A	C1	1	1	6.471	0.1592	32	0.00498		ILS
SBSFS17ET2	TCDQA113FS17ET2	A	C1	1	1	6.433	0.1594	32	0.00498	6.518	ILS
	TCDQA114FS17ET2	A	C1	1	1	6.538	0.1570	32	0.00491		ILS
	TCDQA116FS17ET2	A	C1	1	1	6.488	0.1581	32	0.00494		ILS
	TCDQA112FS18ET2	A	C1	1	1	8.935	0.1561	32	0.00488		ILS
	TCDQA114FS18ET2	A	C1	1	1	8.827	0.1601	32	0.00500		ILS
SBSFS18ET2	TCDQA115FS18ET2	A	C1	1	1	8.874	0.1607	32	0.00502	8.882	ILS
	TCDQA116FS18ET2	A	C1	1	1	8.937	0.1583	32	0.00495		ILS
	TCDQA117FS18ET2	A	C1	1	1	8.837	0.1585	32	0.00495		ILS
	TCDQA111FS19ET2	A	C1	1	1	6.537	0.1578	32	0.00493		ILS
	TCDQA112FS19ET2	A	C1	1	1	6.549	0.1583	32	0.00495		ILS
SBSFS19ET2	TCDQA113FS19ET2	A	C1	1	1	6.626	0.1583	32	0.00495	6.551	ILS
	TCDQA114FS19ET2	A	C1	1	1	6.589	0.1582	32	0.00494		ILS
	TCDQA115FS19ET2	A	C1	1	1	6.455	0.1487	32	0.00465		ILS
	TCDQA111FS20ET2	A	C1	1	1	8.464	0.1600	32	0.00500		ILS
	TCDQA112FS20ET2	A	C1	1	1	8.370	0.1592	32	0.00497		ILS
SBSFS20ET2	TCDQA114FS20ET2	A	C1	1	1	8.292	0.1593	32	0.00498	8.376	ILS
	TCDQA115FS20ET2	A	C1	1	1	8.464	0.1597	32	0.00499		ILS
	TCDQA116FS20ET2	A	C1	1	1	8.291	0.1591	32	0.00497		ILS
	TCDQA111FS21ET2	A	C1	1	1	9.033	0.1593	32	0.00498		ILS
	TCDQA112FS21ET2	A	C1	1	1	8.857	0.1591	32	0.00497		ILS
SBSFS21ET2	TCDQA113FS21ET2	A	C1	1	1	8.646	0.1605	32	0.00502	8.747	ILS
	TCDQA114FS21ET2	A	C1	1	1	8.534	0.1593	32	0.00498		ILS
	TCDQA115FS21ET2	A	C1	1	1	8.664	0.1611	32	0.00503		ILS
	TCDQA111FS22ET2	A	C1	1	1	7.997	0.1594	32	0.00498		ILS
	TCDQA112FS22ET2	A	C1	1	1	8.162	0.1594	32	0.00498		ILS
SBSFS22ET2	TCDQA113FS22ET2	A	C1	1	1	8.218	0.1604	32	0.00501	8.189	ILS
	TCDQA114FS22ET2	A	C1	1	1	8.294	0.1593	32	0.00498		ILS
	TCDQA115FS22ET2	A	C1	1	1	8.272	0.1597	32	0.00499		ILS
	TCDQA111FS23ET2	A	C1	1	1	8.345	0.1584	32	0.00495		ILS
	TCDQA112FS23ET2	A	C1	1	1	8.299	0.1584	32	0.00495		ILS
SBSFS23ET2	TCDQA113FS23ET2	A	C1	1	1	8.314	0.1560	32	0.00488	8.358	ILS
	TCDQA114FS23ET2	A	C1	1	1	8.395	0.1579	32	0.00493		ILS
	TCDQA115FS23ET2	A	C1	1	1	8.439	0.1579	32	0.00494		ILS
	TCDQA111FS24ET2	A	C1	1	1	7.708	0.1581	32	0.00494		ILS
	TCDQA112FS24ET2	A	C1	1	1	7.073	0.1578	32	0.00493		ILS
SBSFS24ET2	TCDQA113FS24ET2	A	C1	1	1	6.869	0.1584	32	0.00495	7.156	ILS
	TCDQA114FS24ET2	A	C1	1	1	7.060	0.1583	32	0.00495		ILS
	TCDQA117FS24ET2	A	C1	1	1	7.070	0.1580	32	0.00494		ILS
	TCDQA111FS41ET2	A	C1	1	1	6.082	0.1541	32	0.00481		ILS
	TCDQA112FS41ET2	A	C1	1	1	6.130	0.1531	32	0.00478		ILS
SBSFS41ET2	TCDQA113FS41ET2	A	C1	1	1	6.075	0.1526	32	0.00477	6.092	ILS
	TCDQA114FS41ET2	A	C1	1	1	6.116	0.1532	32	0.00479		ILS
	TCDQA115FS41ET2	A	C1	1	1	6.054	0.1537	32	0.00480		ILS

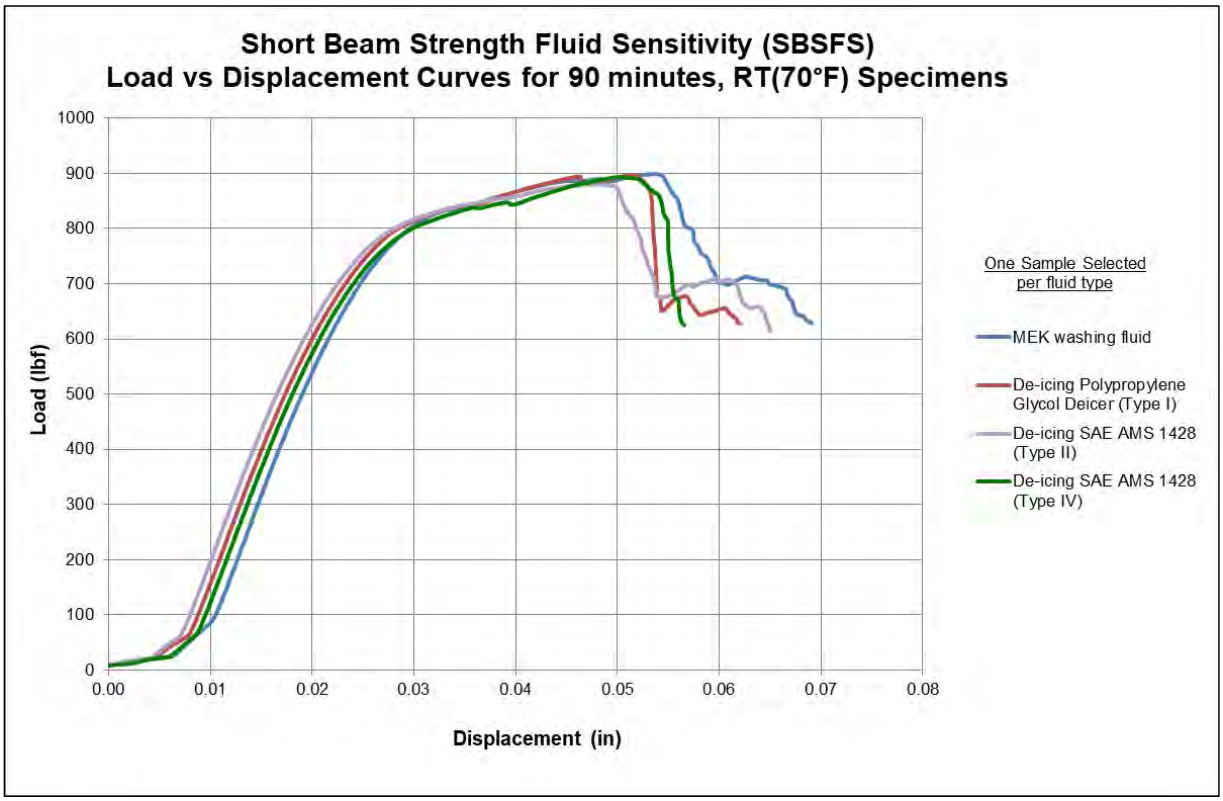
	TCDQA111FS31ET2	A	C1	1	1	8.877	0.1579	32	0.00494		ILS
	TCDQA113FS31ET2	A	C1	1	1	8.929	0.1583	32	0.00495		ILS
SBSFS31ET2	TCDQA115FS31ET2	A	C1	1	1	8.975	0.1582	32	0.00494	8.897	ILS
	TCDQA116FS31ET2	A	C1	1	1	8.895	0.1585	32	0.00495		ILS
	TCDQA117FS31ET2	A	C1	1	1	8.808	0.1586	32	0.00496		ILS
	TCDQA111FS32ET2	A	C1	1	1	8.732	0.1585	32	0.00495		ILS
	TCDQA112FS32ET2	A	C1	1	1	8.905	0.1594	32	0.00498		ILS
SBSFS32ET2	TCDQA114FS32ET2	A	C1	1	1	8.733	0.1579	32	0.00494	8.791	ILS
	TCDQA115FS32ET2	A	C1	1	1	8.779	0.1578	32	0.00493		ILS
	TCDQA117FS32ET2	A	C1	1	1	8.805	0.1590	32	0.00497		ILS
	TCDQA111FS33ET2	A	C1	1	1	8.739	0.1571	32	0.00491		ILS
	TCDQA113FS33ET2	A	C1	1	1	8.772	0.1554	32	0.00486		ILS
SBSFS33ET2	TCDQA115FS33ET2	A	C1	1	1	8.798	0.1543	32	0.00482	8.792	ILS
	TCDQA116FS33ET2	A	C1	1	1	8.859	0.1564	32	0.00489		ILS
	TCDQA117FS33ET2	A	C1	1	1	8.793	0.1570	32	0.00491		ILS
	TCDQA112FS34ET2	A	C1	1	1	8.671	0.1538	32	0.00481		ILS
	TCDQA113FS34ET2	A	C1	1	1	8.686	0.1556	32	0.00486		ILS
SBSFS34ET2	TCDQA114FS34ET2	A	C1	1	1	8.678	0.1562	32	0.00488	8.687	ILS
	TCDQA115FS34ET2	A	C1	1	1	8.774	0.1571	32	0.00491		ILS
	TCDQA116FS34ET2	A	C1	1	1	8.625	0.1560	32	0.00488		ILS
	TCDQA111FS35ET2	A	C1	1	1	9.224	0.1540	32	0.00481		ILS
	TCDQA112FS35ET2	A	C1	1	1	8.645	0.1539	32	0.00481		ILS
SBSFS35ET2	TCDQA114FS35ET2	A	C1	1	1	8.480	0.1541	32	0.00481	8.637	ILS
	TCDQA116FS35ET2	A	C1	1	1	8.513	0.1530	32	0.00478		ILS
	TCDQA117FS35ET2	A	C1	1	1	8.324	0.1530	32	0.00478		ILS
	TCDQA111FS42ET2	A	C1	1	1	9.480	0.1522	32	0.00476		ILS, INELASTIC DEFORMATION
	TCDQA112FS42ET2	A	C1	1	1	9.243	0.1520	32	0.00475		ILS, INELASTIC DEFORMATION
SBSFS42ET2	TCDQA113FS42ET2	A	C1	1	1	9.088	0.1513	32	0.00473	9.205	ILS, INELASTIC DEFORMATION
	TCDQA114FS42ET2	A	C1	1	1	9.099	0.1511	32	0.00472		ILS, INELASTIC DEFORMATION
	TCDQA115FS42ET2	A	C1	1	1	9.117	0.1516	32	0.00474		ILS, INELASTIC DEFORMATION

7.1.3 SBSFS Load Displacement Curves

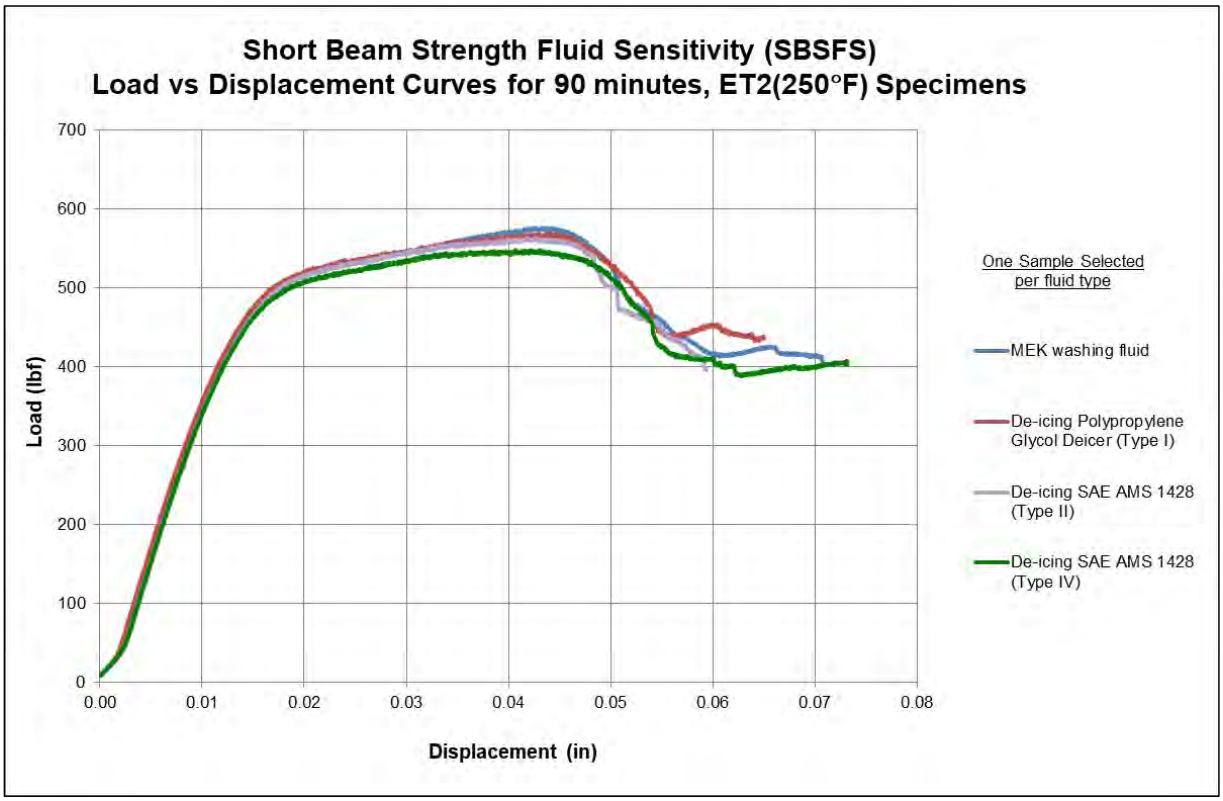


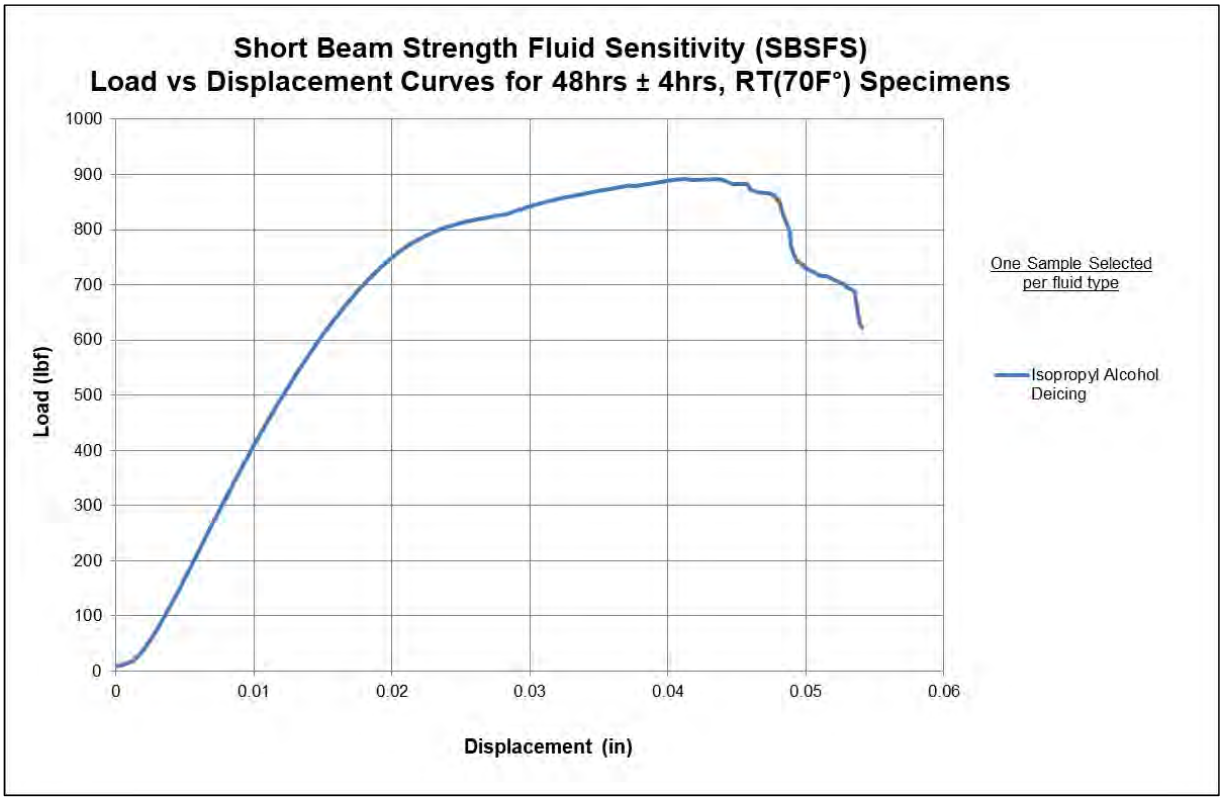


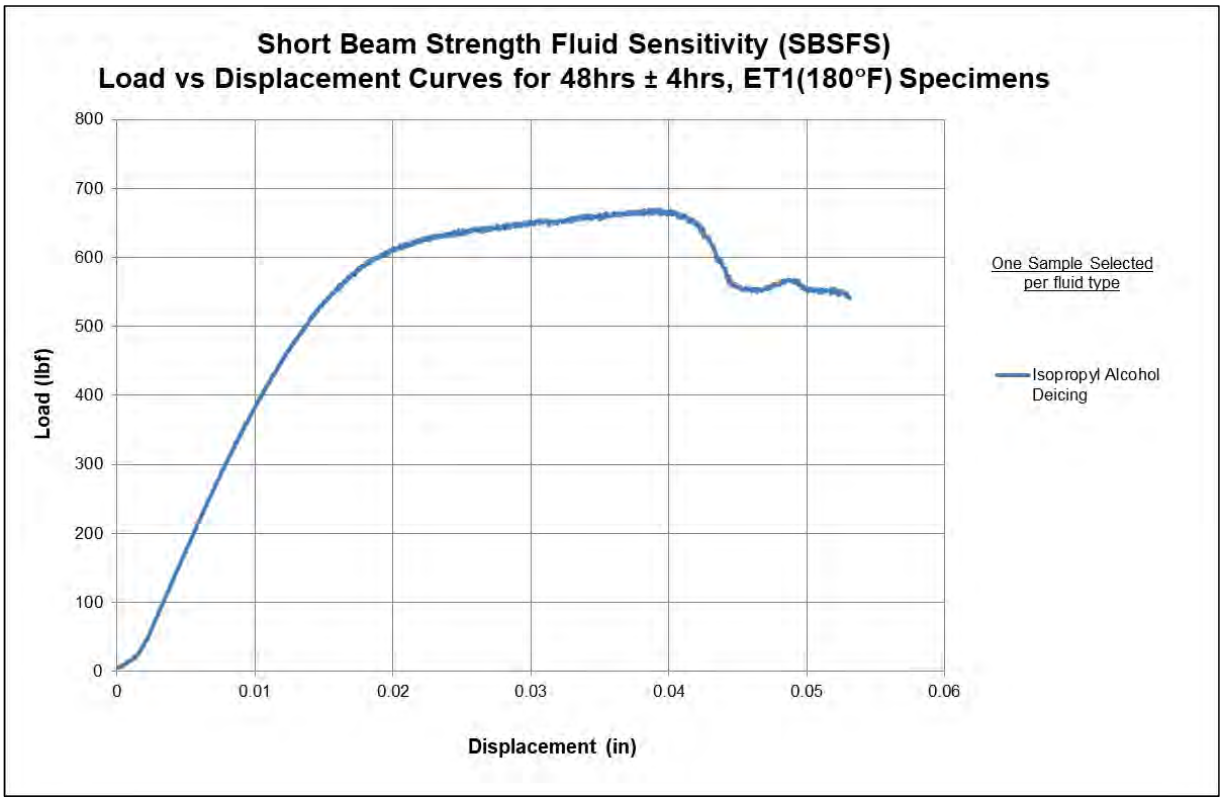

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 90 Days, ET2(250°F) Specimens
Load (lbf)
Displacement (in)
0
100
200
300
400
500
600
700
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
One Sample Selected per fluid type
100 Low Lead Fuel
Jet A Fuel
MIL-PRF-5606 Hydraulic Oil
MIL-PRF-83282 Hydraulic Oil
MIL-PRF-7808 Engine Oil
MIL-PRF-23699 Engine Oil
Sea Water
Skydrol LD-4
50% Water w/ 50% Skydrol LD-4
SAE AMS 2629 Jet Reference Fluid
MIL-PRF-87252 PAO Cooling Fluid
E85 Fuel
SAE AMS 2629 Jet Reference Fluid
MIL-PRF-87257B Hydraulic Oil
60% Ethylene Glycol w/ 40% Water Coolant
Distilled Water

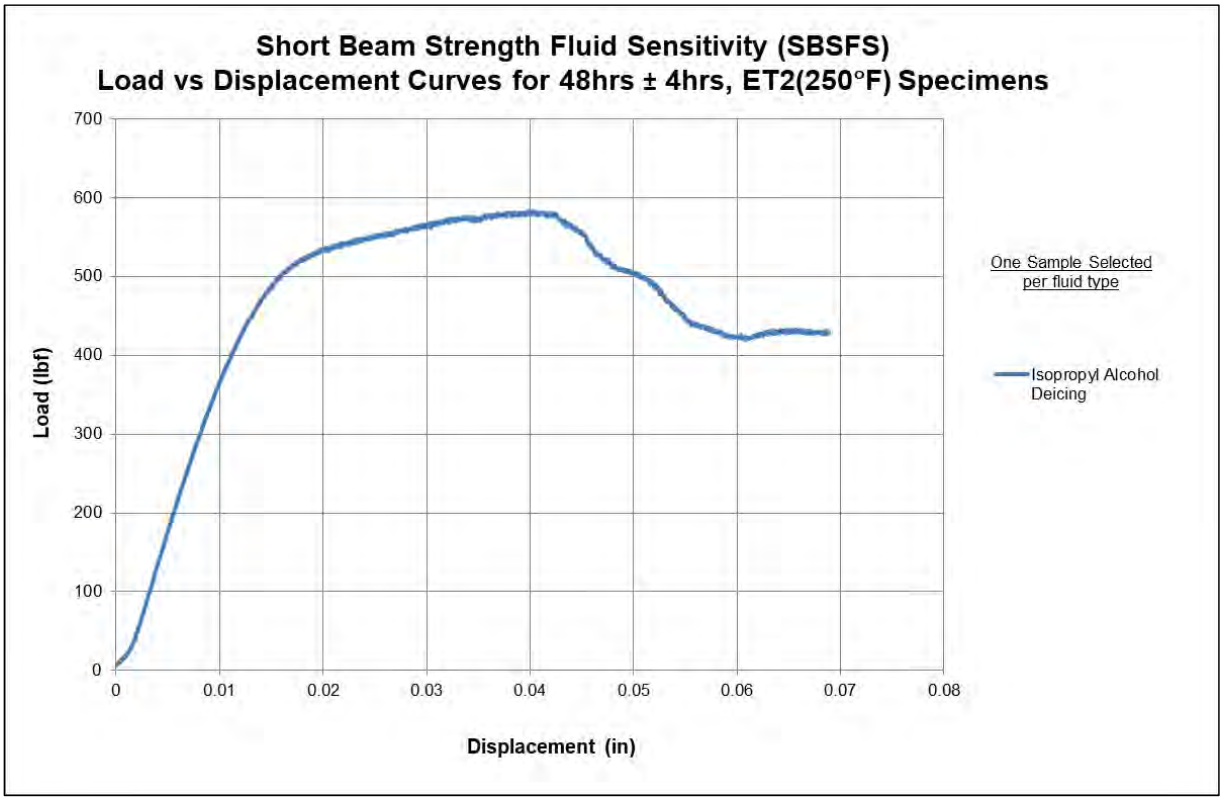

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 90 minutes, RT(70°F) Specimens
Load (lbf)
Displacement (in)
0
100
200
300
400
500
600
700
800
900
1000
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
One Sample Selected per fluid type
MEK washing fluid
De-icing Polypropylene Glycol Deicer (Type I)
De-icing SAE AMS 1428 (Type II)
De-icing SAE AMS 1428 (Type IV)

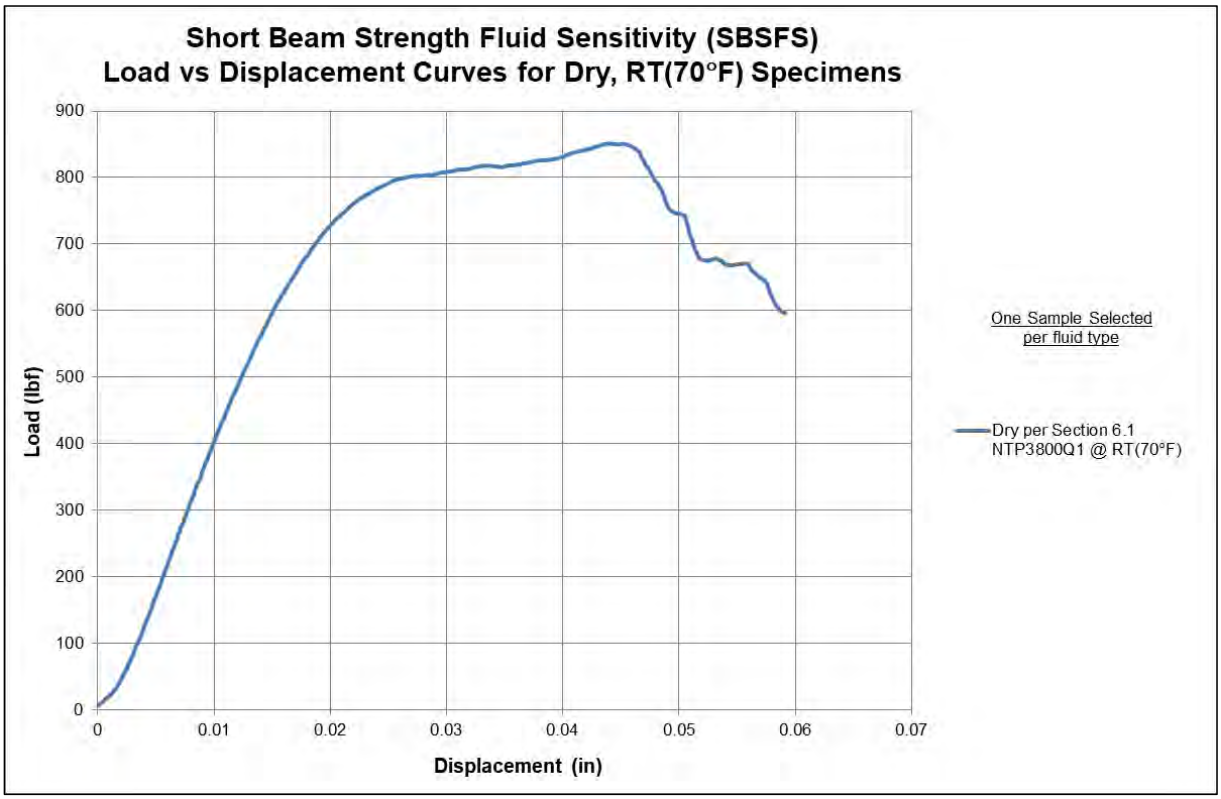

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 90 minutes, ET1(180°F) Specimens
Load (lbf)
800
700
600
500
400
300
200
100
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Displacement (in)
One Sample Selected per fluid type
De-icing Polypropylene Glycol Deicer (Type I)
De-icing SAE AMS 1428 (Type II)
De-icing SAE AMS 1428 (Type IV)

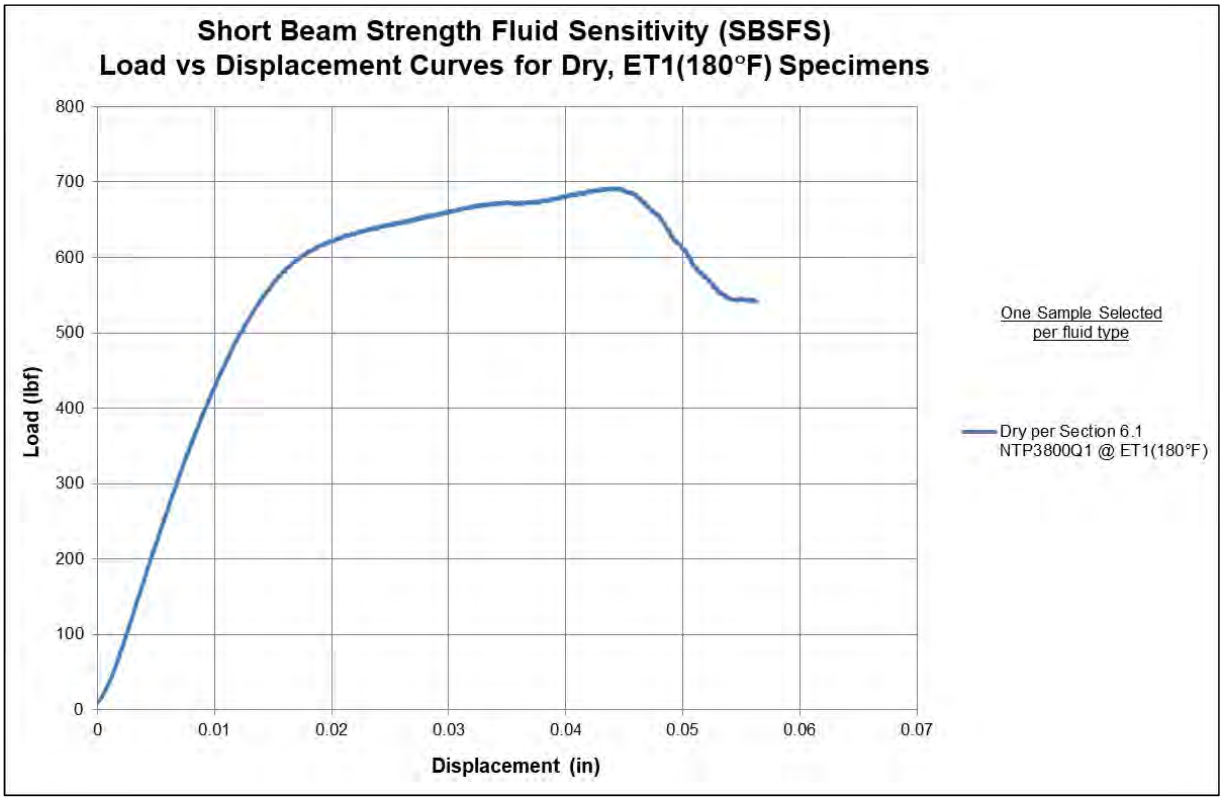

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 90 minutes, ET2(250°F) Specimens
Load (lbf)
700
600
500
400
300
200
100
0
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
Displacement (in)
One Sample Selected per fluid type
MEK washing fluid
De-icing Polypropylene Glycol Deicer (Type I)
De-icing SAE AMS 1428 (Type II)
De-icing SAE AMS 1428 (Type IV)

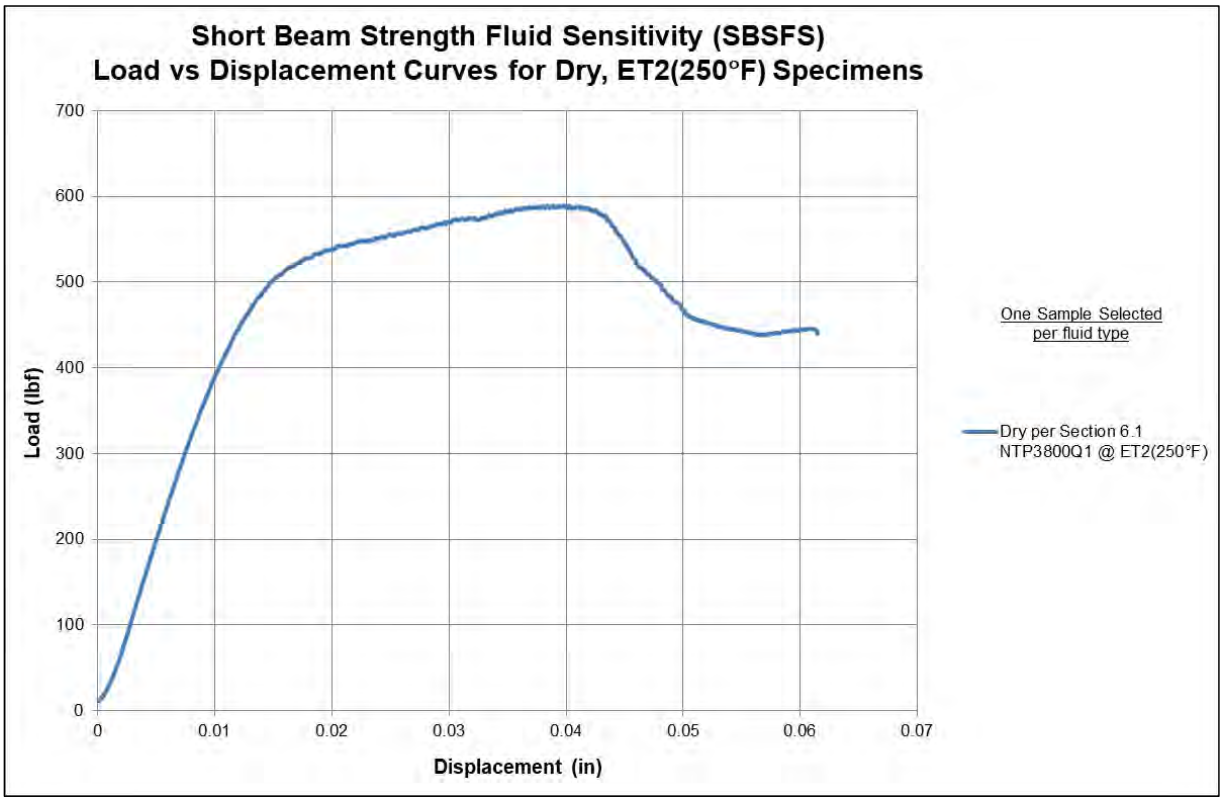

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 48hrs ± 4hrs, RT(70F°) Specimens
Load (lbf)
1000
900
800
700
600
500
400
300
200
100
0
0
0.01
0.02
0.03
0.04
0.05
0.06
Displacement (in)
One Sample Selected per fluid type
Isopropyl Alcohol Deicing


Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 48hrs ± 4hrs, ET1(180°F) Specimens
Load (lbf)
800
700
600
500
400
300
200
100
0
0
0.01
0.02
0.03
0.04
0.05
0.06
Displacement (in)
One Sample Selected per fluid type
Isopropyl Alcohol Deicing

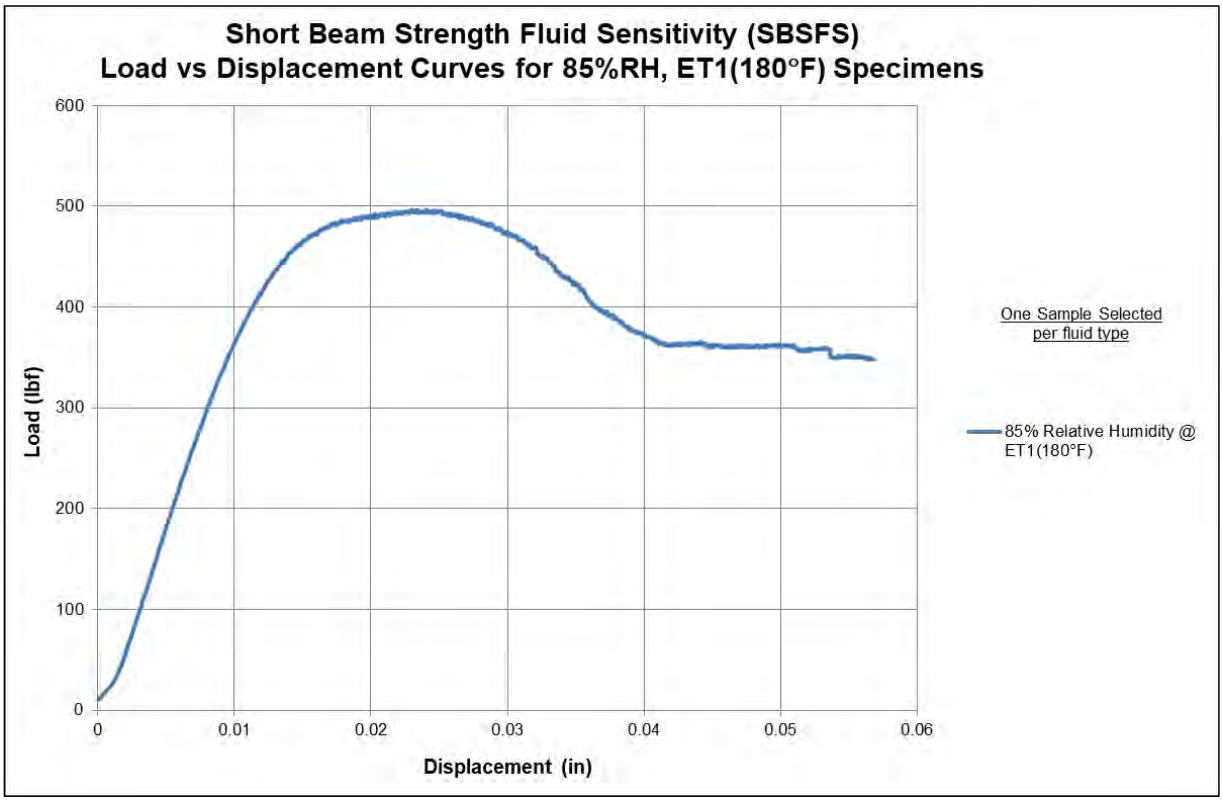

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 48hrs ± 4hrs, ET2(250°F) Specimens
Load (lbf)
Displacement (in)
0
100
200
300
400
500
600
700
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
One Sample Selected per fluid type
Isopropyl Alcohol Deicing


Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for Dry, RT(70°F) Specimens
Load (lbf)
Displacement (in)
0
100
200
300
400
500
600
700
800
900
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
One Sample Selected per fluid type
Dry per Section 6.1 NTP3800Q1 @ RT(70°F)


Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for Dry, ET1(180°F) Specimens
Load (lbf)
800
700
600
500
400
300
200
100
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
Displacement (in)
One Sample Selected per fluid type
Dry per Section 6.1 NTP3800Q1 @ ET1(180°F)


Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for Dry, ET2(250°F) Specimens
Load (lbf)
700
600
500
400
300
200
100
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
Displacement (in)
One Sample Selected per fluid type
Dry per Section 6.1 NTP3800Q1 @ ET2(250°F)

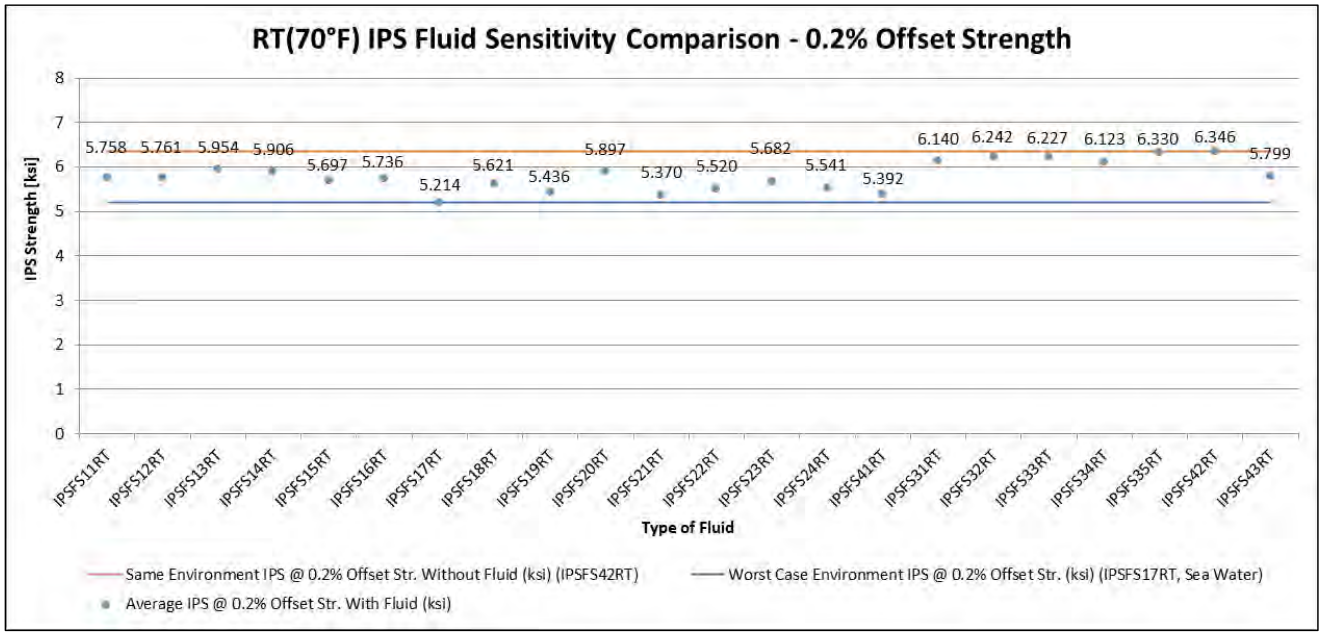

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 85%RH, RT(70°F) Specimens
Load (lbf)
800
700
600
500
400
300
200
100
0
0
0.01
0.02
0.03
0.04
0.05
0.06
Displacement (in)
One Sample Selected per fluid type
85% Relative Humidity @ RT(70°F)

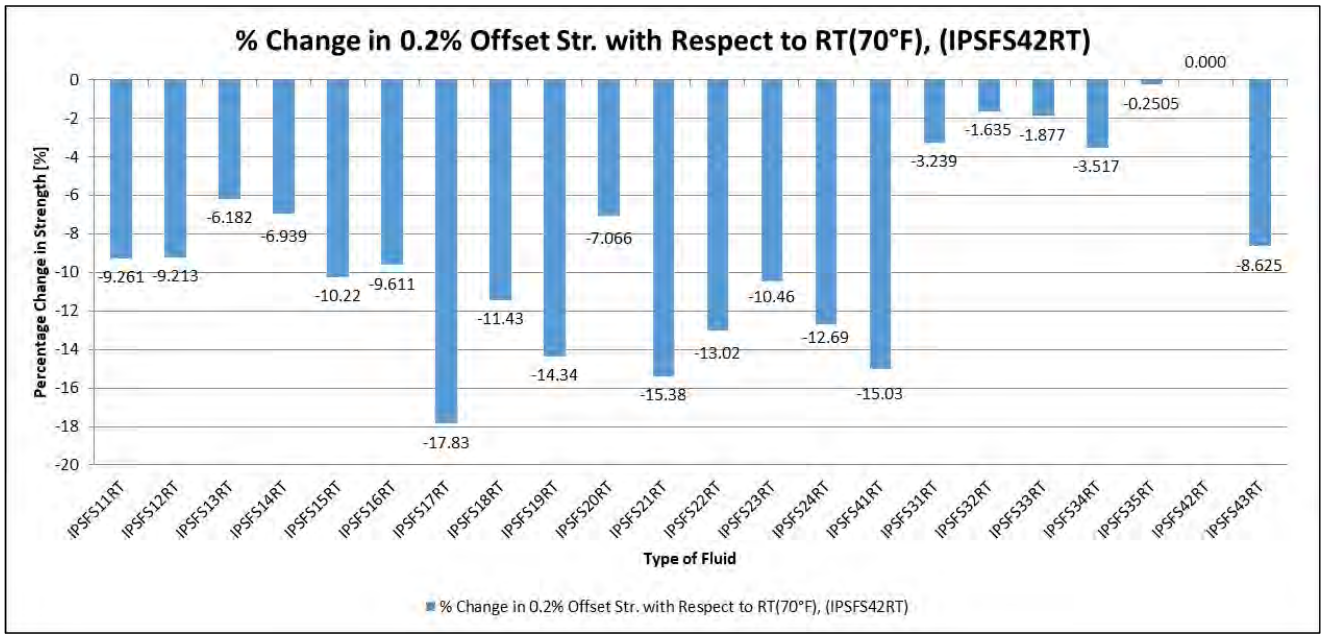

Short Beam Strength Fluid Sensitivity (SBSFS)
Load vs Displacement Curves for 85%RH, ET1(180°F) Specimens
Load (lbf)
600
500
400
300
200
100
0
0
0.01
0.02
0.03
0.04
0.05
0.06
Displacement (in)
One Sample Selected per fluid type
85% Relative Humidity @ ET1(180°F)

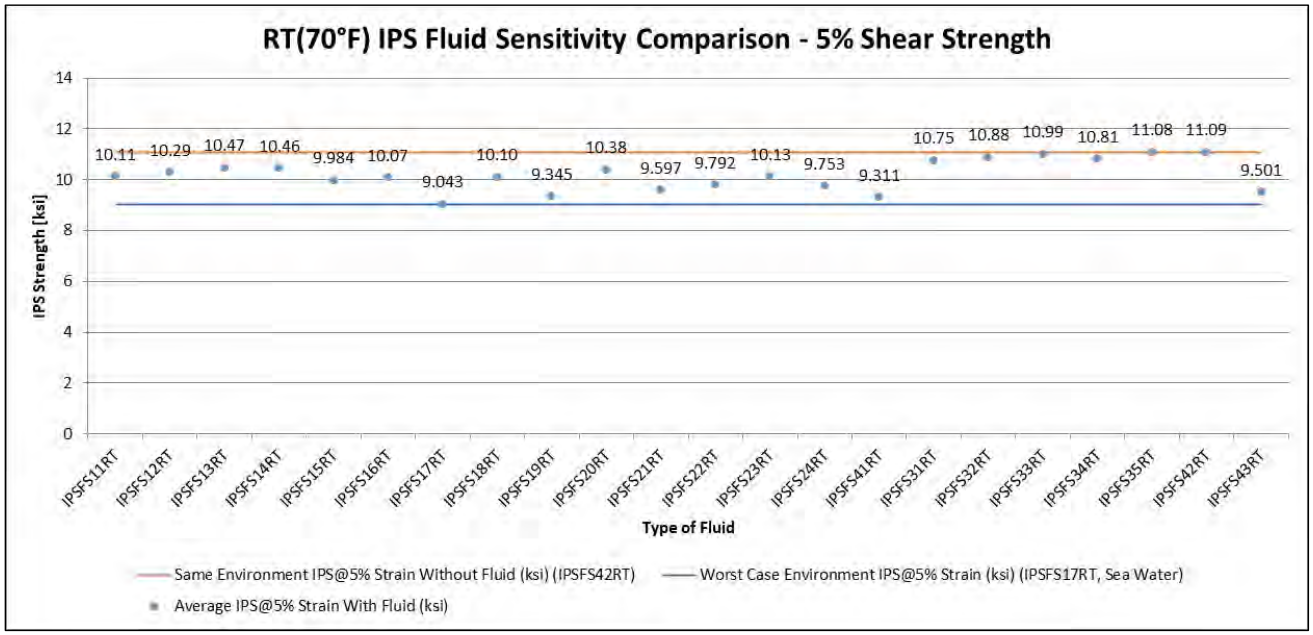
7.2 In-Plane Shear Fluid Sensitivity (IPSFS)

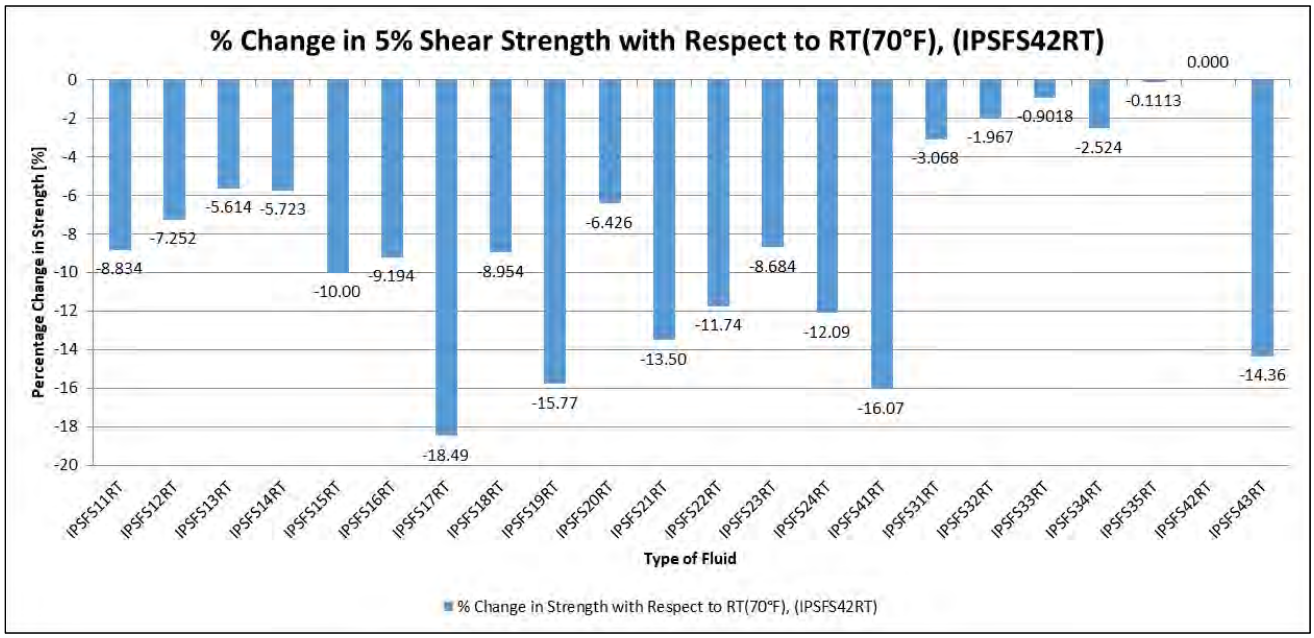
7.2.1 IPSFS Room Temperature Test Data

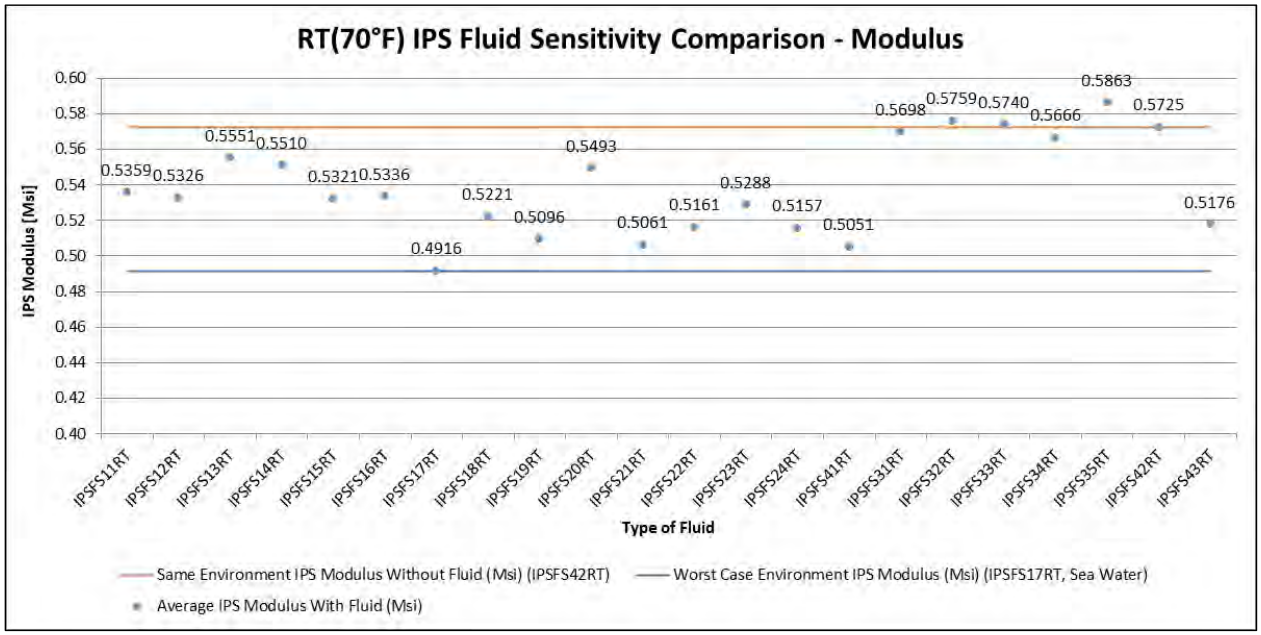
Code	Type of Fluid	Exposure
IPSFS11RT	100 Low Lead Fuel	90 days min @ 70°F±10°F
IPSFS12RT	Jet A Fuel	
IPSFS13RT	MIL-PRF-5606 Hydraulic Oil	
IPSFS14RT	MIL-PRF-83282 Hydraulic Oil	
IPSFS15RT	MIL-PRF-7808 Engine Oil	
IPSFS16RT	MIL-PRF-23699 Engine Oil	
IPSFS17RT	Sea Water	
IPSFS18RT	Skydrol LD-4	
IPSFS19RT	50% Water with 50% Skydrol LD-4	
IPSFS20RT	MIL-PRF-87252 PAO Cooling Fluid	
IPSFS21RT	E85 Fuel (Alternate aircraft fuel)	
IPSFS22RT	SAE AMS 2629 Jet Reference Fluid	
IPSFS23RT	MIL-PRF-87257B Hydraulic Oil	
IPSFS24RT	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
IPSFS41RT	Distilled Water	
IPSFS31RT	MEK washing fluid	90 mins @ 70°F±10°F
IPSFS32RT	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
IPSFS33RT	De-icing Fluid SAE AMS 1428 (Type II)	
IPSFS34RT	De-icing Fluid SAE AMS 1428 (Type IV)	
IPSFS35RT	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
IPSFS42RT	Dry	Per section 6.1 Test Plan NTP 3800Q1
IPSFS43RT	85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1

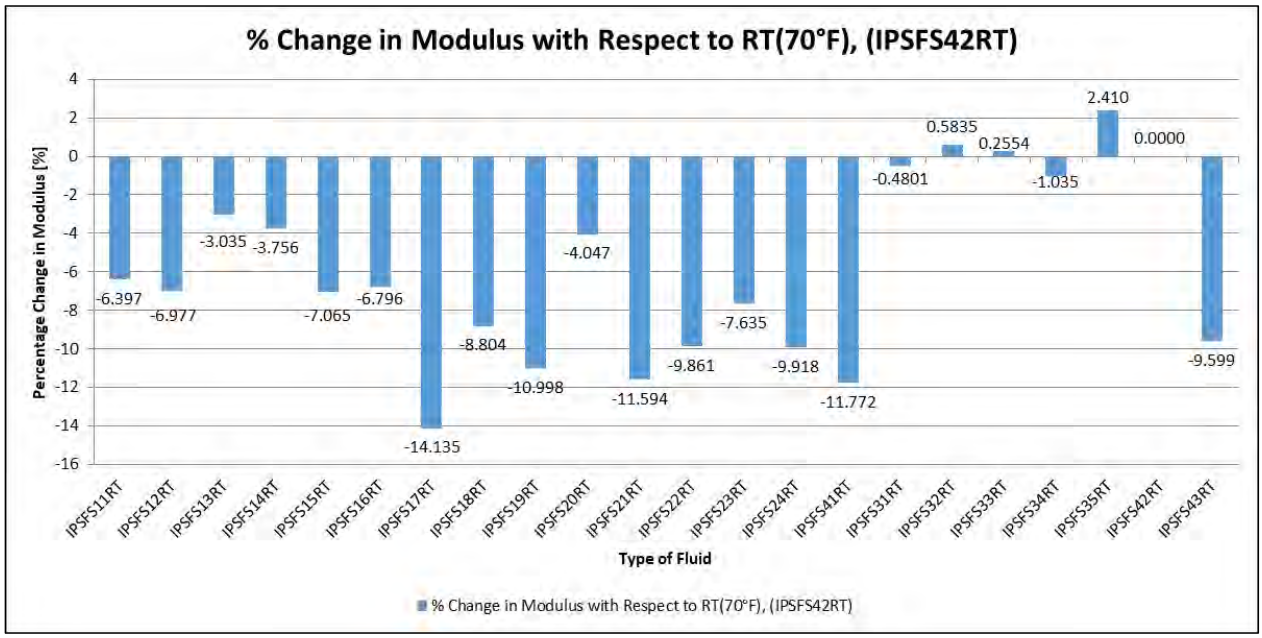

RT(70°F) IPS Fluid Sensitivity Comparison - 0.2% Offset Strength
IPS Strength [ksi]
Type of Fluid
5.758 5.761 5.954 5.906 5.697 5.736 5.214 5.621 5.436 5.897 5.370 5.520 5.682 5.541 5.392 6.140 6.242 6.227 6.123 6.330 6.346 5.799
IPSFS11RT IPSFS12RT IPSFS13RT IPSFS14RT IPSFS15RT IPSFS16RT IPSFS17RT IPSFS18RT IPSFS19RT IPSFS20RT IPSFS21RT IPSFS22RT IPSFS23RT IPSFS24RT IPSFS41RT IPSFS31RT IPSFS32RT IPSFS33RT IPSFS34RT IPSFS35RT IPSFS42RT IPSFS43RT
Same Environment IPS @ 0.2% Offset Str. Without Fluid (ksi) (IPSFS42RT)
Worst Case Environment IPS @ 0.2% Offset Str. (ksi) (IPSFS17RT, Sea Water)
Average IPS @ 0.2% Offset Str. With Fluid (ksi)


% Change in 0.2% Offset Str. with Respect to RT(70°F), (IPSFS42RT)
Percentage Change in Strength [%]
Type of Fluid
-9.261 -9.213 -6.182 -6.939 -10.22 -9.611 -17.83 -11.43 -14.34 -7.066 -15.38 -13.02 -10.46 -12.69 -15.03 -3.239 -1.635 -1.877 -3.517 -0.2505 0.000 -8.625
IPSFS11RT IPSFS12RT IPSFS13RT IPSFS14RT IPSFS15RT IPSFS16RT IPSFS17RT IPSFS18RT IPSFS19RT IPSFS20RT IPSFS21RT IPSFS22RT IPSFS23RT IPSFS24RT IPSFS41RT IPSFS31RT IPSFS32RT IPSFS33RT IPSFS34RT IPSFS35RT IPSFS42RT IPSFS43RT
% Change in 0.2% Offset Str. with Respect to RT(70°F), (IPSFS42RT)


RT(70°F) IPS Fluid Sensitivity Comparison - 5% Shear Strength
IPS Strength [ksi]
14
12
10
8
6
4
2
0
10.11
10.29
10.47
10.46
9.984
10.07
9.043
10.10
9.345
10.38
9.597
9.792
10.13
9.753
9.311
10.75
10.88
10.99
10.81
11.08
11.09
9.501
IPSFS11RT
IPSFS12RT
IPSFS13RT
IPSFS14RT
IPSFS15RT
IPSFS16RT
IPSFS17RT
IPSFS18RT
IPSFS19RT
IPSFS20RT
IPSFS21RT
IPSFS22RT
IPSFS23RT
IPSFS24RT
IPSFS41RT
IPSFS31RT
IPSFS32RT
IPSFS33RT
IPSFS34RT
IPSFS35RT
IPSFS42RT
IPSFS43RT
Type of Fluid
Same Environment IPS@5% Strain Without Fluid (ksi) (IPSFS42RT)
Worst Case Environment IPS@5% Strain (ksi) (IPSFS17RT, Sea Water)
Average IPS@5% Strain With Fluid (ksi)


% Change in 5% Shear Strength with Respect to RT(70°F), (IPSFS42RT)
Percentage Change in Strength [%]
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-8.834
-7.252
-5.614
-5.723
-10.00
-9.194
-18.49
-8.954
-15.77
-6.426
-13.50
-11.74
-8.684
-12.09
-16.07
-3.068
-1.967
-0.9018
-2.524
-0.1113
0.000
-14.36
IPSFS11RT
IPSFS12RT
IPSFS13RT
IPSFS14RT
IPSFS15RT
IPSFS16RT
IPSFS17RT
IPSFS18RT
IPSFS19RT
IPSFS20RT
IPSFS21RT
IPSFS22RT
IPSFS23RT
IPSFS24RT
IPSFS41RT
IPSFS31RT
IPSFS32RT
IPSFS33RT
IPSFS34RT
IPSFS35RT
IPSFS42RT
IPSFS43RT
Type of Fluid
% Change in Strength with Respect to RT(70°F), (IPSFS42RT)


RT(70°F) IPS Fluid Sensitivity Comparison - Modulus
IPS Modulus [Msi]
0.60
0.58
0.56
0.54
0.52
0.50
0.48
0.46
0.44
0.42
0.40
0.5359
0.5326
0.5551
0.5510
0.5321
0.5336
0.4916
0.5221
0.5096
0.5493
0.5061
0.5161
0.5288
0.5157
0.5051
0.5698
0.5759
0.5740
0.5666
0.5863
0.5725
0.5176
IPSFS11RT
IPSFS12RT
IPSFS13RT
IPSFS14RT
IPSFS15RT
IPSFS16RT
IPSFS17RT
IPSFS18RT
IPSFS19RT
IPSFS20RT
IPSFS21RT
IPSFS22RT
IPSFS23RT
IPSFS24RT
IPSFS41RT
IPSFS31RT
IPSFS32RT
IPSFS33RT
IPSFS34RT
IPSFS35RT
IPSFS42RT
IPSFS43RT
Type of Fluid
Same Environment IPS Modulus Without Fluid (Msi) (IPSFS42RT)
Worst Case Environment IPS Modulus (Msi) (IPSFS17RT, Sea Water)
Average IPS Modulus With Fluid (Msi)


% Change in Modulus with Respect to RT(70°F), (IPSFS42RT)
Percentage Change in Modulus [%]
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-6.397
-6.977
-3.035
-3.756
-7.065
-6.796
-14.135
-8.804
-10.998
-4.047
-11.594
-9.861
-7.635
-9.918
-11.772
-0.4801
0.5835
0.2554
-1.035
2.410
0.0000
-9.599
IPSFS11RT
IPSFS12RT
IPSFS13RT
IPSFS14RT
IPSFS15RT
IPSFS16RT
IPSFS17RT
IPSFS18RT
IPSFS19RT
IPSFS20RT
IPSFS21RT
IPSFS22RT
IPSFS23RT
IPSFS24RT
IPSFS41RT
IPSFS31RT
IPSFS32RT
IPSFS33RT
IPSFS34RT
IPSFS35RT
IPSFS42RT
IPSFS43RT
Type of Fluid
% Change in Modulus with Respect to RT(70°F), (IPSFS42RT)

Fluid Sensitivity Screening
In-Plane Shear Properties (IPSFS)--RT(70°F) Strength and Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

												Average		
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
	TCDNA111FS11RT	A	C1	1	1	5.999	10.25	0.5533	0.07372	16	0.004607			
	TCDNA112FS11RT	A	C1	1	1	5.576	9.853	0.5197	0.07643	16	0.004777			
IPSFS11RT	TCDNA113FS11RT	A	C1	1	1	5.716	10.14	0.5337	0.07492	16	0.004682	5.758	10.11	0.5359
	TCDNA114FS11RT	A	C1	1	1	5.785	10.25	0.5385	0.07477	16	0.004673			
	TCDNA115FS11RT	A	C1	1	1	5.716	10.09	0.5342	0.07538	16	0.004711			
	TCDNA111FS12RT	A	C1	1	1	5.787	10.26	0.5346	0.07482	16	0.004676			
	TCDNA112FS12RT	A	C1	1	1	5.687	10.43	0.5260	0.07587	16	0.004742			
IPSFS12RT	TCDNA113FS12RT	A	C1	1	1	5.663	10.22	0.5216	0.07587	16	0.004742	5.761	10.29	0.5326
	TCDNA114FS12RT	A	C1	1	1	5.765	10.25	0.5343	0.07612	16	0.004757			
	TCDNA115FS12RT*	A	C1	1	1	5.842		0.5404	0.07560	16	0.004725			
	TCDNA116FS12RT*	A	C1	1	1	5.824		0.5384	0.07490	16	0.004681			
	TCDNA121FS13RT	A	C1	1	1	5.729	10.26	0.5339	0.07423	16	0.004640			
	TCDNA122FS13RT	A	C1	1	1	5.806	10.40	0.5426	0.07377	16	0.004610			
IPSFS13RT	TCDNA123FS13RT	A	C1	1	1	6.044	10.53	0.5649	0.07245	16	0.004528	5.954	10.47	0.5551
	TCDNA124FS13RT	A	C1	1	1	6.149	10.57	0.5714	0.07123	16	0.004452			
	TCDNA125FS13RT	A	C1	1	1	6.040	10.60	0.5628	0.07327	16	0.004579			
	TCDNA131FS14RT	A	C1	1	1	5.938	10.47	0.5551	0.07295	16	0.004559			
	TCDNA132FS14RT	A	C1	1	1	5.913	10.51	0.5519	0.07310	16	0.004569			
IPSFS14RT	TCDNA133FS14RT	A	C1	1	1	5.999	10.57	0.5615	0.07335	16	0.004584	5.906	10.46	0.5510
	TCDNA134FS14RT	A	C1	1	1	5.882	10.39	0.5504	0.07392	16	0.004620			
	TCDNA135FS14RT	A	C1	1	1	5.796	10.36	0.5362	0.07362	16	0.004601			
	TCDNA141FS15RT	A	C1	1	1	5.746	10.00	0.5342	0.07413	16	0.004633			
	TCDNA142FS15RT	A	C1	1	1	5.564	9.841	0.5160	0.07513	16	0.004696			
IPSFS15RT	TCDNA143FS15RT	A	C1	1	1	5.655	9.961	0.5286	0.07488	16	0.004680	5.697	9.984	0.5321
	TCDNA144FS15RT	A	C1	1	1	5.769	10.07	0.5424	0.07403	16	0.004627			
	TCDNA145FS15RT	A	C1	1	1	5.752	10.05	0.5391	0.07382	16	0.004614			
	TCDNA141FS16RT	A	C1	1	1	5.637	9.911	0.5230	0.07523	16	0.004702			
	TCDNA142FS16RT	A	C1	1	1	5.667	10.03	0.5290	0.07577	16	0.004735			
IPSFS16RT	TCDNA143FS16RT	A	C1	1	1	5.767	10.14	0.5376	0.07522	16	0.004701	5.736	10.07	0.5336
	TCDNA144FS16RT	A	C1	1	1	5.860	10.20	0.5442	0.07500	16	0.004688			
	TCDNA145FS16RT	A	C1	1	1	5.749	10.09	0.5343	0.07547	16	0.004717			
	TCDNA151FS17RT	A	C1	1	1	5.255	9.071	0.4964	0.07588	16	0.004743			
	TCDNA152FS17RT	A	C1	1	1	5.126	8.922	0.4820	0.07587	16	0.004742			
IPSFS17RT	TCDNA153FS17RT	A	C1	1	1	5.135	8.909	0.4847	0.07680	16	0.004800	5.214	9.043	0.4916
	TCDNA154FS17RT	A	C1	1	1	5.302	9.179	0.5007	0.07535	16	0.004709			
	TCDNA155FS17RT	A	C1	1	1	5.253	9.135	0.4942	0.07568	16	0.004730			
	TCDNA161FS18RT	A	C1	1	1	5.803	10.18	0.5392	0.07105	16	0.004441			
	TCDNA162FS18RT	A	C1	1	1	5.540	10.01	0.5152	0.07382	16	0.004614			
IPSFS18RT	TCDNA163FS18RT	A	C1	1	1	5.466	9.946	0.5058	0.07545	16	0.004716	5.621	10.10	0.5221
	TCDNA164FS18RT	A	C1	1	1	5.545	10.05	0.5174	0.07557	16	0.004723			
	TCDNA165FS18RT	A	C1	1	1	5.749	10.31	0.5329	0.07465	16	0.004666			
	TCDNA161FS19RT	A	C1	1	1	5.453	9.412	0.5103	0.07403	16	0.004627			
	TCDNA162FS19RT	A	C1	1	1	5.367	9.324	0.5039	0.07410	16	0.004631			
IPSFS19RT	TCDNA163FS19RT	A	C1	1	1	5.306	9.216	0.4972	0.07417	16	0.004635	5.436	9.345	0.5096
	TCDNA164FS19RT	A	C1	1	1	5.488	9.363	0.5165	0.07275	16	0.004547			
	TCDNA175FS19RT	A	C1	1	1	5.564	9.409	0.5200	0.07127	16	0.004454			
	TCDNA171FS20RT	A	C1	1	1	5.674	10.20	0.5309	0.07502	16	0.004689			
	TCDNA172FS20RT	A	C1	1	1	5.882	10.41	0.5470	0.07412	16	0.004632			
IPSFS20RT	TCDNA173FS20RT	A	C1	1	1	5.980	10.42	0.5575	0.07278	16	0.004549	5.897	10.38	0.5493
	TCDNA174FS20RT	A	C1	1	1	6.105	10.55	0.5676	0.07065	16	0.004416			
	TCDNA175FS20RT	A	C1	1	1	5.847	10.33	0.5437	0.07280	16	0.004550			
	TCDNA181FS21RT	A	C1	1	1	5.407	9.651	0.5106	0.07502	16	0.004689			
	TCDNA182FS21RT	A	C1	1	1	5.415	9.637	0.5081	0.07512	16	0.004695			
IPSFS21RT	TCDNA183FS21RT	A	C1	1	1	5.418	9.653	0.5099	0.07498	16	0.004686	5.370	9.597	0.5061
	TCDNA184FS21RT	A	C1	1	1	5.310	9.563	0.5027	0.07503	16	0.004690			
	TCDNA185FS21RT	A	C1	1	1	5.300	9.480	0.4995	0.07527	16	0.004704			
	TCDNA181FS22RT	A	C1	1	1	5.548	9.807	0.5210	0.07448	16	0.004655			
	TCDNA182FS22RT	A	C1	1	1	5.619	9.928	0.5248	0.07420	16	0.004638			
IPSFS22RT	TCDNA183FS22RT	A	C1	1	1	5.532	9.813	0.5170	0.07495	16	0.004684	5.520	9.792	0.5161
	TCDNA184FS22RT	A	C1	1	1	5.417	9.643	0.5063	0.07512	16	0.004695			
	TCDNA185FS22RT	A	C1	1	1	5.484	9.768	0.5112	0.07430	16	0.004644			
	TCDNA191FS23RT	A	C1	1	1	5.731	10.26	0.5351	0.07487	16	0.004679			
	TCDNA192FS23RT	A	C1	1	1	5.591	10.13	0.5216	0.07543	16	0.004715			
IPSFS23RT	TCDNA193FS23RT	A	C1	1	1	5.598	10.06	0.5196	0.07598	16	0.004749	5.682	10.13	0.5288
	TCDNA194FS23RT	A	C1	1	1	5.665	10.02	0.5258	0.07538	16	0.004711			
	TCDNA195FS23RT	A	C1	1	1	5.824	10.18	0.5419	0.07352	16	0.004595			
	TCDNA1101FS24RT	A	C1	1	1	5.507	9.689	0.5142	0.07448	16	0.004655			
	TCDNA1102FS24RT	A	C1	1	1	5.479	9.695	0.5116	0.07490	16	0.004681			
IPSFS24RT	TCDNA1103FS24RT	A	C1	1	1	5.540	9.764	0.5147	0.07482	16	0.004676	5.541	9.753	0.5157
	TCDNA1104FS24RT	A	C1	1	1	5.582	9.795	0.5197	0.07473	16	0.004671			
	TCDNA1105FS24RT	A	C1	1	1	5.595	9.821	0.5184	0.07435	16	0.004647			
	TCDNA1141FS41RT*	A	C1	1	1	5.402		0.5048	0.07345	16	0.004591			
	TCDNA1142FS41RT*	A	C1	1	1	5.408		0.5067	0.07418	16	0.004636			
IPSFS41RT	TCDNA1143FS41RT*	A	C1	1	1	5.386		0.5058	0.07427	16	0.004642	5.392	9.311	0.5051
	TCDNA1144FS41RT	A	C1	1	1	5.303	9.245	0.4968	0.07468	16	0.004668			
	TCDNA1145FS41RT	A	C1	1	1	5.271	9.193	0.4923	0.07442	16	0.004651			
	TCDNA1146FS41RT	A	C1	1	1	5.585	9.497	0.5243	0.07188	16	0.004493			
	TCDNA1101FS31RT	A	C1	1	1	6.079	10.73	0.5619	0.07368	16	0.004605			
	TCDNA1102FS31RT	A	C1	1	1	6.284	10.87	0.5868	0.07233	16	0.004521			
IPSFS31RT	TCDNA1113FS31RT	A	C1	1	1	6.274	10.78	0.5831	0.07162	16	0.004476	6.140	10.75	0.5698
	TCDNA1114FS31RT	A	C1	1	1	6.037	10.67	0.5581	0.07453	16	0.004658			
	TCDNA1115FS31RT	A	C1	1	1	6.027	10.71	0.5590	0.07555	16	0.004722			

IPSFS32RT	TCDNA1111FS32RT	A	C1	1	1	6.354	11.00	0.5852	0.07302	16	0.004564	6.242	10.88	0.5759
	TCDNA1112FS32RT	A	C1	1	1	6.502	10.98	0.6028	0.07185	16	0.004491			
	TCDNA1113FS32RT	A	C1	1	1	6.139	10.80	0.5675	0.07362	16	0.004601			
	TCDNA1114FS32RT	A	C1	1	1	6.019	10.72	0.5543	0.07460	16	0.004663			
	TCDNA1115FS32RT	A	C1	1	1	6.197	10.89	0.5695	0.07455	16	0.004659			
IPSFS33RT	TCDNA1121FS33RT	A	C1	1	1	6.065	10.86	0.5610	0.07487	16	0.004679	6.227	10.99	0.5740
	TCDNA1122FS33RT	A	C1	1	1	6.103	10.91	0.5641	0.07472	16	0.004670			
	TCDNA1123FS33RT	A	C1	1	1	6.242	11.04	0.5747	0.07478	16	0.004674			
	TCDNA1124FS33RT	A	C1	1	1	6.219	11.00	0.5762	0.07420	16	0.004638			
	TCDNA1125FS33RT	A	C1	1	1	6.506	11.16	0.5938	0.07210	16	0.004506			
IPSFS34RT	TCDNA1131FS34RT	A	C1	1	1	5.915	10.60	0.5439	0.07395	16	0.004622	6.123	10.81	0.5666
	TCDNA1132FS34RT	A	C1	1	1	6.084	10.75	0.5629	0.07410	16	0.004631			
	TCDNA1133FS34RT	A	C1	1	1	6.283	10.95	0.5833	0.07317	16	0.004573			
	TCDNA1134FS34RT	A	C1	1	1	6.205	10.93	0.5733	0.07312	16	0.004570			
	TCDNA1135FS34RT	A	C1	1	1	6.127	10.84	0.5697	0.07335	16	0.004584			
IPSFS35RT	TCDNA1131FS35RT	A	C1	1	1	6.227	10.99	0.5740	0.07450	16	0.004656	6.330	11.08	0.5863
	TCDNA1132FS35RT	A	C1	1	1	6.395	11.04	0.5955	0.07297	16	0.004560			
	TCDNA1143FS35RT	A	C1	1	1	6.525	11.24	0.6073	0.07075	16	0.004422			
	TCDNA1144FS35RT	A	C1	1	1	6.300	11.08	0.5807	0.07328	16	0.004580			
	TCDNA1145FS35RT	A	C1	1	1	6.204	11.05	0.5742	0.07495	16	0.004684			
IPSFS42RT	TCDNA1151FS42RT**	A	C1	1	1	7.191		0.5376	0.07328	16	0.004580	6.346	11.09	0.5725
	TCDNA1152FS42RT	A	C1	1	1	6.249	11.22	0.5870	0.07397	16	0.004623			
	TCDNA1153FS42RT	A	C1	1	1	5.986	10.96	0.5856	0.07425	16	0.004641			
	TCDNA1154FS42RT	A	C1	1	1	6.269	11.18	0.5761	0.07382	16	0.004614			
	TCDNA1155FS42RT	A	C1	1	1	6.125	11.06	0.5686	0.07398	16	0.004624			
	TCDNA1156FS42RT	A	C1	1	1	6.257	11.04	0.5802	0.07412	16	0.004632			
IPSFS43RT	TCDNA1161FS43RT	A	C1	1	1	5.976	9.864	0.5332	0.07507	16	0.004692	5.799	9.501	0.5176
	TCDNA1162FS43RT	A	C1	1	1	5.648	9.414	0.5022	0.07427	16	0.004642			
	TCDNA1163FS43RT	A	C1	1	1	6.150	9.665	0.5582	0.07142	16	0.004464			
	TCDNA1164FS43RT	A	C1	1	1	5.648	9.275	0.5032	0.07357	16	0.004598			
	TCDNA1165FS43RT	A	C1	1	1	5.571	9.287	0.4910	0.07435	16	0.004647			

Modulus calculation is obtained from 2000 - 6000 microstrain for all IPS fluid sensitivity tests.

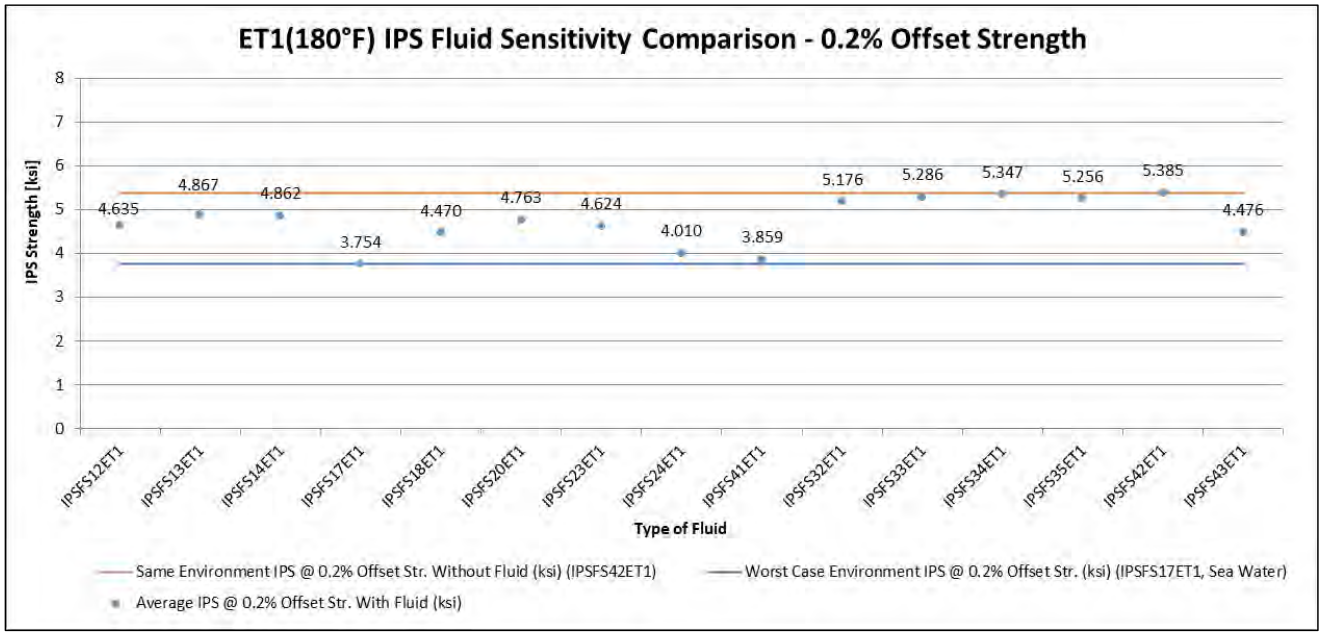
* 5% shear strength not reported because the biaxial extensometer slipped before obtaining a shear strain of 50000 microstrain.

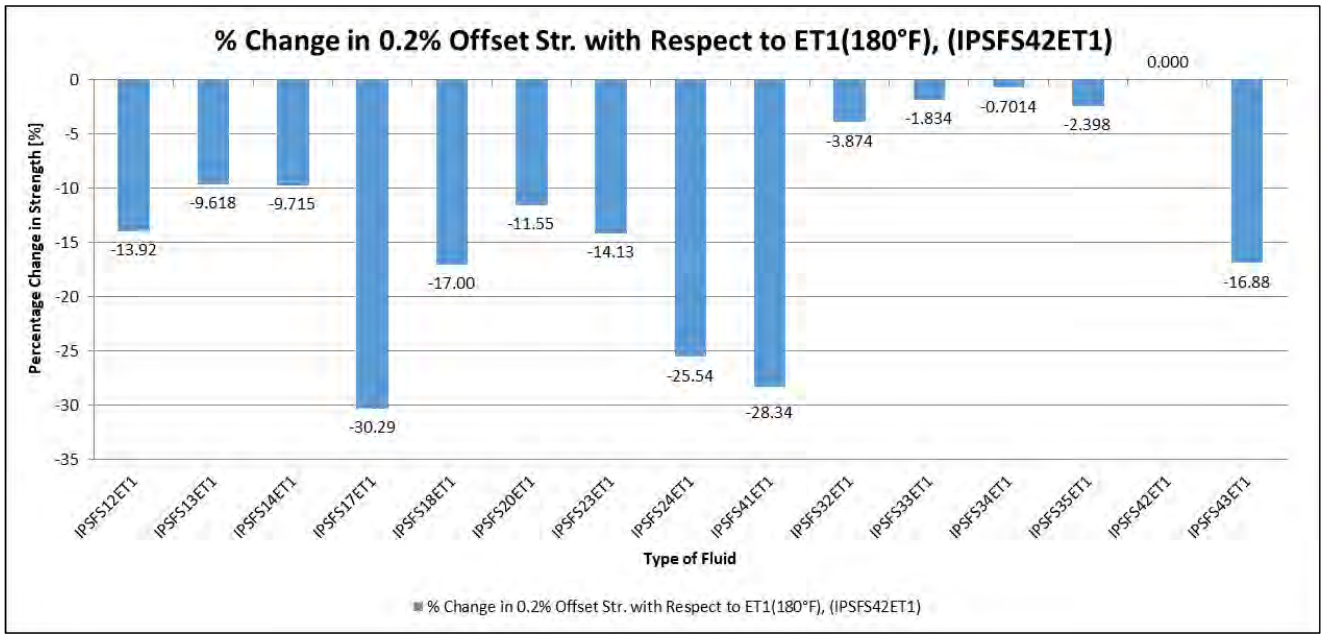
** 5% shear strength not reported due to strain gage failure occurred before reaching a shear strain of 50000 microstrain.

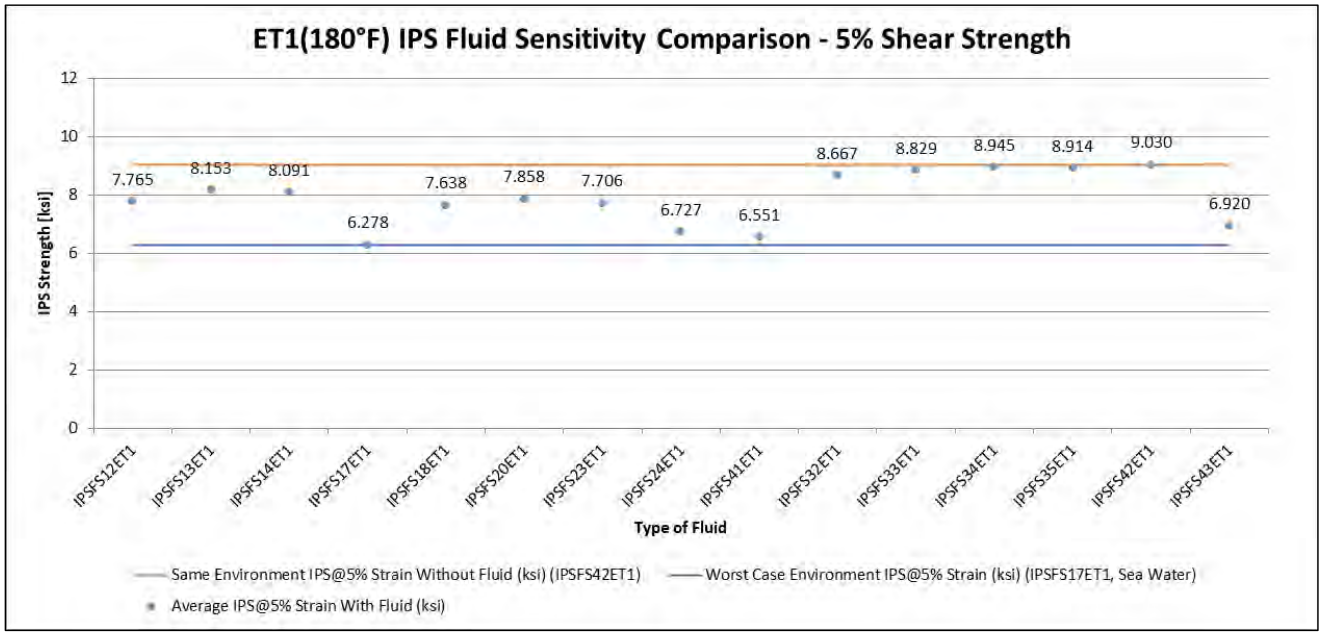
7.2.2 IPSFS Elevated Temperature Test Data

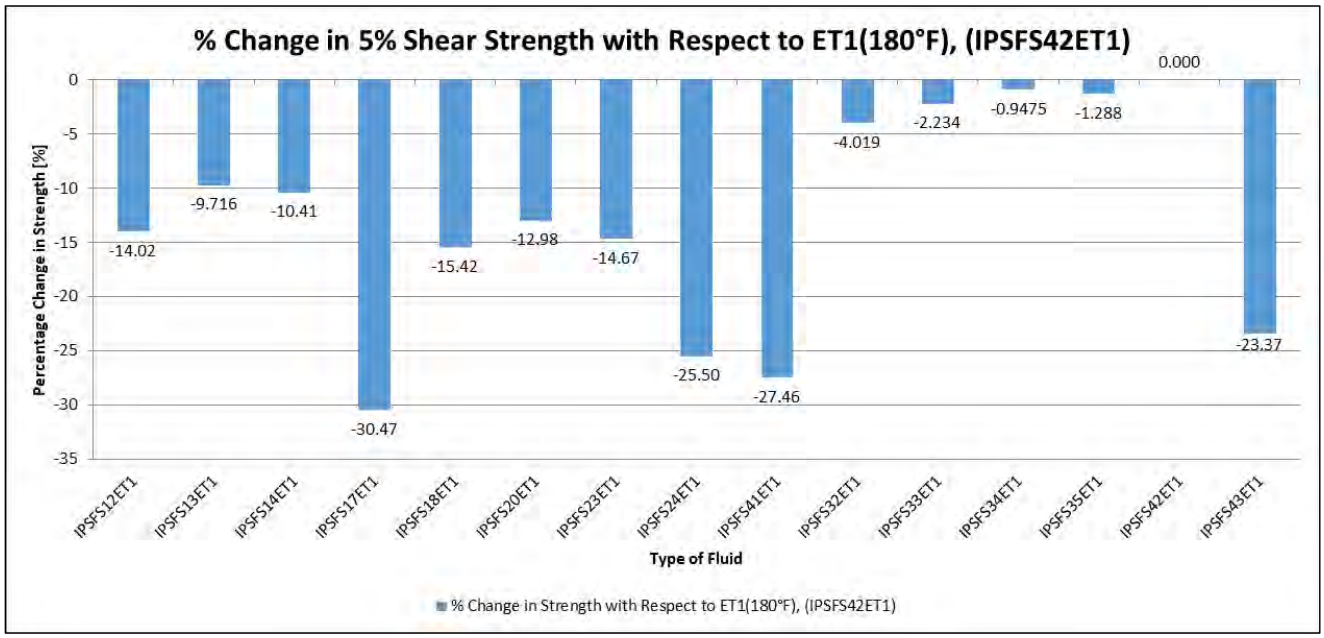
7.2.2.1 IPSFS ET1(180°F) Data

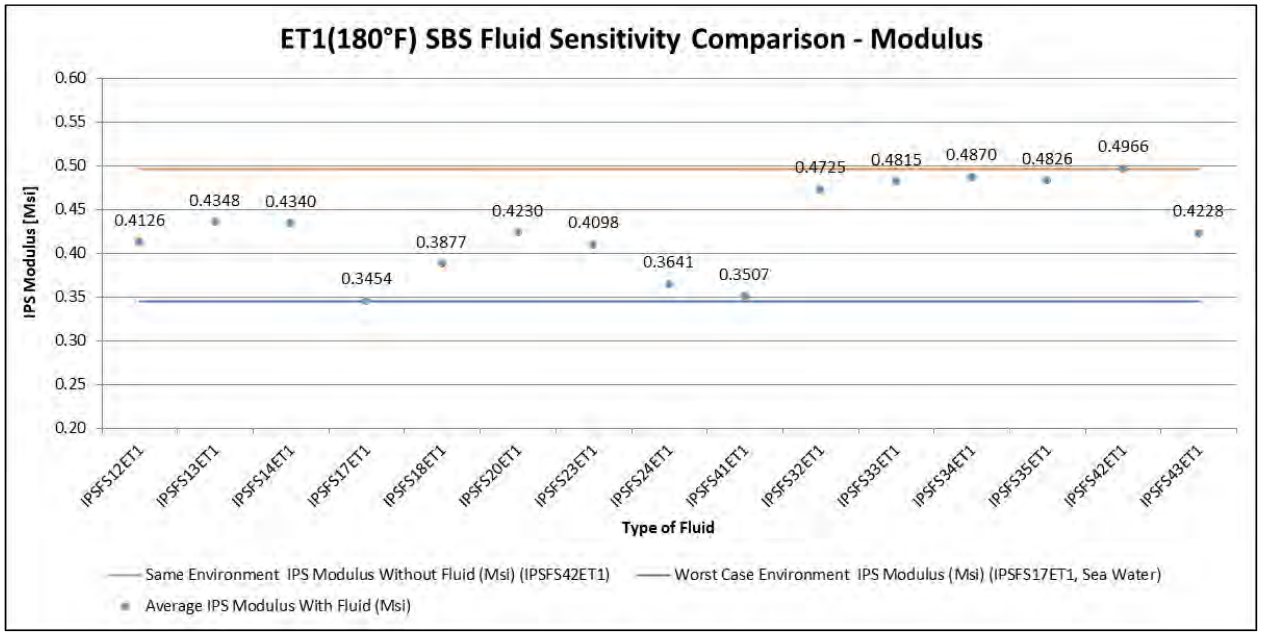
Code	Type of Fluid	Exposure
IPSFS12ET1	Jet A Fuel	90 days min @ 70°F±10°F
IPSFS13ET1	MIL-PRF-5606 Hydraulic Oil	
IPSFS14ET1	MIL-PRF-83282 Hydraulic Oil	
IPSFS17ET1	Sea Water	
IPSFS18ET1	Skydrol LD-4	
IPSFS20ET1	MIL-PRF-87252 PAO Cooling Fluid	
IPSFS23ET1	MIL-PRF-87257B Hydraulic Oil	
IPSFS24ET1	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
IPSFS41ET1	Distilled Water	
IPSFS32ET1	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	90 mins @ 70°F±10°F
IPSFS33ET1	De-icing Fluid SAE AMS 1428 (Type II)	
IPSFS34ET1	De-icing Fluid SAE AMS 1428 (Type IV)	
IPSFS35ET1	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
IPSFS42ET1	Dry	Per section 6.1 Test Plan NTP 3800Q1
IPSFS43ET1	85% Relative Humidity	Per section 6.1 Test Plan NTP 3800Q1

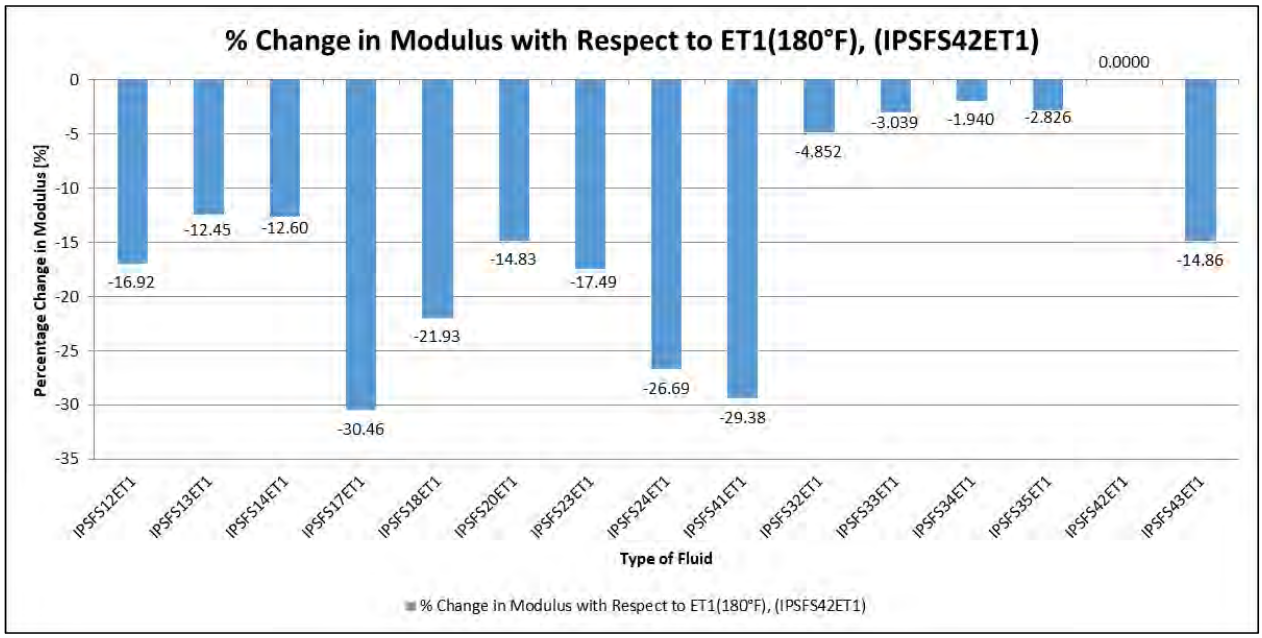

ET1(180°F) IPS Fluid Sensitivity Comparison - 0.2% Offset Strength
IPS Strength [ksi]
8
7
6
5
4
3
2
1
0
4.635
4.867
4.862
3.754
4.470
4.763
4.624
4.010
3.859
5.176
5.286
5.347
5.256
5.385
4.476
IPSFS12ET1
IPSFS13ET1
IPSFS14ET1
IPSFS17ET1
IPSFS18ET1
IPSFS20ET1
IPSFS23ET1
IPSFS24ET1
IPSFS41ET1
IPSFS32ET1
IPSFS33ET1
IPSFS34ET1
IPSFS35ET1
IPSFS42ET1
IPSFS43ET1
Type of Fluid
Same Environment IPS @ 0.2% Offset Str. Without Fluid (ksi) (IPSFS42ET1)
Worst Case Environment IPS @ 0.2% Offset Str. (ksi) (IPSFS17ET1, Sea Water)
Average IPS @ 0.2% Offset Str. With Fluid (ksi)


% Change in 0.2% Offset Str. with Respect to ET1(180°F), (IPSFS42ET1)
Percentage Change in Strength [%]
0
-5
-10
-15
-20
-25
-30
-35
-13.92
-9.618
-9.715
-30.29
-17.00
-11.55
-14.13
-25.54
-28.34
-3.874
-1.834
-0.7014
-2.398
0.000
-16.88
IPSFS12ET1
IPSFS13ET1
IPSFS14ET1
IPSFS17ET1
IPSFS18ET1
IPSFS20ET1
IPSFS23ET1
IPSFS24ET1
IPSFS41ET1
IPSFS32ET1
IPSFS33ET1
IPSFS34ET1
IPSFS35ET1
IPSFS42ET1
IPSFS43ET1
Type of Fluid
% Change in 0.2% Offset Str. with Respect to ET1(180°F), (IPSFS42ET1)


ET1(180°F) IPS Fluid Sensitivity Comparison - 5% Shear Strength
IPS Strength [ksi]
12
10
8
6
4
2
0
7.765
8.153
8.091
6.278
7.638
7.858
7.706
6.727
6.551
8.667
8.829
8.945
8.914
9.030
6.920
IPSFS12ET1
IPSFS13ET1
IPSFS14ET1
IPSFS17ET1
IPSFS18ET1
IPSFS20ET1
IPSFS23ET1
IPSFS24ET1
IPSFS41ET1
IPSFS32ET1
IPSFS33ET1
IPSFS34ET1
IPSFS35ET1
IPSFS42ET1
IPSFS43ET1
Type of Fluid
Same Environment IPS@5% Strain Without Fluid (ksi) (IPSFS42ET1)
Worst Case Environment IPS@5% Strain (ksi) (IPSFS17ET1, Sea Water)
Average IPS@5% Strain With Fluid (ksi)


% Change in 5% Shear Strength with Respect to ET1(180°F), (IPSFS42ET1)
Percentage Change in Strength [%]
0
-5
-10
-15
-20
-25
-30
-35
-14.02
-9.716
-10.41
-30.47
-15.42
-12.98
-14.67
-25.50
-27.46
-4.019
-2.234
-0.9475
-1.288
0.000
-23.37
IPSFS12ET1
IPSFS13ET1
IPSFS14ET1
IPSFS17ET1
IPSFS18ET1
IPSFS20ET1
IPSFS23ET1
IPSFS24ET1
IPSFS41ET1
IPSFS32ET1
IPSFS33ET1
IPSFS34ET1
IPSFS35ET1
IPSFS42ET1
IPSFS43ET1
Type of Fluid
% Change in Strength with Respect to ET1(180°F), (IPSFS42ET1)


ET1(180°F) SBS Fluid Sensitivity Comparison - Modulus
IPS Modulus [Msi]
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.4126
0.4348
0.4340
0.3454
0.3877
0.4230
0.4098
0.3641
0.3507
0.4725
0.4815
0.4870
0.4826
0.4966
0.4228
IPSFS12ET1
IPSFS13ET1
IPSFS14ET1
IPSFS17ET1
IPSFS18ET1
IPSFS20ET1
IPSFS23ET1
IPSFS24ET1
IPSFS41ET1
IPSFS32ET1
IPSFS33ET1
IPSFS34ET1
IPSFS35ET1
IPSFS42ET1
IPSFS43ET1
Type of Fluid
Same Environment IPS Modulus Without Fluid (Msi) (IPSFS42ET1)
Worst Case Environment IPS Modulus (Msi) (IPSFS17ET1, Sea Water)
Average IPS Modulus With Fluid (Msi)


% Change in Modulus with Respect to ET1(180°F), (IPSFS42ET1)
Percentage Change in Modulus [%]
0
-5
-10
-15
-20
-25
-30
-35
-16.92
-12.45
-12.60
-30.46
-21.93
-14.83
-17.49
-26.69
-29.38
-4.852
-3.039
-1.940
-2.826
0.0000
-14.86
IPSFS12ET1
IPSFS13ET1
IPSFS14ET1
IPSFS17ET1
IPSFS18ET1
IPSFS20ET1
IPSFS23ET1
IPSFS24ET1
IPSFS41ET1
IPSFS32ET1
IPSFS33ET1
IPSFS34ET1
IPSFS35ET1
IPSFS42ET1
IPSFS43ET1
Type of Fluid
% Change in Modulus with Respect to ET1(180°F), (IPSFS42ET1)

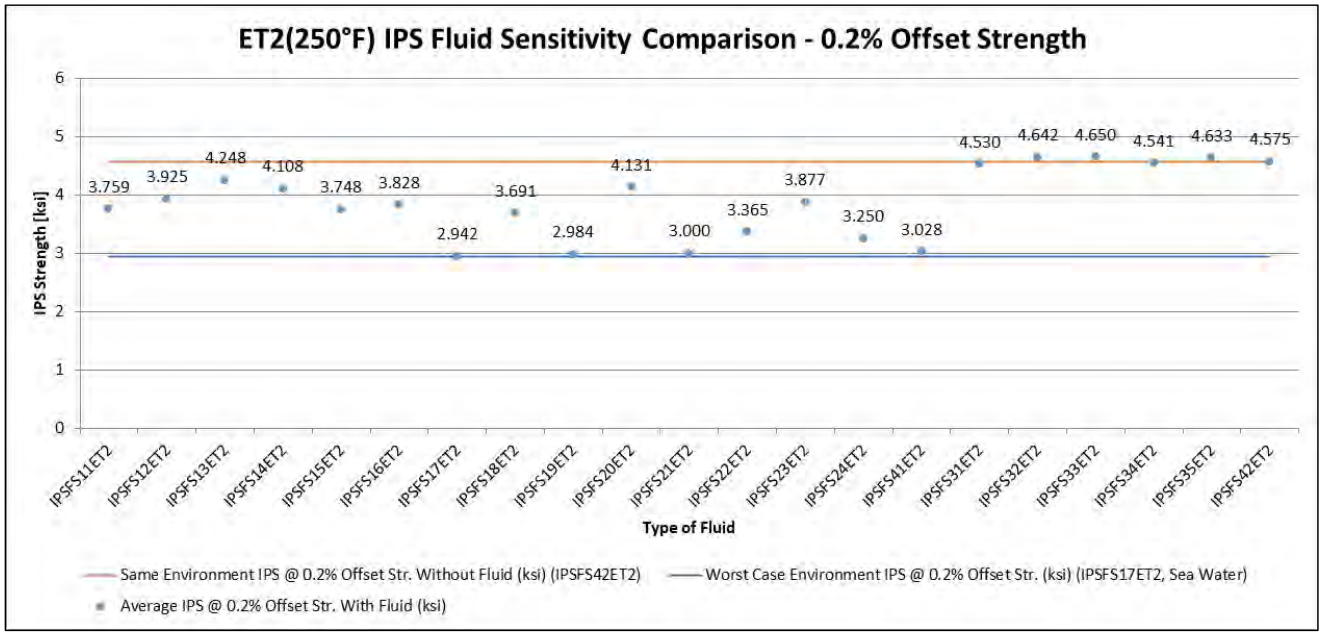
Fluid Sensitivity Screening
In-Plane Shear Properties (IPSFS)--ET1(180°F) Strength and Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

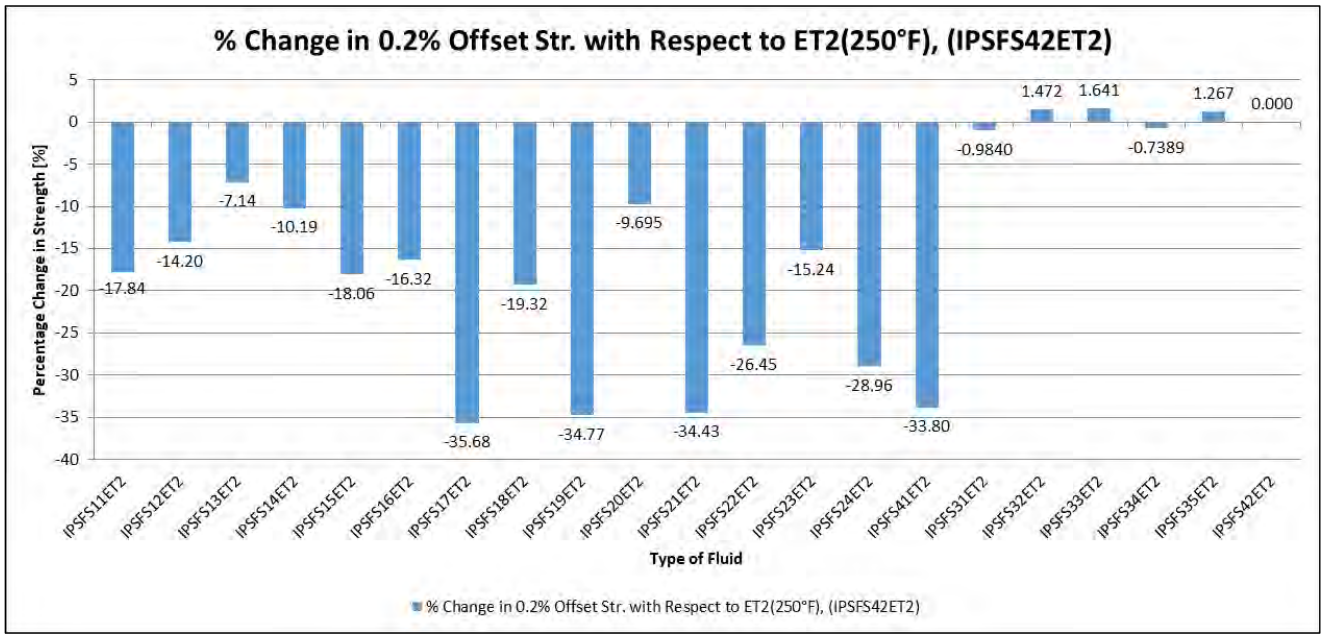
												Average		
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
IPSFS12ET1	TCDNA111FS12ET1	A	C1	1	1	4.374	7.539	0.3886	0.07505	16	0.004691	4.635	7.765	0.4126
	TCDNA112FS12ET1	A	C1	1	1	4.489	7.699	0.3987	0.07590	16	0.004744			
	TCDNA113FS12ET1	A	C1	1	1	4.630	7.805	0.4116	0.07500	16	0.004688			
	TCDNA114FS12ET1	A	C1	1	1	4.636	7.694	0.4109	0.07350	16	0.004594			
	TCDNA125FS12ET1	A	C1	1	1	5.048	8.087	0.4533	0.07092	16	0.004432			
IPSFS13ET1	TCDNA121FS13ET1	A	C1	1	1	4.684	8.110	0.4153	0.07455	16	0.004659	4.867	8.153	0.4348
	TCDNA122FS13ET1	A	C1	1	1	4.972	8.284	0.4396	0.07415	16	0.004634			
	TCDNA123FS13ET1	A	C1	1	1	4.932	8.219	0.4426	0.07418	16	0.004636			
	TCDNA124FS13ET1	A	C1	1	1	4.813	8.079	0.4326	0.07415	16	0.004634			
	TCDNA125FS13ET1	A	C1	1	1	4.964	8.174	0.4448	0.07447	16	0.004654			
	TCDNA126FS13ET1	A	C1	1	1	4.837	8.053	0.4339	0.07460	16	0.004663			
IPSFS14ET1	TCDNA131FS14ET1	A	C1	1	1	4.886	8.064	0.4362	0.07203	16	0.004502	4.862	8.091	0.4340
	TCDNA132FS14ET1	A	C1	1	1	5.027	8.275	0.4512	0.07103	16	0.004440			
	TCDNA133FS14ET1	A	C1	1	1	4.803	8.030	0.4292	0.07305	16	0.004566			
	TCDNA134FS14ET1	A	C1	1	1	4.785	8.016	0.4265	0.07422	16	0.004639			
	TCDNA135FS14ET1	A	C1	1	1	4.809	8.068	0.4270	0.07470	16	0.004669			
IPSFS17ET1	TCDNA151FS17ET1	A	C1	1	1	3.793	6.256	0.3561	0.07433	16	0.004646	3.754	6.278	0.3454
	TCDNA152FS17ET1	A	C1	1	1	3.943	6.494	0.3569	0.07218	16	0.004511			
	TCDNA153FS17ET1	A	C1	1	1	3.710	6.264	0.3386	0.07687	16	0.004804			
	TCDNA154FS17ET1	A	C1	1	1	3.675	6.163	0.3382	0.07737	16	0.004835			
	TCDNA155FS17ET1	A	C1	1	1	3.649	6.214	0.3370	0.07767	16	0.004854			
IPSFS18ET1	TCDNA161FS18ET1	A	C1	1	1	4.542	7.792	0.3930	0.07468	16	0.004668	4.470	7.638	0.3877
	TCDNA162FS18ET1	A	C1	1	1	4.458	7.663	0.3901	0.07497	16	0.004685			
	TCDNA163FS18ET1	A	C1	1	1	4.382	7.501	0.3775	0.07562	16	0.004726			
	TCDNA164FS18ET1	A	C1	1	1	4.419	7.544	0.3823	0.07478	16	0.004674			
	TCDNA165FS18ET1	A	C1	1	1	4.547	7.688	0.3956	0.07275	16	0.004547			
IPSFS20ET1	TCDNA171FS20ET1	A	C1	1	1	4.567	7.650	0.4067	0.07375	16	0.004609	4.763	7.858	0.4230
	TCDNA172FS20ET1	A	C1	1	1	4.823	7.895	0.4302	0.07362	16	0.004601			
	TCDNA173FS20ET1	A	C1	1	1	4.823	7.959	0.4284	0.07280	16	0.004550			
	TCDNA174FS20ET1	A	C1	1	1	4.734	7.785	0.4214	0.07302	16	0.004564			
	TCDNA175FS20ET1	A	C1	1	1	4.869	8.004	0.4281	0.07380	16	0.004613			
IPSFS23ET1	TCDNA191FS23ET1	A	C1	1	1	4.575	7.559	0.4058	0.07393	16	0.004621	4.624	7.706	0.4098
	TCDNA192FS23ET1	A	C1	1	1	4.562	7.809	0.4047	0.07455	16	0.004659			
	TCDNA193FS23ET1	A	C1	1	1	4.594	7.721	0.4101	0.07478	16	0.004674			
	TCDNA194FS23ET1	A	C1	1	1	4.695	7.690	0.4163	0.07452	16	0.004657			
	TCDNA195FS23ET1	A	C1	1	1	4.704	7.794	0.4101	0.07382	16	0.004614			
	TCDNA196FS23ET1	A	C1	1	1	4.615	7.660	0.4117	0.07403	16	0.004627			
IPSFS24ET1	TCDNA1101FS24ET1	A	C1	1	1	3.955	6.724	0.3558	0.07475	16	0.004672	4.010	6.727	0.3641
	TCDNA1102FS24ET1	A	C1	1	1	3.919	6.644	0.3546	0.07425	16	0.004641			
	TCDNA1103FS24ET1	A	C1	1	1	4.028	6.719	0.3667	0.07238	16	0.004524			
	TCDNA1104FS24ET1	A	C1	1	1	4.240	6.959	0.3866	0.07105	16	0.004441			
	TCDNA1105FS24ET1	A	C1	1	1	3.908	6.591	0.3566	0.07298	16	0.004561			
IPSFS41ET1	TCDNA1151FS41ET1	A	C1	1	1	3.975	6.550	0.3624	0.07090	16	0.004431	3.859	6.551	0.3507
	TCDNA1152FS41ET1	A	C1	1	1	3.814	6.492	0.3489	0.07352	16	0.004595			
	TCDNA1153FS41ET1	A	C1	1	1	3.779	6.547	0.3458	0.07422	16	0.004639			
	TCDNA1154FS41ET1	A	C1	1	1	3.834	6.530	0.3446	0.07468	16	0.004668			
	TCDNA1155FS41ET1	A	C1	1	1	3.893	6.634	0.3520	0.07450	16	0.004656			
IPSFS32ET1	TCDNA1111FS32ET1	A	C1	1	1	5.260	8.762	0.4830	0.07378	16	0.004611	5.176	8.667	0.4725
	TCDNA1112FS32ET1	A	C1	1	1	5.195	8.718	0.4763	0.07375	16	0.004609			
	TCDNA1113FS32ET1	A	C1	1	1	5.161	8.657	0.4724	0.07473	16	0.004671			
	TCDNA1114FS32ET1	A	C1	1	1	5.054	8.588	0.4583	0.07493	16	0.004683			
	TCDNA1115FS32ET1	A	C1	1	1	5.099	8.529	0.4636	0.07437	16	0.004648			
	TCDNA1116FS32ET1	A	C1	1	1	5.290	8.750	0.4816	0.07320	16	0.004575			
IPSFS33ET1	TCDNA1121FS33ET1	A	C1	1	1	5.300	8.879	0.4851	0.07252	16	0.004532	5.286	8.829	0.4815
	TCDNA1122FS33ET1	A	C1	1	1	5.277	8.825	0.4785	0.07273	16	0.004546			
	TCDNA1123FS33ET1	A	C1	1	1	5.295	8.838	0.4818	0.07303	16	0.004565			
	TCDNA1124FS33ET1	A	C1	1	1	5.317	8.834	0.4845	0.07273	16	0.004546			
	TCDNA1125FS33ET1	A	C1	1	1	5.243	8.767	0.4778	0.07290	16	0.004556			
IPSFS34ET1	TCDNA1131FS34ET1	A	C1	1	1	5.206	8.803	0.4695	0.07437	16	0.004648	5.347	8.945	0.4870
	TCDNA1132FS34ET1	A	C1	1	1	5.249	8.898	0.4785	0.07350	16	0.004594			
	TCDNA1133FS34ET1	A	C1	1	1	5.488	9.155	0.4989	0.07187	16	0.004492			
	TCDNA1134FS34ET1	A	C1	1	1	5.472	9.018	0.4999	0.07162	16	0.004476			
	TCDNA1135FS34ET1	A	C1	1	1	5.321	8.850	0.4881	0.07377	16	0.004610			
IPSFS35ET1	TCDNA1141FS35ET1	A	C1	1	1	5.273	8.912	0.4817	0.07453	16	0.004658	5.256	8.914	0.4826
	TCDNA1142FS35ET1	A	C1	1	1	5.349	9.071	0.4933	0.07458	16	0.004661			
	TCDNA1143FS35ET1	A	C1	1	1	5.363	9.068	0.4918	0.07445	16	0.004653			
	TCDNA1144FS35ET1	A	C1	1	1	5.195	8.855	0.4776	0.07482	16	0.004676			
	TCDNA1145FS35ET1	A	C1	1	1	5.101	8.663	0.4684	0.07538	16	0.004711			
IPSFS42ET1	TCDNA1151FS42ET1	A	C1	1	1	5.383	9.034	0.4972	0.07423	16	0.004640	5.385	9.030	0.4966
	TCDNA1152FS42ET1	A	C1	1	1	5.201	8.887	0.4780	0.07415	16	0.004634			
	TCDNA1153FS42ET1	A	C1	1	1	5.291	8.988	0.4847	0.07367	16	0.004604			
	TCDNA1154FS42ET1	A	C1	1	1	5.479	9.142	0.5054	0.07225	16	0.004516			
	TCDNA1165FS42ET1	A	C1	1	1	5.581	9.129	0.5180	0.07107	16	0.004442			
	TCDNA1166FS42ET1	A	C1	1	1	5.376	9.003	0.4963	0.07352	16	0.004595			
IPSFS43ET1	TCDNA1161FS43ET1	A	C1	1	1	4.510	6.956	0.4273	0.07417	16	0.004635	4.476	6.920	0.4228
	TCDNA1162FS43ET1	A	C1	1	1	4.473	6.892	0.4231	0.07388	16	0.004618			
	TCDNA1163FS43ET1	A	C1	1	1	4.480	6.901	0.4234	0.07295	16	0.004559			
	TCDNA1164FS43ET1	A	C1	1	1	4.464	6.921	0.4191	0.07385	16	0.004616			
	TCDNA1165FS43ET1	A	C1	1	1	4.454	6.927	0.4213	0.07407	16	0.004629			

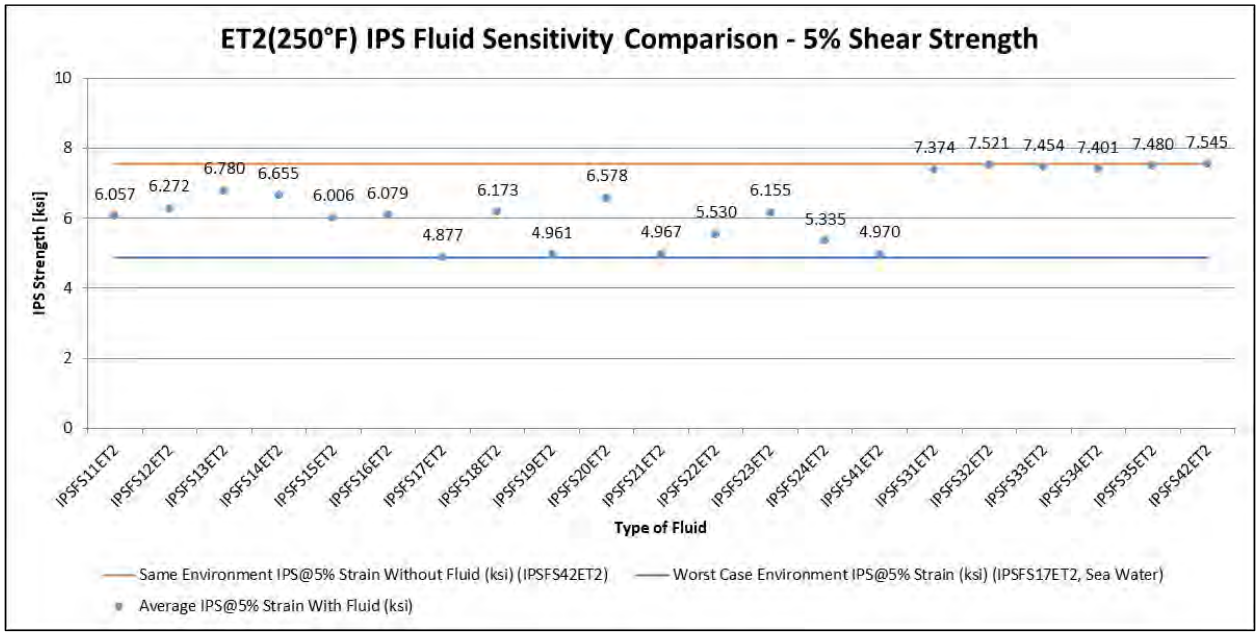
Modulus calculation is obtained from 2000 - 6000 microstrain for all IPS fluid sensitivity tests.

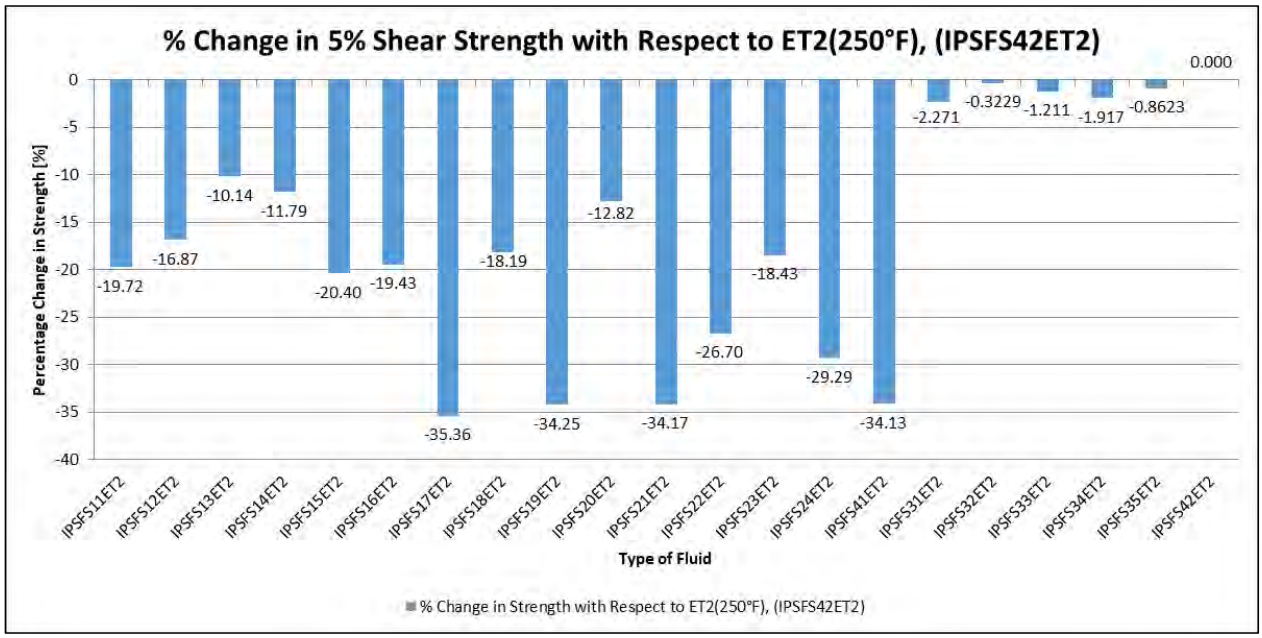
7.2.2.2 IPSFS ET2(250°F) Data

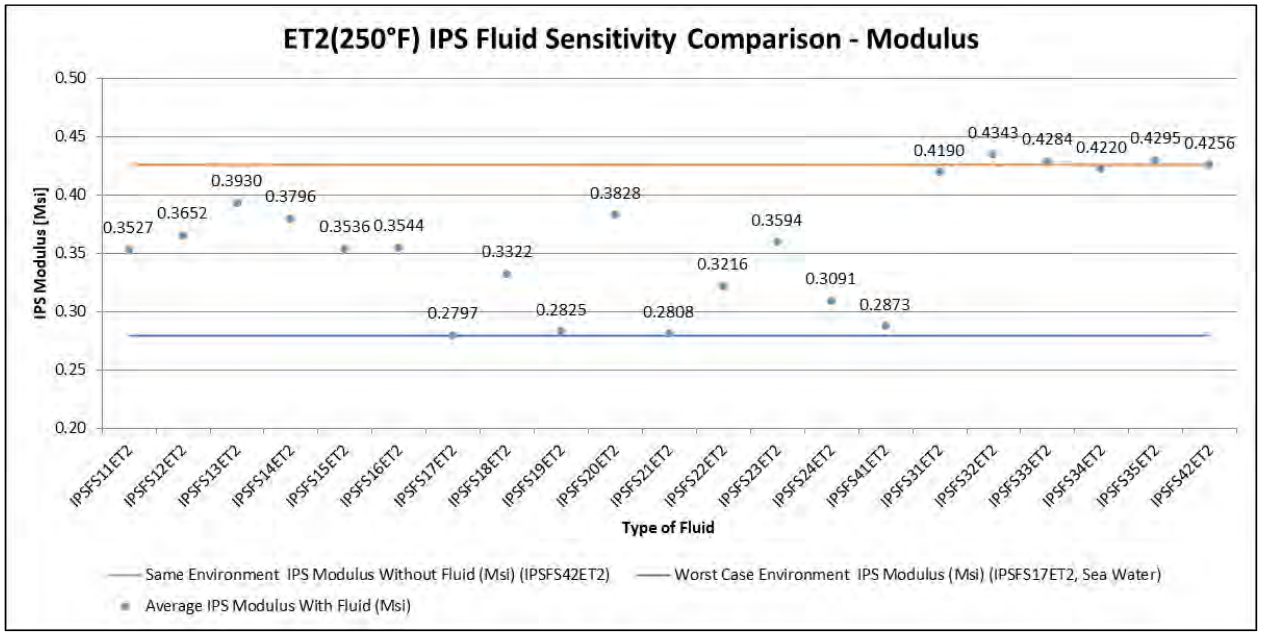
Code	Type of Fluid	Exposure
IPSFS11ET2	100 Low lead Fuel	90 days min @ 70°F±10°F
IPSFS12ET2	Jet A Fuel	
IPSFS13ET2	MIL-PRF-5606 Hydraulic Oil	
IPSFS14ET2	MIL-PRF-83282 Hydraulic Oil	
IPSFS15ET2	MIL-PRF-7808 Engine Oil	
IPSFS16ET2	MIL-PRF-23699 Engine Oil	
IPSFS17ET2	Sea Water	
IPSFS18ET2	Skydrol LD-4	
IPSFS19ET2	50% Water with 50% Skydrol LD-4	
IPSFS20ET2	MIL-PRF-87252 PAO Cooling Fluid	
IPSFS21ET2	E85 Fuel (Alternate aircraft fuel)	
IPSFS22ET2	SAE AMS 2629 Jet Reference Fluid	
IPSFS23ET2	MIL-PRF-87257B Hydraulic Oil	
IPSFS24ET2	60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)	
IPSFS41ET2	Distilled Water	
IPSFS31ET2	MEK washing fluid	90 mins @ 70°F±10°F
IPSFS32ET2	De-icing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1424	
IPSFS33ET2	De-icing Fluid SAE AMS 1428 (Type II)	
IPSFS34ET2	De-icing Fluid SAE AMS 1428 (Type IV)	
IPSFS35ET2	Isopropyl Alcohol Deicing	48±4 hrs @ 70°F±10°F
IPSFS42ET2	Dry	Per section 6.1 Test Plan NTP 3800Q1

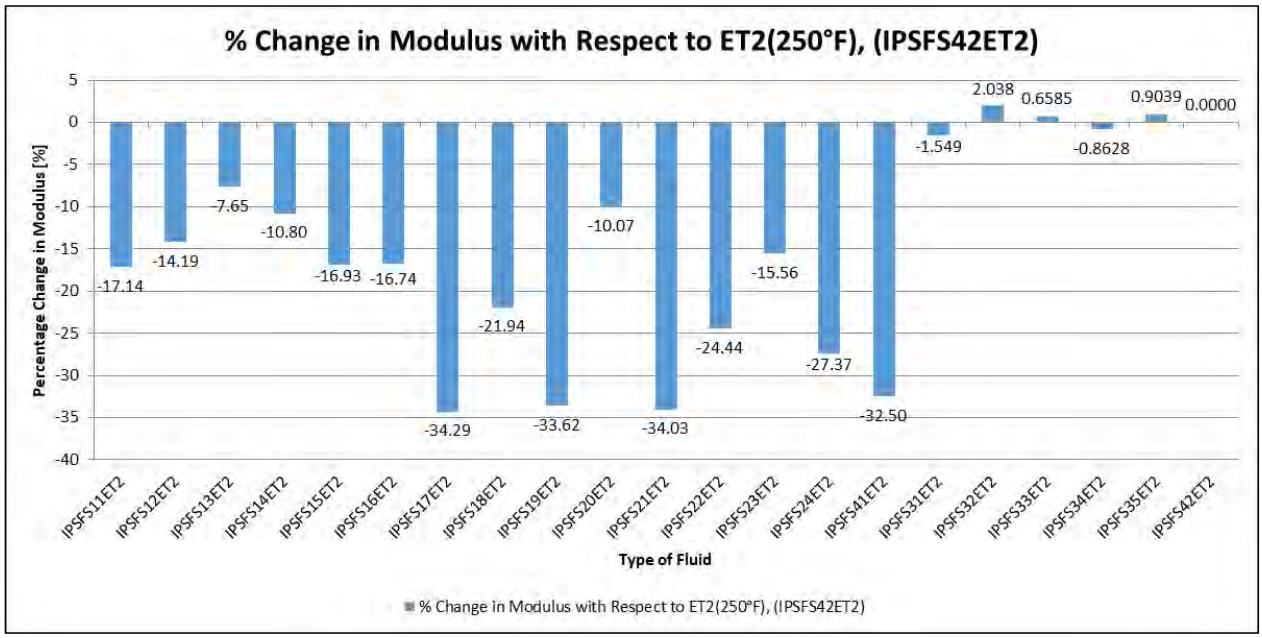

ET2(250°F) IPS Fluid Sensitivity Comparison - 0.2% Offset Strength
IPS Strength [ksi]
Type of Fluid
3.759
3.925
4.248
4.108
3.748
3.828
2.942
3.691
2.984
3.000
4.131
3.365
3.877
3.250
3.028
4.530
4.642
4.650
4.541
4.633
4.575
IPSFS11ET2
IPSFS12ET2
IPSFS13ET2
IPSFS14ET2
IPSFS15ET2
IPSFS16ET2
IPSFS17ET2
IPSFS18ET2
IPSFS19ET2
IPSFS20ET2
IPSFS21ET2
IPSFS22ET2
IPSFS23ET2
IPSFS24ET2
IPSFS41ET2
IPSFS31ET2
IPSFS32ET2
IPSFS33ET2
IPSFS34ET2
IPSFS35ET2
IPSFS42ET2
Same Environment IPS @ 0.2% Offset Str. Without Fluid (ksi) (IPSFS42ET2)
Worst Case Environment IPS @ 0.2% Offset Str. (ksi) (IPSFS17ET2, Sea Water)
Average IPS @ 0.2% Offset Str. With Fluid (ksi)


% Change in 0.2% Offset Str. with Respect to ET2(250°F), (IPSFS42ET2)
Percentage Change in Strength [%]
Type of Fluid
-17.84
-14.20
-7.14
-10.19
-18.06
-16.32
-35.68
-19.32
-34.77
-9.695
-34.43
-26.45
-15.24
-28.96
-33.80
-0.9840
1.472
1.641
-0.7389
1.267
0.000
IPSFS11ET2
IPSFS12ET2
IPSFS13ET2
IPSFS14ET2
IPSFS15ET2
IPSFS16ET2
IPSFS17ET2
IPSFS18ET2
IPSFS19ET2
IPSFS20ET2
IPSFS21ET2
IPSFS22ET2
IPSFS23ET2
IPSFS24ET2
IPSFS41ET2
IPSFS31ET2
IPSFS32ET2
IPSFS33ET2
IPSFS34ET2
IPSFS35ET2
IPSFS42ET2
% Change in 0.2% Offset Str. with Respect to ET2(250°F), (IPSFS42ET2)


ET2(250°F) IPS Fluid Sensitivity Comparison - 5% Shear Strength
IPS Strength [ksi]
Type of Fluid
6.057
6.272
6.780
6.655
6.006
6.079
4.877
6.173
4.961
6.578
4.967
5.530
6.155
5.335
4.970
7.374
7.521
7.454
7.401
7.480
7.545
IPSFS11ET2
IPSFS12ET2
IPSFS13ET2
IPSFS14ET2
IPSFS15ET2
IPSFS16ET2
IPSFS17ET2
IPSFS18ET2
IPSFS19ET2
IPSFS20ET2
IPSFS21ET2
IPSFS22ET2
IPSFS23ET2
IPSFS24ET2
IPSFS41ET2
IPSFS31ET2
IPSFS32ET2
IPSFS33ET2
IPSFS34ET2
IPSFS35ET2
IPSFS42ET2
Same Environment IPS@5% Strain Without Fluid (ksi) (IPSFS42ET2)
Worst Case Environment IPS@5% Strain (ksi) (IPSFS17ET2, Sea Water)
Average IPS@5% Strain With Fluid (ksi)


% Change in 5% Shear Strength with Respect to ET2(250°F), (IPSFS42ET2)
Percentage Change in Strength [%]
Type of Fluid
-19.72
-16.87
-10.14
-11.79
-20.40
-19.43
-35.36
-18.19
-34.25
-12.82
-34.17
-26.70
-18.43
-29.29
-34.13
-2.271
-0.3229
-1.211
-1.917
-0.8623
0.000
IPSFS11ET2
IPSFS12ET2
IPSFS13ET2
IPSFS14ET2
IPSFS15ET2
IPSFS16ET2
IPSFS17ET2
IPSFS18ET2
IPSFS19ET2
IPSFS20ET2
IPSFS21ET2
IPSFS22ET2
IPSFS23ET2
IPSFS24ET2
IPSFS41ET2
IPSFS31ET2
IPSFS32ET2
IPSFS33ET2
IPSFS34ET2
IPSFS35ET2
IPSFS42ET2
% Change in Strength with Respect to ET2(250°F), (IPSFS42ET2)


ET2(250°F) IPS Fluid Sensitivity Comparison - Modulus
IPS Modulus [Msi]
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.3527
0.3652
0.3930
0.3796
0.3536
0.3544
0.2797
0.3322
0.2825
0.3828
0.2808
0.3216
0.3594
0.3091
0.2873
0.4190
0.4343
0.4284
0.4220
0.4295
0.4256
IPSFS11ET2
IPSFS12ET2
IPSFS13ET2
IPSFS14ET2
IPSFS15ET2
IPSFS16ET2
IPSFS17ET2
IPSFS18ET2
IPSFS19ET2
IPSFS20ET2
IPSFS21ET2
IPSFS22ET2
IPSFS23ET2
IPSFS24ET2
IPSFS41ET2
IPSFS31ET2
IPSFS32ET2
IPSFS33ET2
IPSFS34ET2
IPSFS35ET2
IPSFS42ET2
Type of Fluid
Same Environment IPS Modulus Without Fluid (Msi) (IPSFS42ET2)
Worst Case Environment IPS Modulus (Msi) (IPSFS17ET2, Sea Water)
Average IPS Modulus With Fluid (Msi)


% Change in Modulus with Respect to ET2(250°F), (IPSFS42ET2)
Percentage Change in Modulus [%]
5
0
-5
-10
-15
-20
-25
-30
-35
-40
-17.14
-14.19
-7.65
-10.80
-16.93
-16.74
-34.29
-21.94
-33.62
-10.07
-34.03
-24.44
-15.56
-27.37
-32.50
-1.549
2.038
0.6585
-0.8628
0.9039
0.0000
IPSFS11ET2
IPSFS12ET2
IPSFS13ET2
IPSFS14ET2
IPSFS15ET2
IPSFS16ET2
IPSFS17ET2
IPSFS18ET2
IPSFS19ET2
IPSFS20ET2
IPSFS21ET2
IPSFS22ET2
IPSFS23ET2
IPSFS24ET2
IPSFS41ET2
IPSFS31ET2
IPSFS32ET2
IPSFS33ET2
IPSFS34ET2
IPSFS35ET2
IPSFS42ET2
Type of Fluid
% Change in Modulus with Respect to ET2(250°F), (IPSFS42ET2)

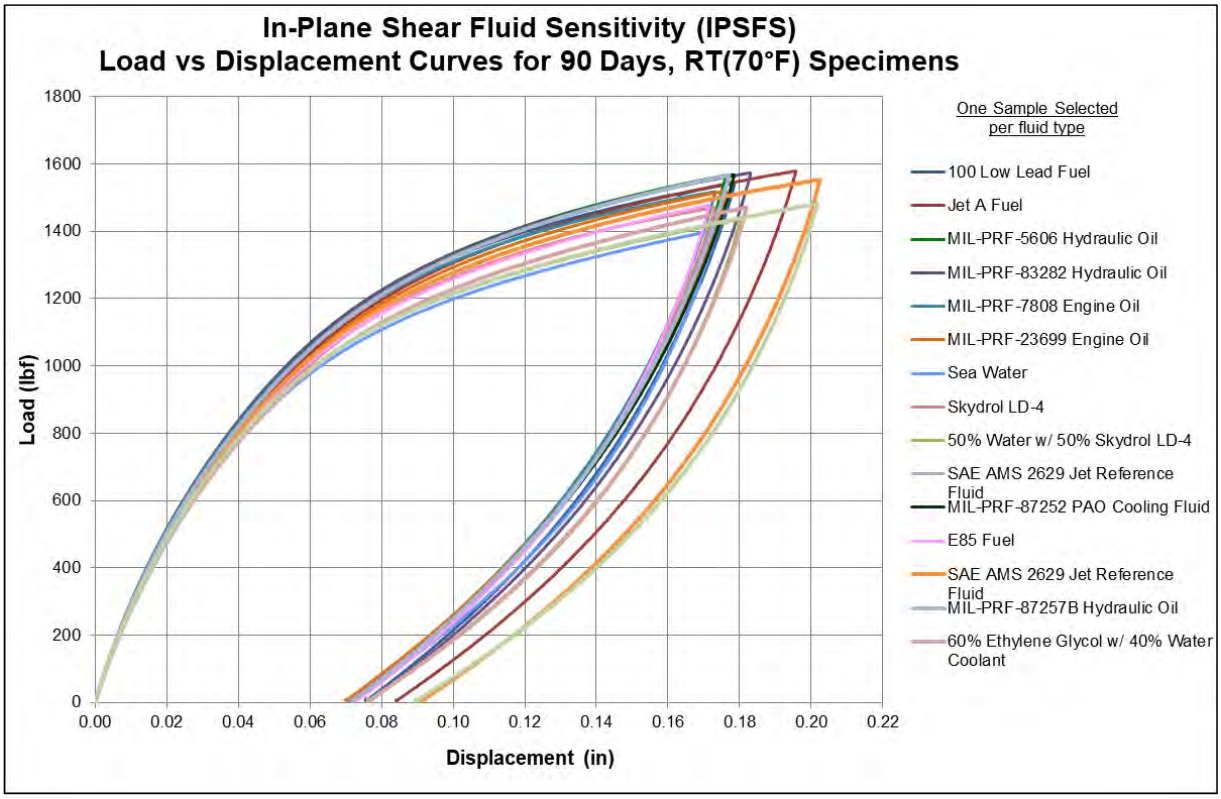
Fluid Sensitivity Screening
In-Plane Shear Properties (IPSFS)--ET2(250°F) Strength and Modulus
Toray Advanced Composites TC380 T1100GC 24K 120gsm Unitape with 35%RC

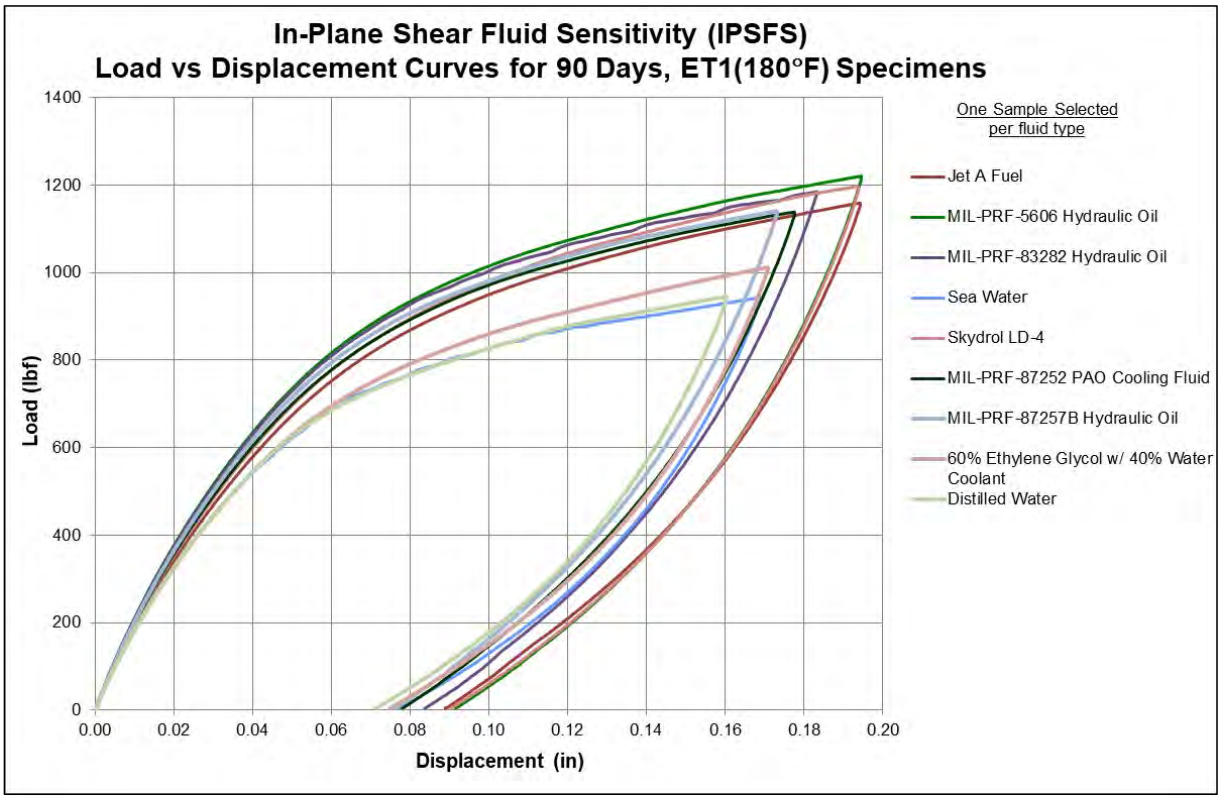
												Average		
Fluid Code	Specimen Number	Toray Batch #	NIAR Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickness [in]	# Plies in Laminate	Avg. t_{ply} [in]	0.2% Offset Strength [ksi]	5% Shear Strength [ksi]	Modulus [Msi]
	TCDNA111FS11ET2	A	C1	1	1	3.771	6.054	0.3497	0.07442	16	0.004651			
	TCDNA112FS11ET2	A	C1	1	1	3.744	6.047	0.3571	0.07537	16	0.004710			
IPSFS11ET2	TCDNA113FS11ET2	A	C1	1	1	3.710	6.071	0.3497	0.07492	16	0.004682	3.759	6.057	0.3527
	TCDNA114FS11ET2	A	C1	1	1	3.730	5.975	0.3426	0.07505	16	0.004691			
	TCDNA115FS11ET2	A	C1	1	1	3.838	6.137	0.3643	0.07322	16	0.004576			
	TCDNA121FS12ET2	A	C1	1	1	3.766	6.076	0.3491	0.07368	16	0.004605			
	TCDNA122FS12ET2	A	C1	1	1	4.018	6.421	0.3739	0.07350	16	0.004594			
IPSFS12ET2	TCDNA123FS12ET2	A	C1	1	1	3.961	6.337	0.3694	0.07408	16	0.004630	3.925	6.272	0.3652
	TCDNA124FS12ET2	A	C1	1	1	3.870	6.169	0.3617	0.07387	16	0.004617			
	TCDNA125FS12ET2	A	C1	1	1	3.975	6.312	0.3697	0.07387	16	0.004617			
	TCDNA126FS12ET2	A	C1	1	1	3.958	6.318	0.3677	0.07400	16	0.004625			
	TCDNA121FS13ET2	A	C1	1	1	4.136	6.663	0.3855	0.07393	16	0.004621			
	TCDNA122FS13ET2	A	C1	1	1	4.454	6.918	0.4065	0.07183	16	0.004490			
IPSFS13ET2	TCDNA133FS13ET2	A	C1	1	1	4.408	6.955	0.4100	0.07068	16	0.004418	4.248	6.780	0.3930
	TCDNA134FS13ET2	A	C1	1	1	4.148	6.706	0.3879	0.07253	16	0.004533			
	TCDNA135FS13ET2	A	C1	1	1	4.095	6.657	0.3754	0.07408	16	0.004630			
	TCDNA131FS14ET2	A	C1	1	1	4.078	6.650	0.3770	0.07413	16	0.004633			
	TCDNA132FS14ET2	A	C1	1	1	4.179	6.762	0.3887	0.07447	16	0.004654			
IPSFS14ET2	TCDNA133FS14ET2	A	C1	1	1	4.106	6.670	0.3795	0.07447	16	0.004654	4.108	6.655	0.3796
	TCDNA134FS14ET2	A	C1	1	1	3.986	6.457	0.3671	0.07438	16	0.004649			
	TCDNA135FS14ET2	A	C1	1	1	4.193	6.738	0.3859	0.07325	16	0.004578			
	TCDNA141FS15ET2	A	C1	1	1	3.685	5.950	0.3517	0.07452	16	0.004657			
	TCDNA142FS15ET2	A	C1	1	1	3.735	5.983	0.3485	0.07438	16	0.004649			
IPSFS15ET2	TCDNA143FS15ET2	A	C1	1	1	3.670	5.940	0.3447	0.07435	16	0.004647	3.748	6.006	0.3536
	TCDNA144FS15ET2	A	C1	1	1	3.779	6.030	0.3540	0.07323	16	0.004577			
	TCDNA145FS15ET2	A	C1	1	1	3.872	6.126	0.3689	0.07235	16	0.004522			
	TCDNA141FS16ET2	A	C1	1	1	3.739	6.085	0.3490	0.07518	16	0.004699			
	TCDNA142FS16ET2	A	C1	1	1	3.949	6.195	0.3632	0.07455	16	0.004659			
IPSFS16ET2	TCDNA153FS16ET2	A	C1	1	1	3.994	6.216	0.3727	0.07448	16	0.004655	3.828	6.079	0.3544
	TCDNA154FS16ET2	A	C1	1	1	3.805	6.018	0.3497	0.07492	16	0.004682			
	TCDNA155FS16ET2	A	C1	1	1	3.652	5.882	0.3373	0.07632	16	0.004770			
	TCDNA151FS17ET2	A	C1	1	1	2.937	4.858	0.2788	0.07720	16	0.004825			
	TCDNA152FS17ET2	A	C1	1	1	2.956	4.897	0.2830	0.07697	16	0.004810			
IPSFS17ET2	TCDNA153FS17ET2	A	C1	1	1	2.906	4.847	0.2747	0.07648	16	0.004780	2.942	4.877	0.2797
	TCDNA154FS17ET2	A	C1	1	1	2.936	4.864	0.2773	0.07652	16	0.004782			
	TCDNA155FS17ET2	A	C1	1	1	2.977	4.919	0.2846	0.07688	16	0.004805			
	TCDNA161FS18ET2	A	C1	1	1	3.706	6.137	0.3293	0.07337	16	0.004585			
	TCDNA162FS18ET2	A	C1	1	1	3.633	6.127	0.3284	0.07415	16	0.004634			
IPSFS18ET2	TCDNA163FS18ET2	A	C1	1	1	3.670	6.205	0.3290	0.07453	16	0.004658	3.691	6.173	0.3322
	TCDNA164FS18ET2	A	C1	1	1	3.759	6.248	0.3380	0.07395	16	0.004622			
	TCDNA165FS18ET2	A	C1	1	1	3.684	6.148	0.3364	0.07380	16	0.004613			
	TCDNA171FS19ET2	A	C1	1	1	2.917	4.858	0.2765	0.07503	16	0.004690			
	TCDNA172FS19ET2	A	C1	1	1	2.957	4.956	0.2803	0.07503	16	0.004690			
IPSFS19ET2	TCDNA173FS19ET2	A	C1	1	1	2.990	5.045	0.2843	0.07490	16	0.004681	2.984	4.961	0.2825
	TCDNA174FS19ET2	A	C1	1	1	3.019	5.003	0.2878	0.07465	16	0.004666			
	TCDNA175FS19ET2	A	C1	1	1	3.037	4.945	0.2837	0.07413	16	0.004633			
	TCDNA171FS20ET2	A	C1	1	1	3.925	6.321	0.3628	0.07357	16	0.004598			
	TCDNA172FS20ET2	A	C1	1	1	4.301	6.738	0.3983	0.07183	16	0.004490			
IPSFS20ET2	TCDNA183FS20ET2	A	C1	1	1	4.295	6.772	0.4008	0.07160	16	0.004475	4.131	6.578	0.3828
	TCDNA184FS20ET2	A	C1	1	1	4.049	6.475	0.3747	0.07353	16	0.004596			
	TCDNA185FS20ET2	A	C1	1	1	4.085	6.584	0.3772	0.07517	16	0.004698			
	TCDNA181FS21ET2	A	C1	1	1	3.060	4.974	0.2831	0.07308	16	0.004568			
	TCDNA182FS21ET2	A	C1	1	1	3.196	5.208	0.3021	0.07142	16	0.004464			
IPSFS21ET2	TCDNA183FS21ET2	A	C1	1	1	2.977	4.938	0.2794	0.07307	16	0.004567	3.000	4.967	0.2808
	TCDNA184FS21ET2	A	C1	1	1	2.842	4.827	0.2665	0.07447	16	0.004654			
	TCDNA185FS21ET2	A	C1	1	1	2.922	4.889	0.2727	0.07437	16	0.004648			
	TCDNA191FS22ET2	A	C1	1	1	3.477	5.611	0.3347	0.07147	16	0.004467			
	TCDNA192FS22ET2	A	C1	1	1	3.363	5.507	0.3207	0.07385	16	0.004616			
IPSFS22ET2	TCDNA193FS22ET2	A	C1	1	1	3.275	5.439	0.3140	0.07525	16	0.004703	3.365	5.530	0.3216
	TCDNA194FS22ET2	A	C1	1	1	3.312	5.486	0.3181	0.07542	16	0.004714			
	TCDNA195FS22ET2	A	C1	1	1	3.396	5.610	0.3206	0.07498	16	0.004686			
	TCDNA191FS23ET2	A	C1	1	1	3.867	6.105	0.3565	0.07448	16	0.004655			
	TCDNA192FS23ET2	A	C1	1	1	3.810	6.096	0.3473	0.07512	16	0.004695			
IPSFS23ET2	TCDNA193FS23ET2	A	C1	1	1	3.884	6.148	0.3565	0.07385	16	0.004616	3.877	6.155	0.3594
	TCDNA194FS23ET2	A	C1	1	1	3.924	6.221	0.3672	0.07250	16	0.004531			
	TCDNA1105FS23ET2	A	C1	1	1	3.901	6.204	0.3696	0.07160	16	0.004475			
	TCDNA1101FS24ET2	A	C1	1	1	3.319	5.419	0.3134	0.07347	16	0.004592			
	TCDNA1102FS24ET2	A	C1	1	1	3.253	5.353	0.3142	0.07373	16	0.004608			
IPSFS24ET2	TCDNA1103FS24ET2	A	C1	1	1	3.258	5.324	0.3107	0.07347	16	0.004592	3.250	5.335	0.3091
	TCDNA1104FS24ET2	A	C1	1	1	3.231	5.341	0.3058	0.07328	16	0.004580			
	TCDNA1105FS24ET2	A	C1	1	1	3.188	5.240	0.3017	0.07402	16	0.004626			
	TCDNA1151FS41ET2	A	C1	1	1	3.126	5.106	0.2944	0.07443	16	0.004652			
	TCDNA1152FS41ET2	A	C1	1	1	3.040	5.026	0.2914	0.07470	16	0.004669			
IPSFS41ET2	TCDNA1153FS41ET2	A	C1	1	1	2.950	4.895	0.2796	0.07503	16	0.004690	3.028	4.970	0.2873
	TCDNA1154FS41ET2	A	C1	1	1	2.963	4.867	0.2799	0.07430	16	0.004644			
	TCDNA1155FS41ET2	A	C1	1	1	3.062	4.955	0.2911	0.07238	16	0.004524			
	TCDNA1111FS31ET2	A	C1	1	1	4.634	7.518	0.4307	0.07530	16	0.004706			
	TCDNA1112FS31ET2	A	C1	1	1	4.582	7.473	0.4279	0.07470	16	0.004669			
IPSFS31ET2	TCDNA1113FS31ET2	A	C1	1	1	4.578	7.376	0.4152	0.07525	16	0.004703	4.530	7.374	0.4190
	TCDNA1114FS31ET2	A	C1	1	1	4.431	7.289	0.4138	0.07575	16	0.004734			
	TCDNA1115FS31ET2	A	C1	1	1	4.422	7.214	0.4076	0.07600	16	0.004750			

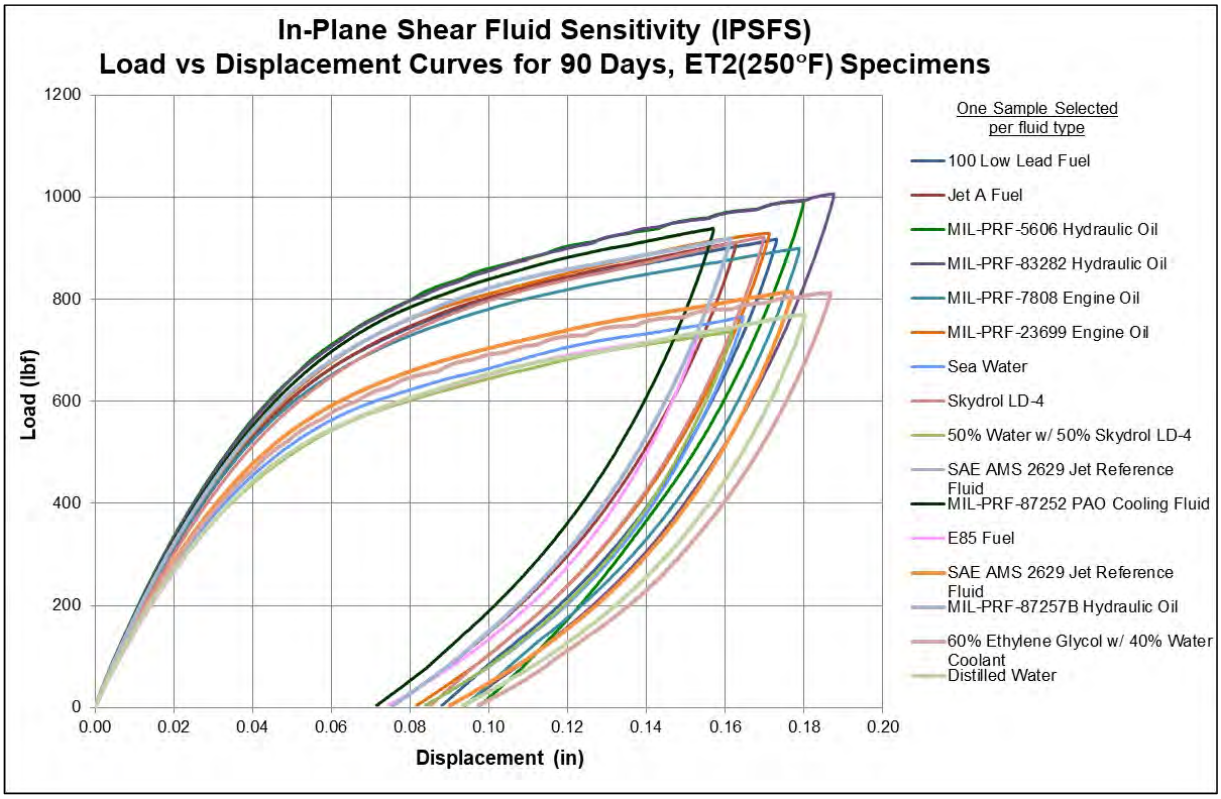
IPSFS32ET2	TCDNA1121FS32ET2	A	C1	1	1	4.791	7.666	0.4741	0.07183	16	0.004490	4.642	7.521	0.4343
	TCDNA1122FS32ET2	A	C1	1	1	4.708	7.542	0.4342	0.07367	16	0.004604			
	TCDNA1123FS32ET2	A	C1	1	1	4.589	7.456	0.4203	0.07477	16	0.004673			
	TCDNA1124FS32ET2	A	C1	1	1	4.539	7.450	0.4224	0.07500	16	0.004688			
	TCDNA1125FS32ET2	A	C1	1	1	4.584	7.490	0.4205	0.07482	16	0.004676			
IPSFS33ET2	TCDNA1121FS33ET2	A	C1	1	1	4.562	7.463	0.4236	0.07348	16	0.004593	4.650	7.454	0.4284
	TCDNA1122FS33ET2	A	C1	1	1	4.439	7.269	0.4111	0.07372	16	0.004607			
	TCDNA1123FS33ET2	A	C1	1	1	4.546	7.340	0.4160	0.07378	16	0.004611			
	TCDNA1124FS33ET2	A	C1	1	1	4.882	7.577	0.4434	0.07203	16	0.004502			
	TCDNA1135FS33ET2	A	C1	1	1	4.820	7.620	0.4479	0.07097	16	0.004435			
IPSFS34ET2	TCDNA1131FS34ET2	A	C1	1	1	4.518	7.326	0.4209	0.07522	16	0.004701	4.541	7.401	0.4220
	TCDNA1132FS34ET2	A	C1	1	1	4.509	7.531	0.4189	0.07482	16	0.004676			
	TCDNA1133FS34ET2	A	C1	1	1	4.569	7.433	0.4248	0.07463	16	0.004665			
	TCDNA1134FS34ET2	A	C1	1	1	4.534	7.370	0.4241	0.07497	16	0.004685			
	TCDNA1135FS34ET2	A	C1	1	1	4.555	7.356	0.4218	0.07525	16	0.004703			
	TCDNA1136FS34ET2	A	C1	1	1	4.560	7.388	0.4212	0.07498	16	0.004686			
IPSFS35ET2	TCDNA1141FS35ET2	A	C1	1	1	4.623	7.492	0.4311	0.07240	16	0.004525	4.633	7.480	0.4295
	TCDNA1142FS35ET2	A	C1	1	1	4.867	7.661	0.4504	0.07142	16	0.004464			
	TCDNA1143FS35ET2	A	C1	1	1	4.569	7.429	0.4235	0.07325	16	0.004578			
	TCDNA1144FS35ET2	A	C1	1	1	4.499	7.351	0.4157	0.07390	16	0.004619			
	TCDNA1145FS35ET2	A	C1	1	1	4.605	7.469	0.4267	0.07430	16	0.004644			
IPSFS42ET2	TCDNA1161FS42ET2	A	C1	1	1	4.547	7.527	0.4307	0.07528	16	0.004705	4.575	7.545	0.4256
	TCDNA1162FS42ET2	A	C1	1	1	4.529	7.488	0.4362	0.07592	16	0.004745			
	TCDNA1163FS42ET2	A	C1	1	1	4.594	7.573	0.4253	0.07492	16	0.004682			
	TCDNA1164FS42ET2	A	C1	1	1	4.707	7.644	0.4398	0.07490	16	0.004681			
	TCDNA1165FS42ET2	A	C1	1	1	4.655	7.675	0.4313	0.07458	16	0.004661			
	TCDNA1166FS42ET2	A	C1	1	1	4.415	7.364	0.3904	0.07560	16	0.004725			

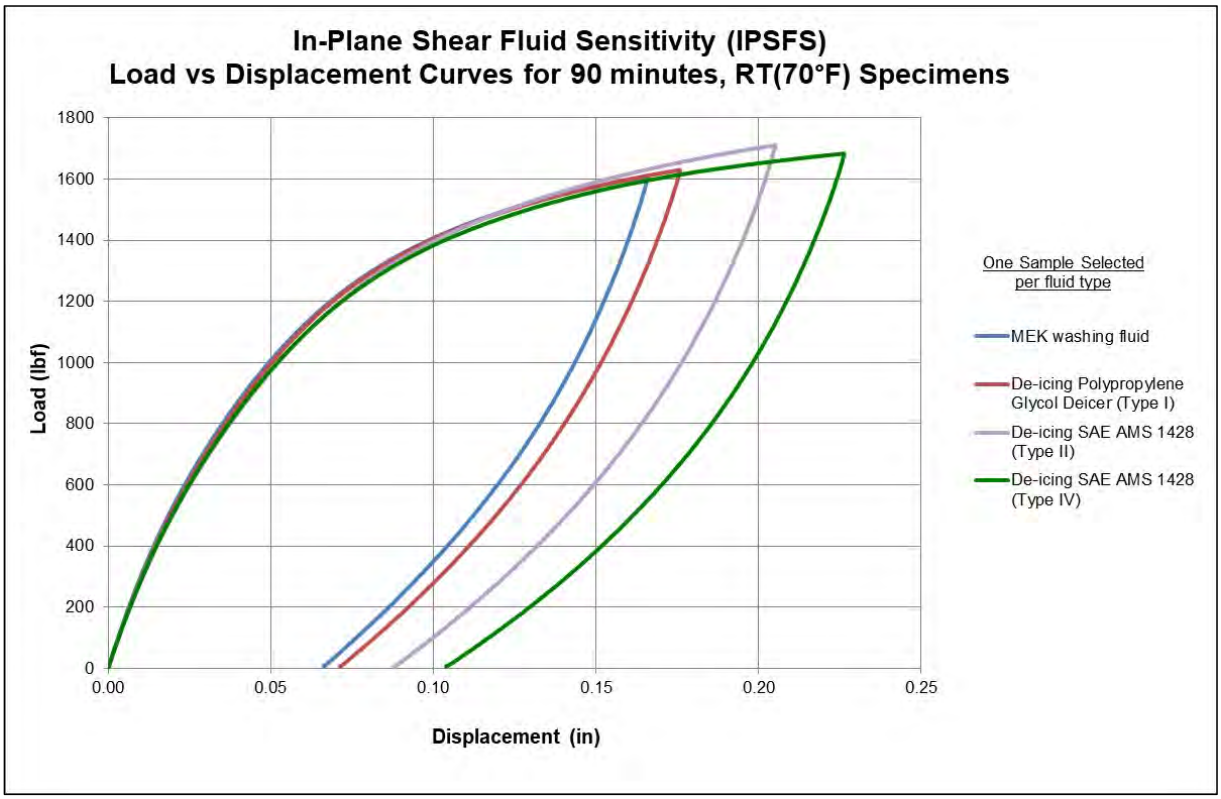
Modulus calculation is obtained from 2000 - 6000 microstrain for all IPS fluid sensitivity tests.

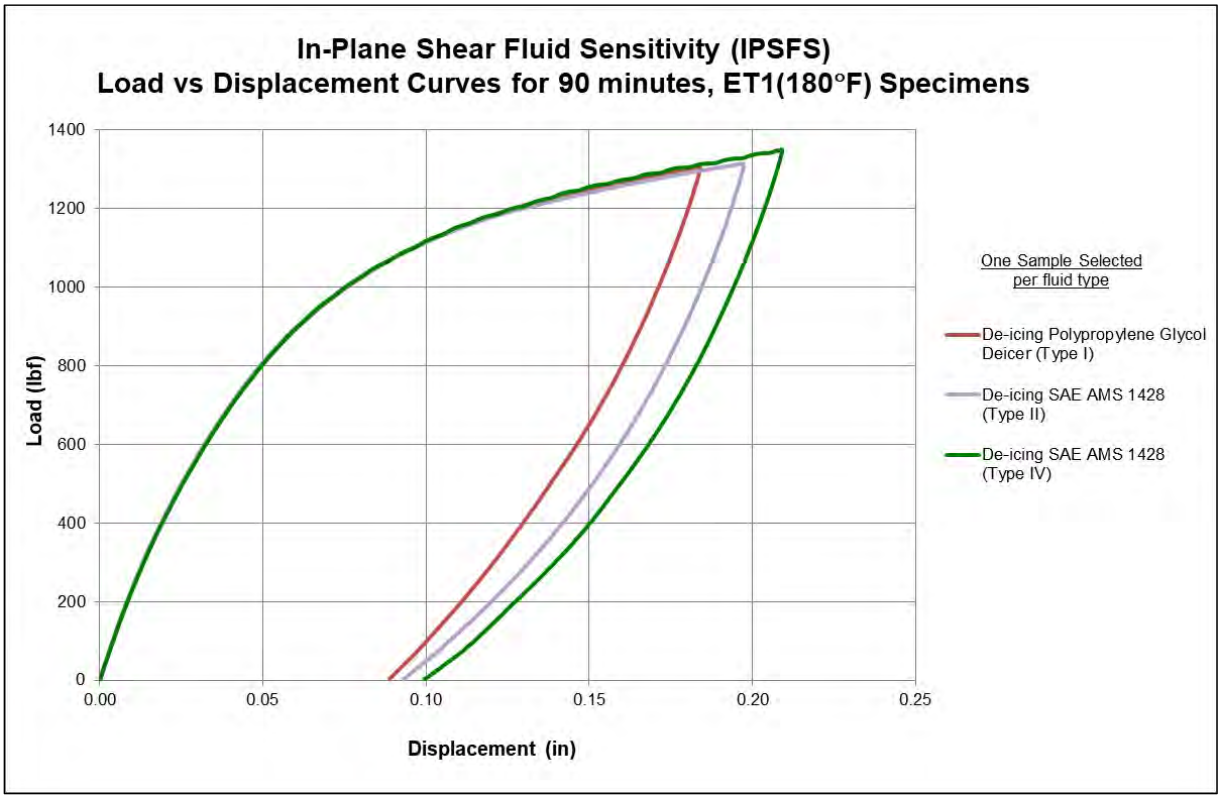
7.2.3 IPSFS Load Displacement Curves

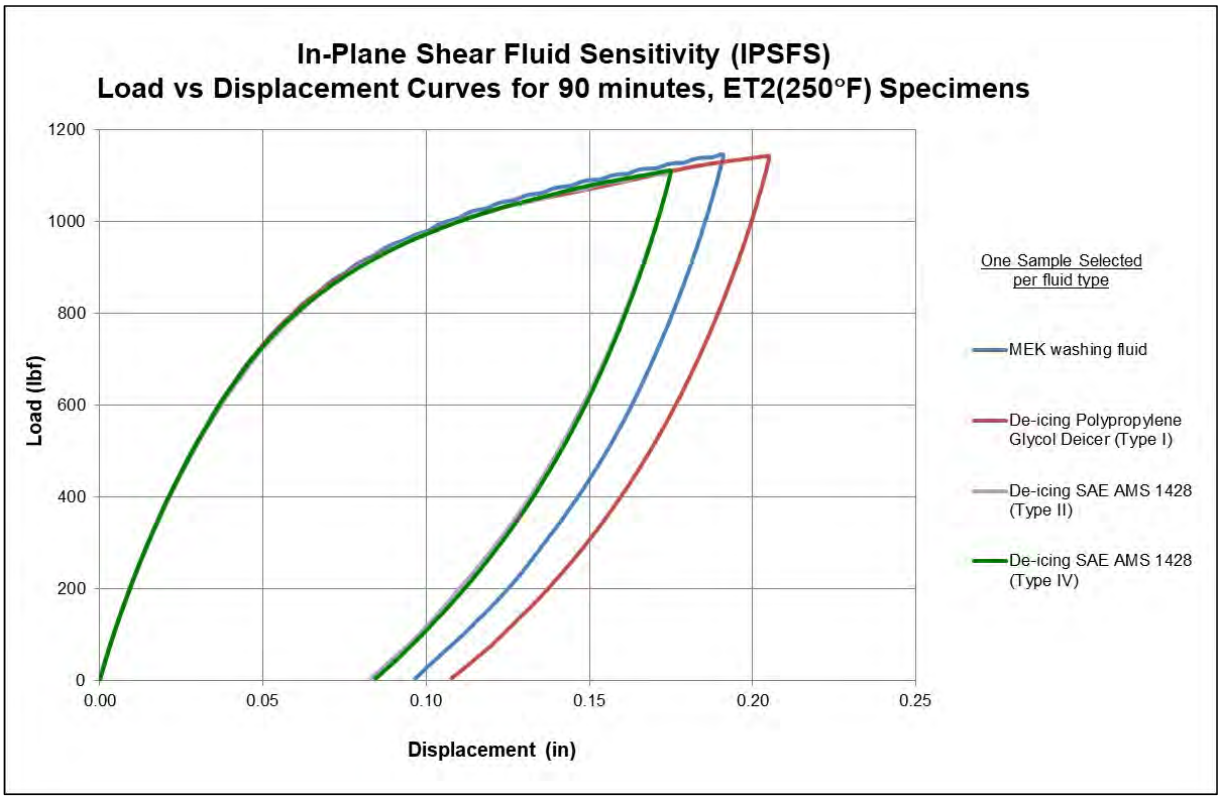


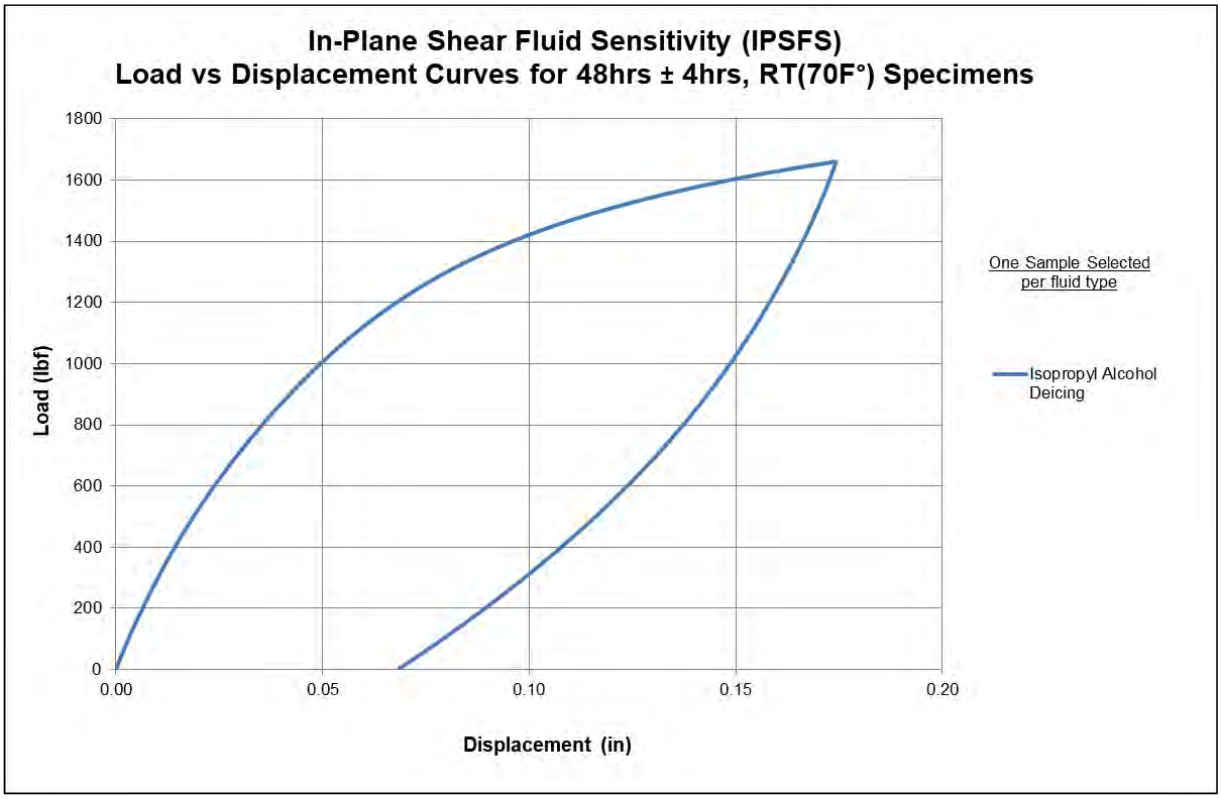


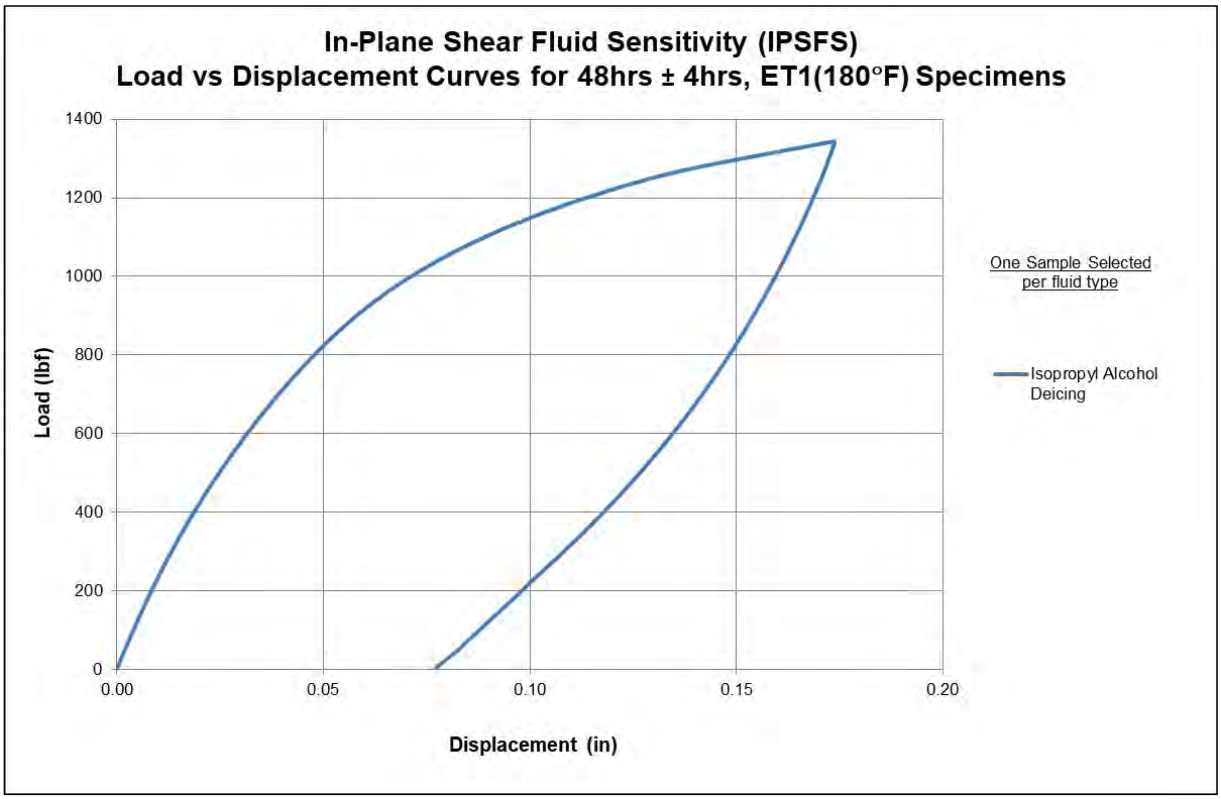

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 90 Days, ET2(250°F) Specimens
Load (lbf)
Displacement (in)
0
200
400
600
800
1000
1200
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16
0.18
0.20
One Sample Selected per fluid type
100 Low Lead Fuel
Jet A Fuel
MIL-PRF-5606 Hydraulic Oil
MIL-PRF-83282 Hydraulic Oil
MIL-PRF-7808 Engine Oil
MIL-PRF-23699 Engine Oil
Sea Water
Skydrol LD-4
50% Water w/ 50% Skydrol LD-4
SAE AMS 2629 Jet Reference Fluid
MIL-PRF-87252 PAO Cooling Fluid
E85 Fuel
SAE AMS 2629 Jet Reference Fluid
MIL-PRF-87257B Hydraulic Oil
60% Ethylene Glycol w/ 40% Water Coolant
Distilled Water

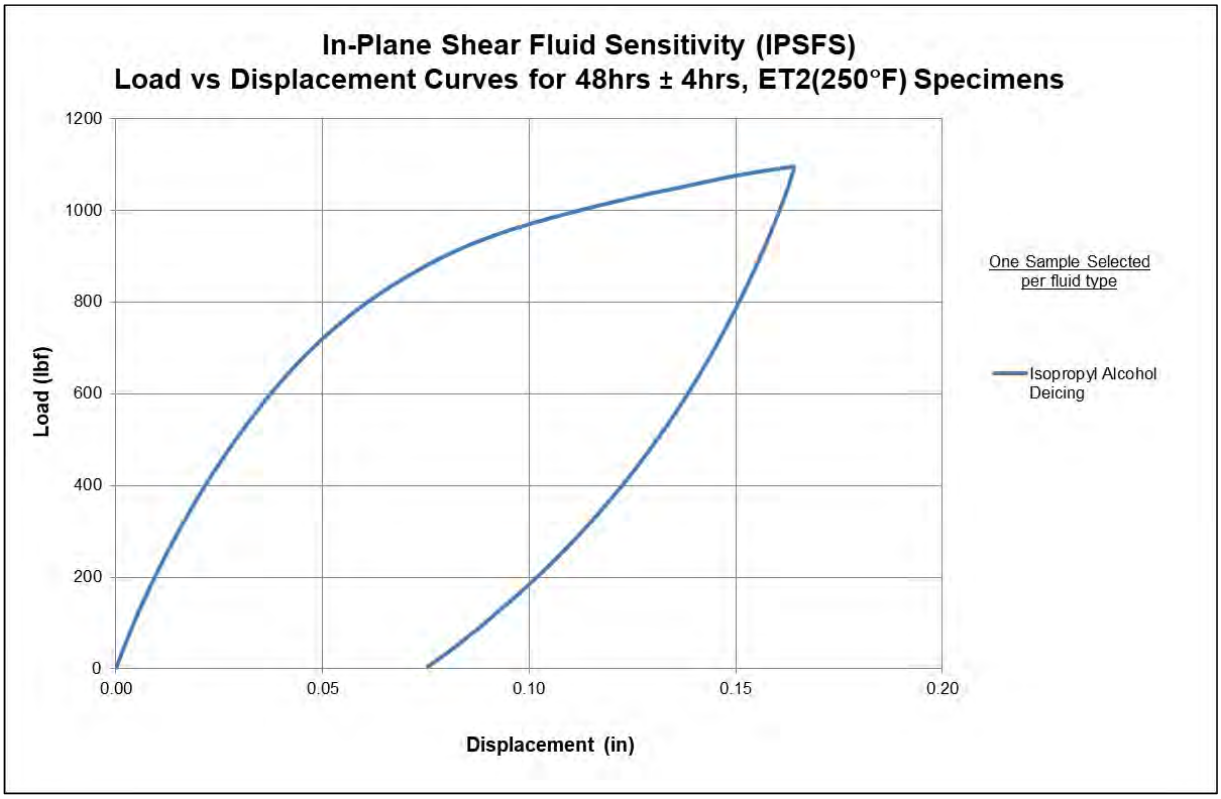

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 90 minutes, RT(70°F) Specimens
Load (lbf)
Displacement (in)
0
200
400
600
800
1000
1200
1400
1600
1800
0.00
0.05
0.10
0.15
0.20
0.25
One Sample Selected per fluid type
MEK washing fluid
De-icing Polypropylene Glycol Deicer (Type I)
De-icing SAE AMS 1428 (Type II)
De-icing SAE AMS 1428 (Type IV)

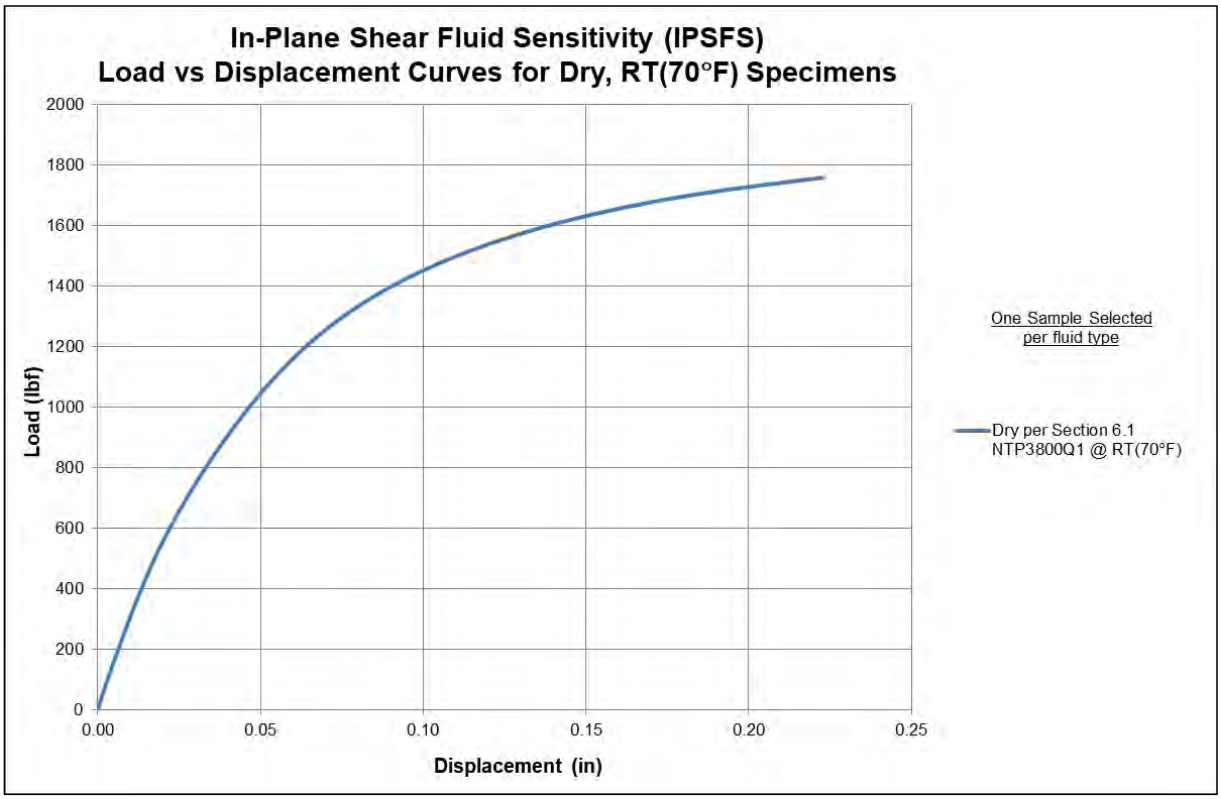

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 90 minutes, ET1(180°F) Specimens
Load (lbf)
1400
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
0.25
Displacement (in)
One Sample Selected per fluid type
De-icing Polypropylene Glycol Deicer (Type I)
De-icing SAE AMS 1428 (Type II)
De-icing SAE AMS 1428 (Type IV)

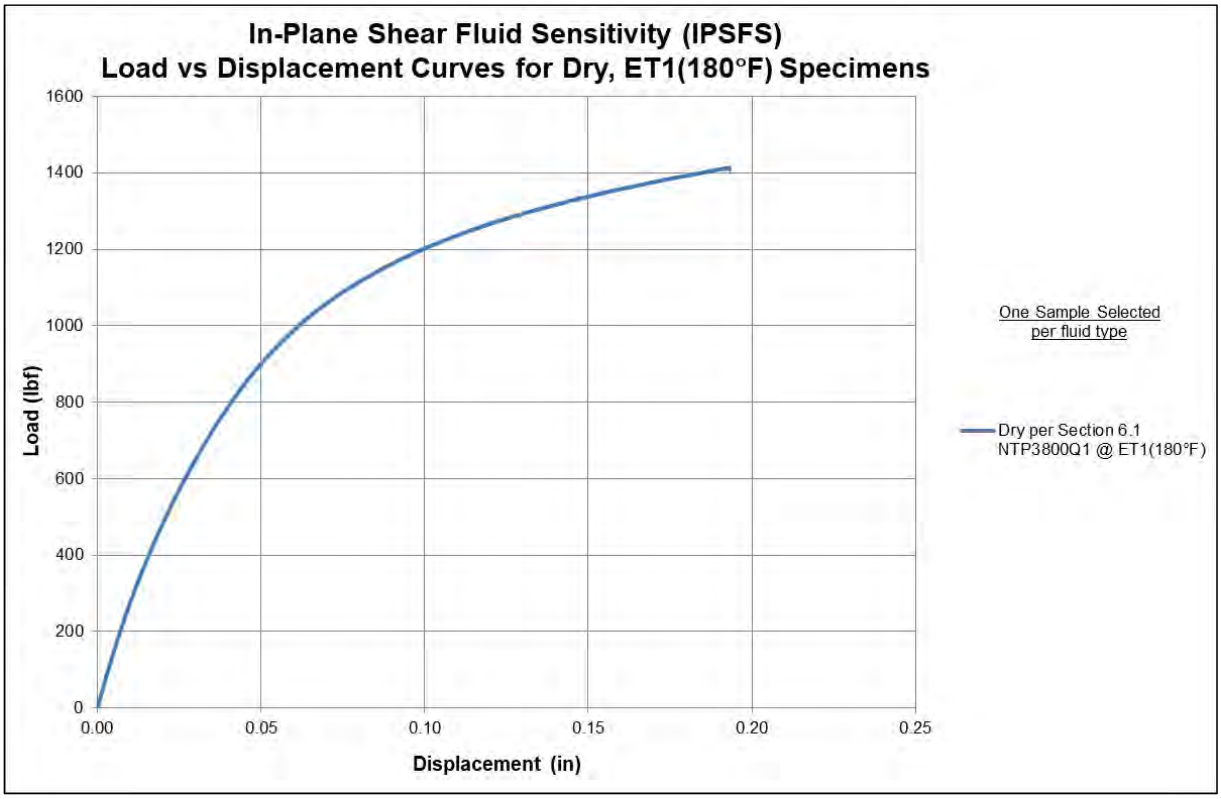

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 90 minutes, ET2(250°F) Specimens
Load (lbf)
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
0.25
Displacement (in)
One Sample Selected per fluid type
MEK washing fluid
De-icing Polypropylene Glycol Deicer (Type I)
De-icing SAE AMS 1428 (Type II)
De-icing SAE AMS 1428 (Type IV)

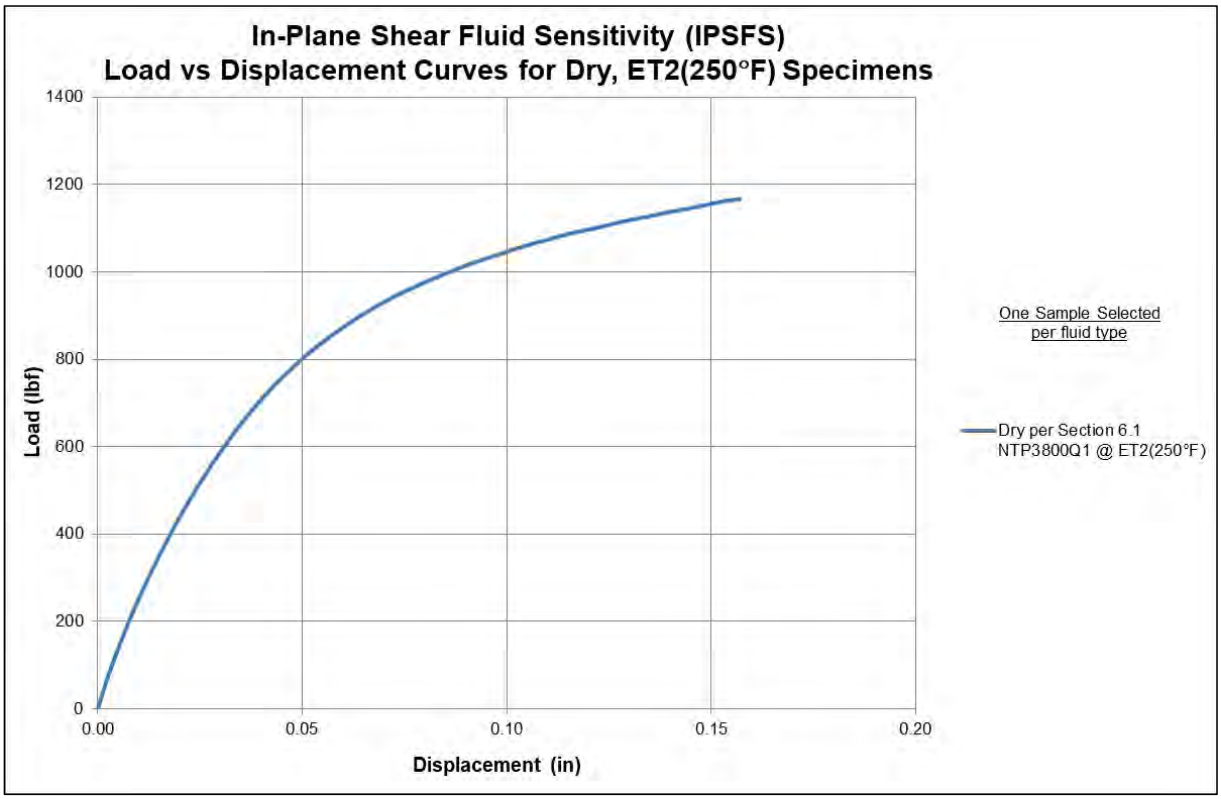

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 48hrs ± 4hrs, RT(70F°) Specimens
Load (lbf)
1800
1600
1400
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
Displacement (in)
One Sample Selected per fluid type
Isopropyl Alcohol Deicing

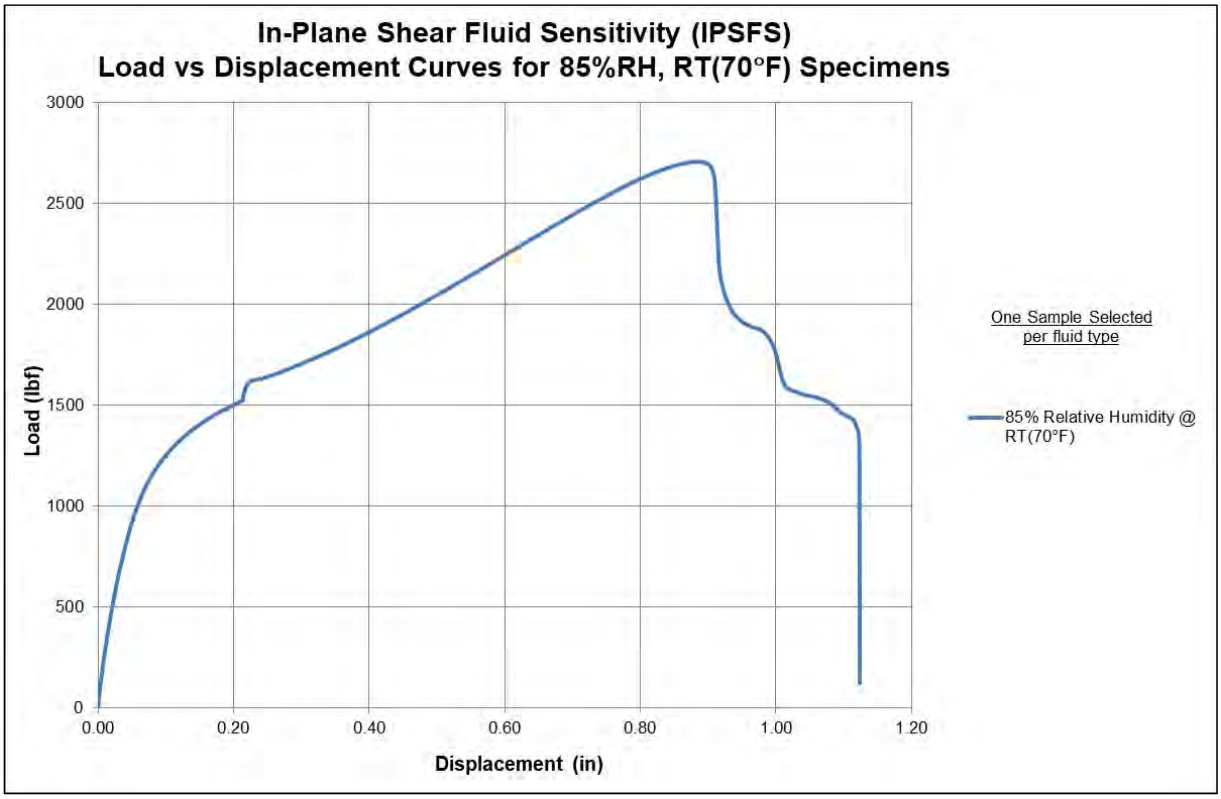

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 48hrs ± 4hrs, ET1(180°F) Specimens
Load (lbf)
1400
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
Displacement (in)
One Sample Selected per fluid type
Isopropyl Alcohol Deicing

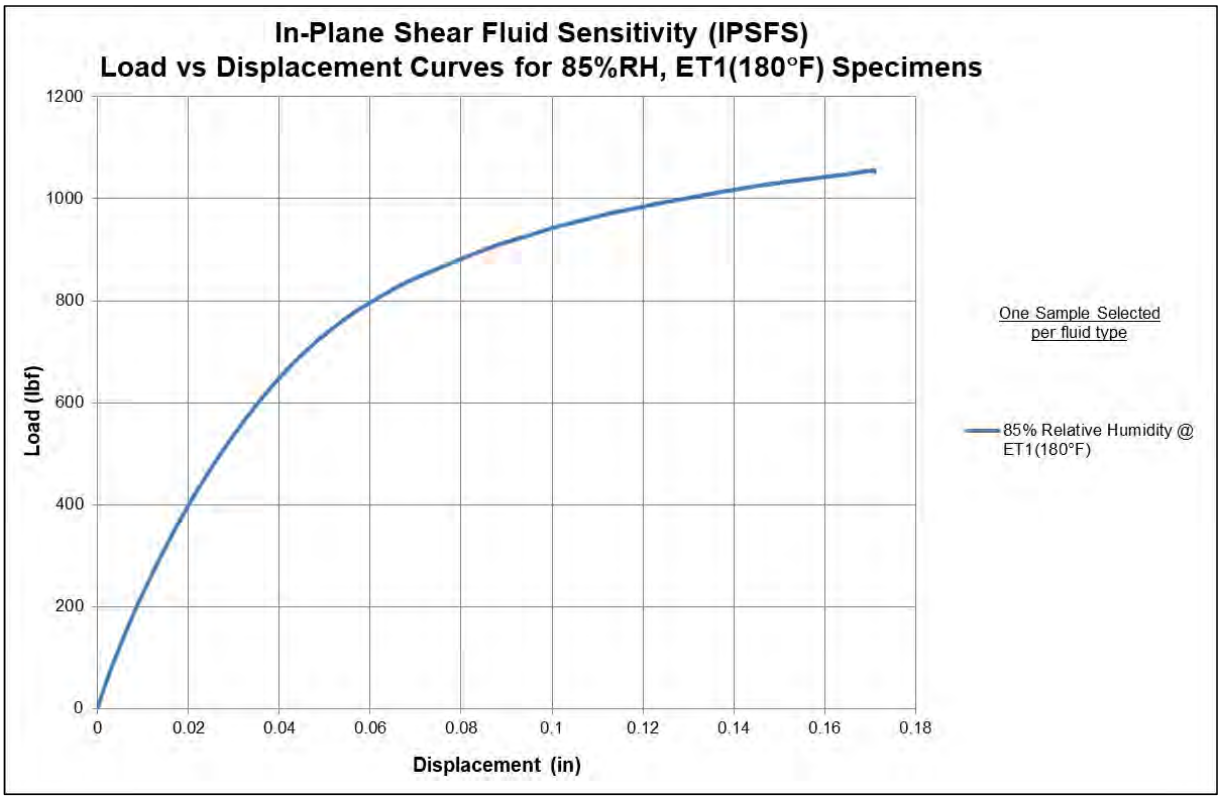

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 48hrs ± 4hrs, ET2(250°F) Specimens
Load (lbf)
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
Displacement (in)
One Sample Selected per fluid type
Isopropyl Alcohol Deicing


In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for Dry, RT(70°F) Specimens
Load (lbf)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
0.25
Displacement (in)
One Sample Selected per fluid type
Dry per Section 6.1 NTP3800Q1 @ RT(70°F)


In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for Dry, ET1(180°F) Specimens
Load (lbf)
1600
1400
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
0.25
Displacement (in)
One Sample Selected per fluid type
Dry per Section 6.1 NTP3800Q1 @ ET1(180°F)

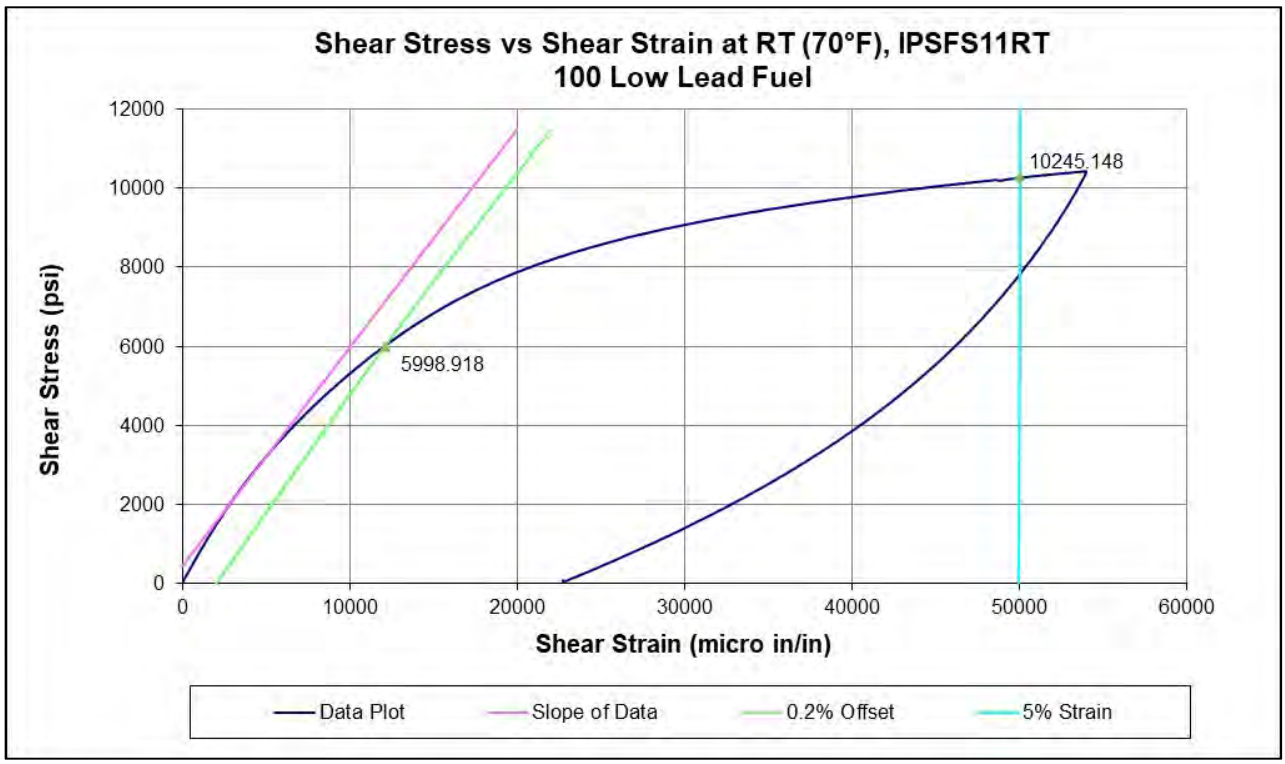

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for Dry, ET2(250°F) Specimens
Load (lbf)
1400
1200
1000
800
600
400
200
0
0.00
0.05
0.10
0.15
0.20
Displacement (in)
One Sample Selected per fluid type
Dry per Section 6.1 NTP3800Q1 @ ET2(250°F)

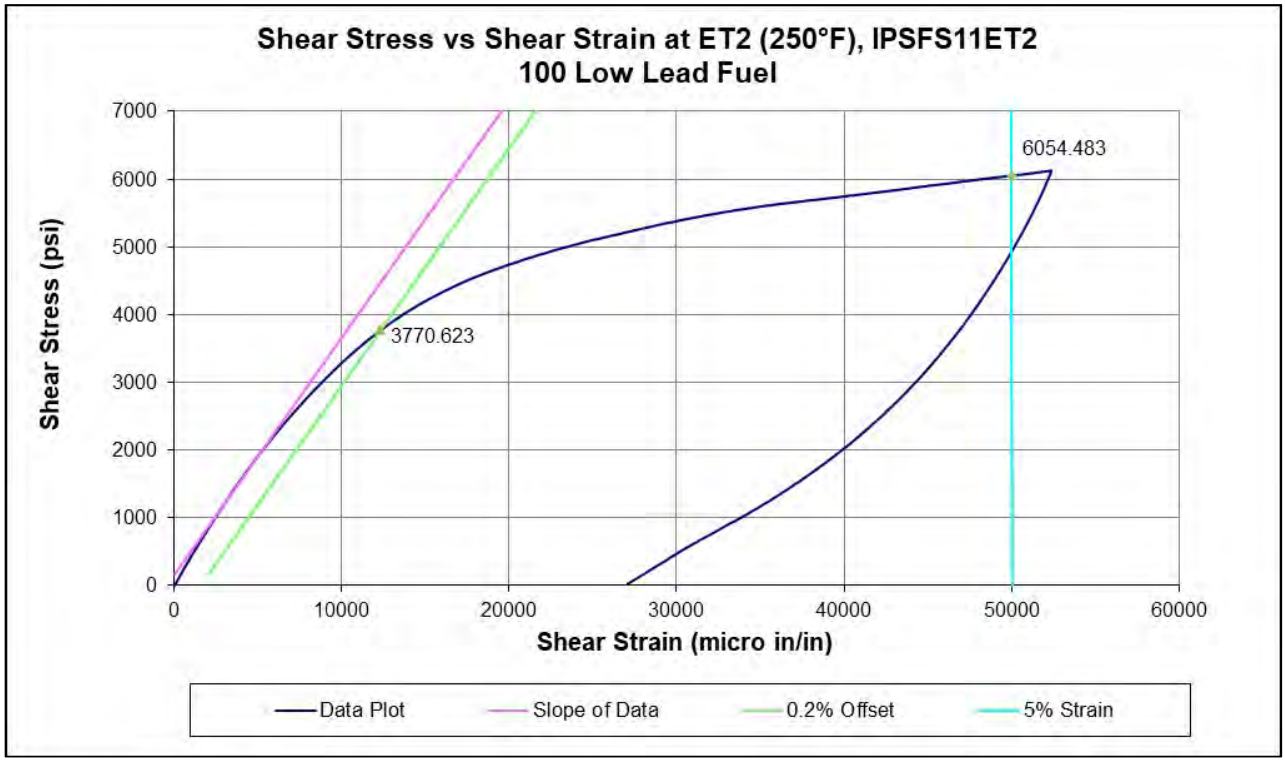

In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 85%RH, RT(70°F) Specimens
Load (lbf)
3000
2500
2000
1500
1000
500
0
0.00
0.20
0.40
0.60
0.80
1.00
1.20
Displacement (in)
One Sample Selected per fluid type
85% Relative Humidity @ RT(70°F)


In-Plane Shear Fluid Sensitivity (IPSFS)
Load vs Displacement Curves for 85%RH, ET1(180°F) Specimens
Load (lbf)
1200
1000
800
600
400
200
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
Displacement (in)
One Sample Selected per fluid type
85% Relative Humidity @ ET1(180°F)

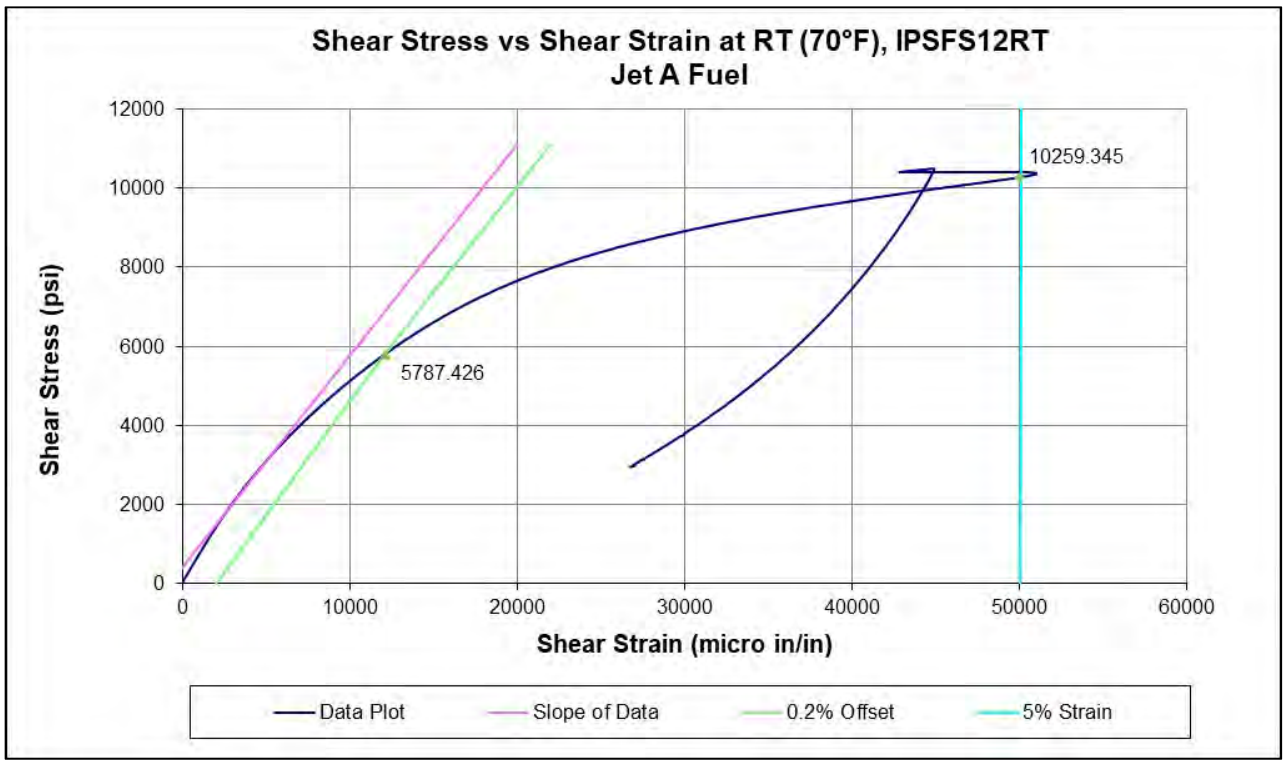
7.2.4 IPSFS Stress vs. Strain Curve

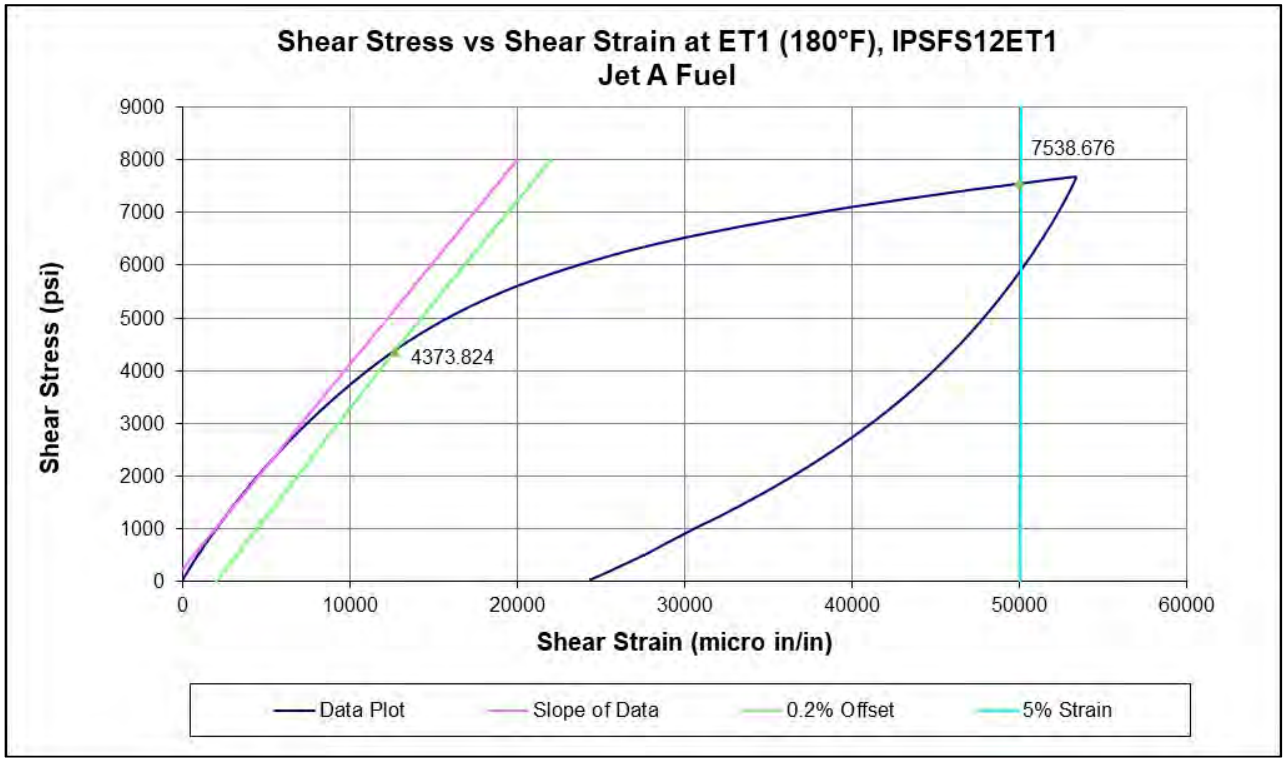
7.2.4.1 100 Low Lead Fuel (IPSFS11RT / IPSFS11ET2)

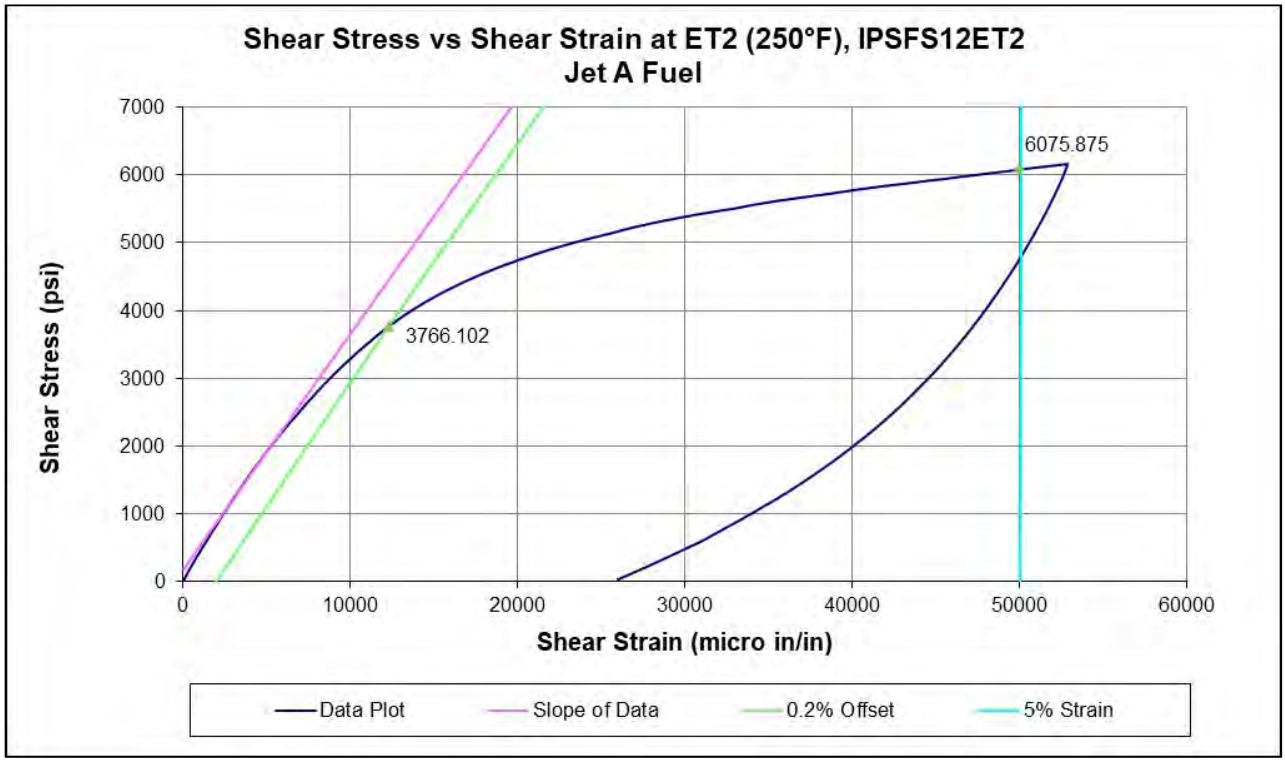




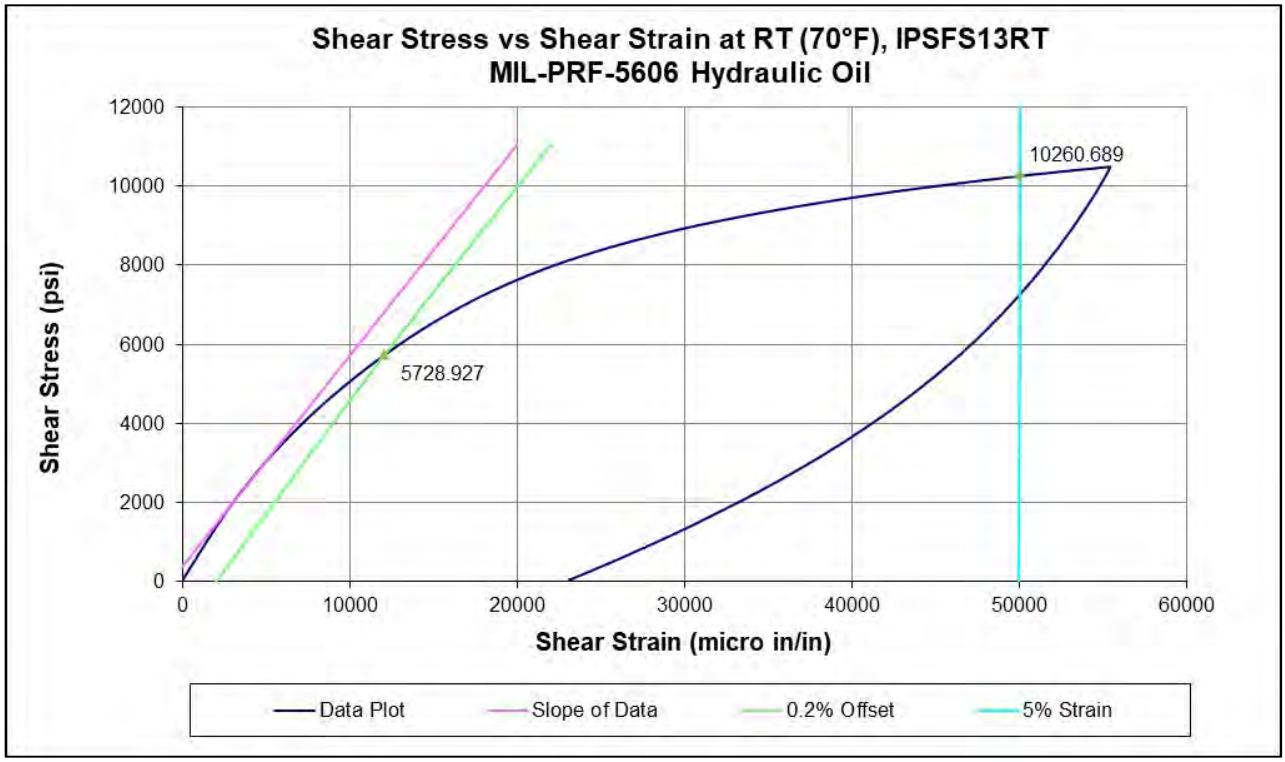
7.2.4.2 Jet A Fuel (IPSFS12RT / IPSFS12ET1 / IPSFS12ET2)

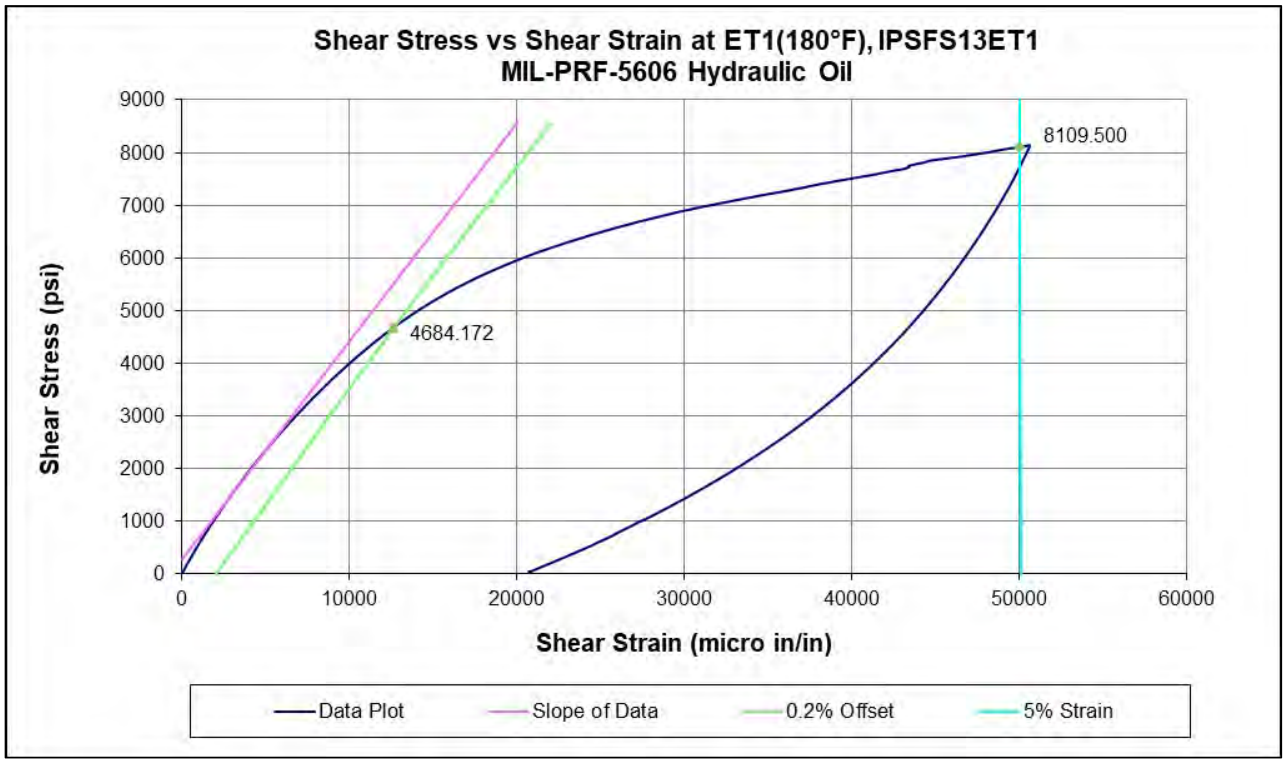


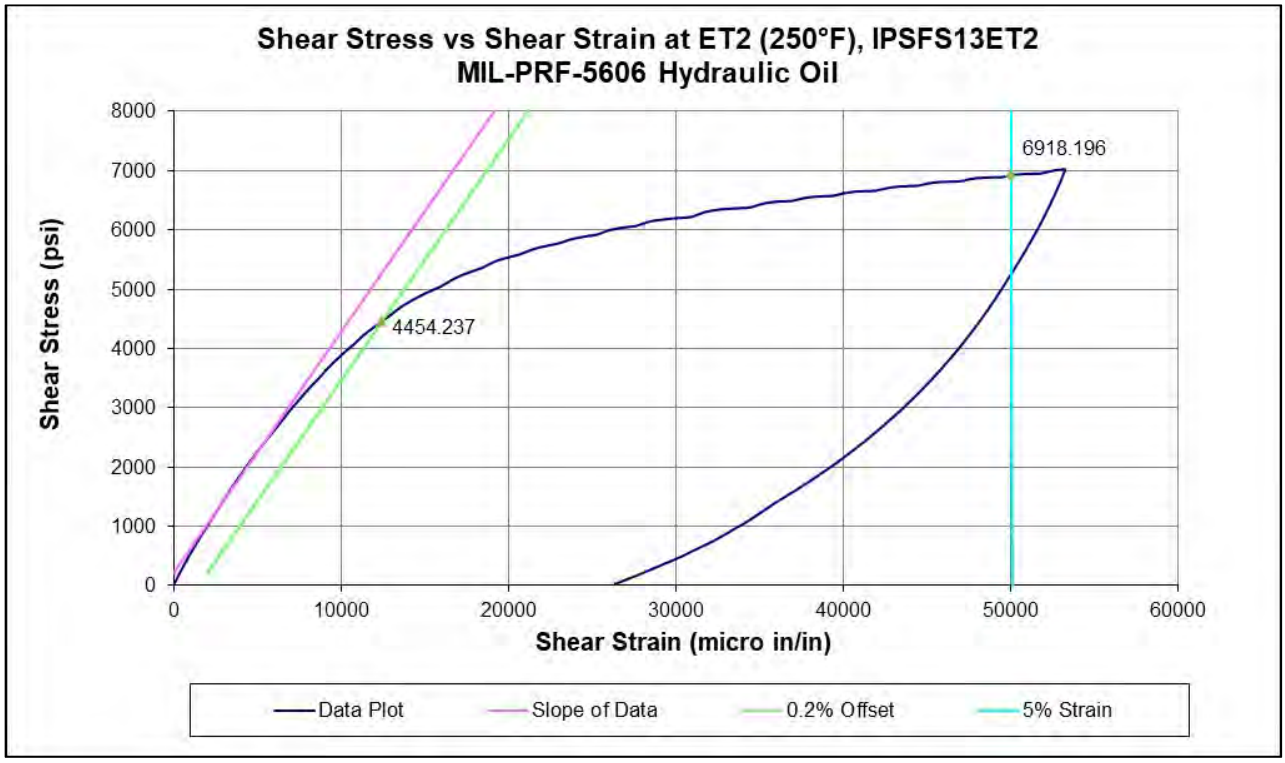



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS12ET2
Jet A Fuel
Shear Stress (psi)
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
6075.875
3766.102
Data Plot
Slope of Data
0.2% Offset
5% Strain

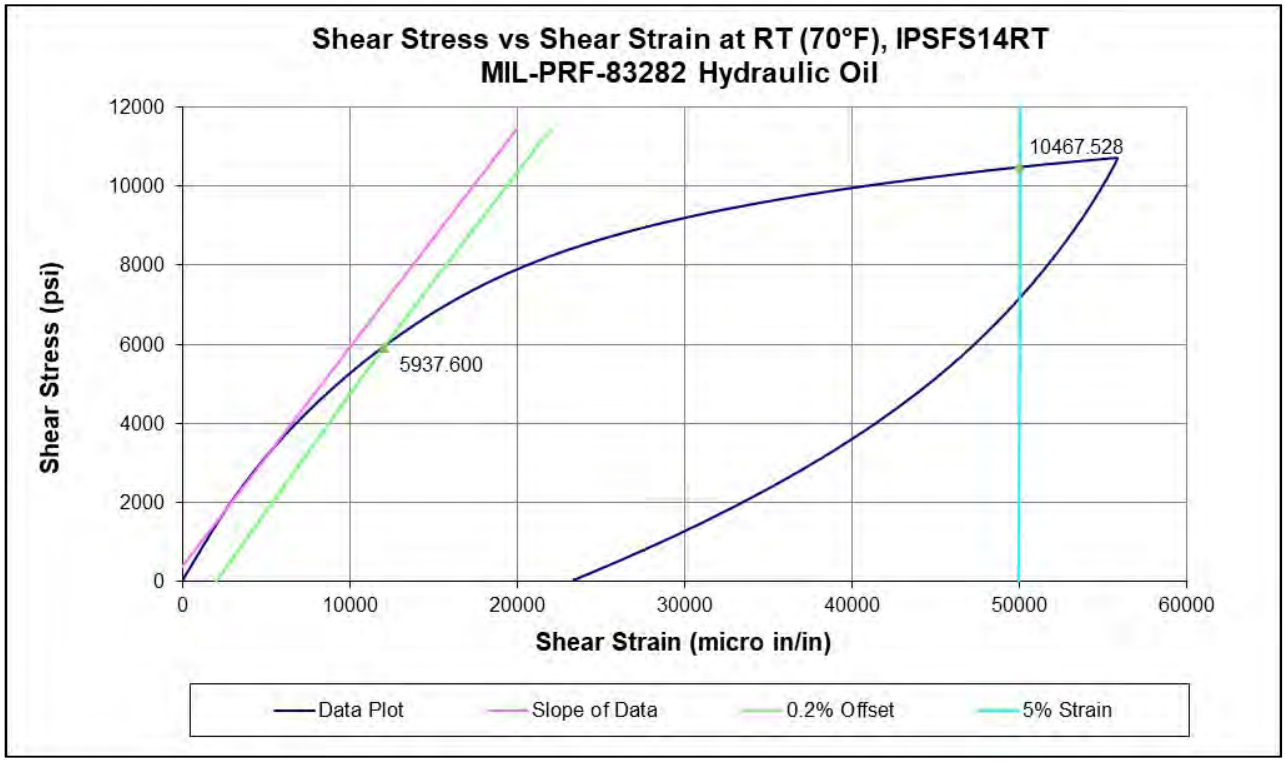
7.2.4.3 MIL-PRF-5606 Hydraulic Oil (IPSFS13RT / IPSFS13ET1 / IPSFS13ET2)

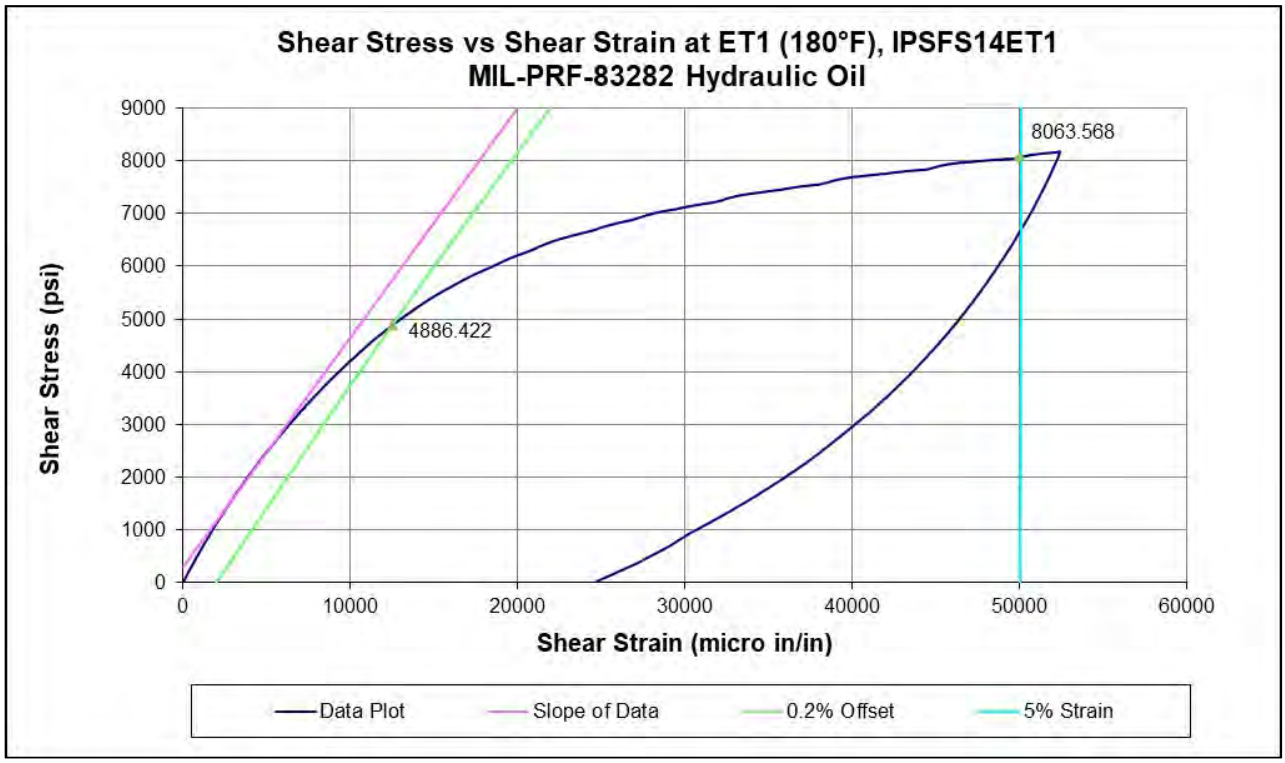


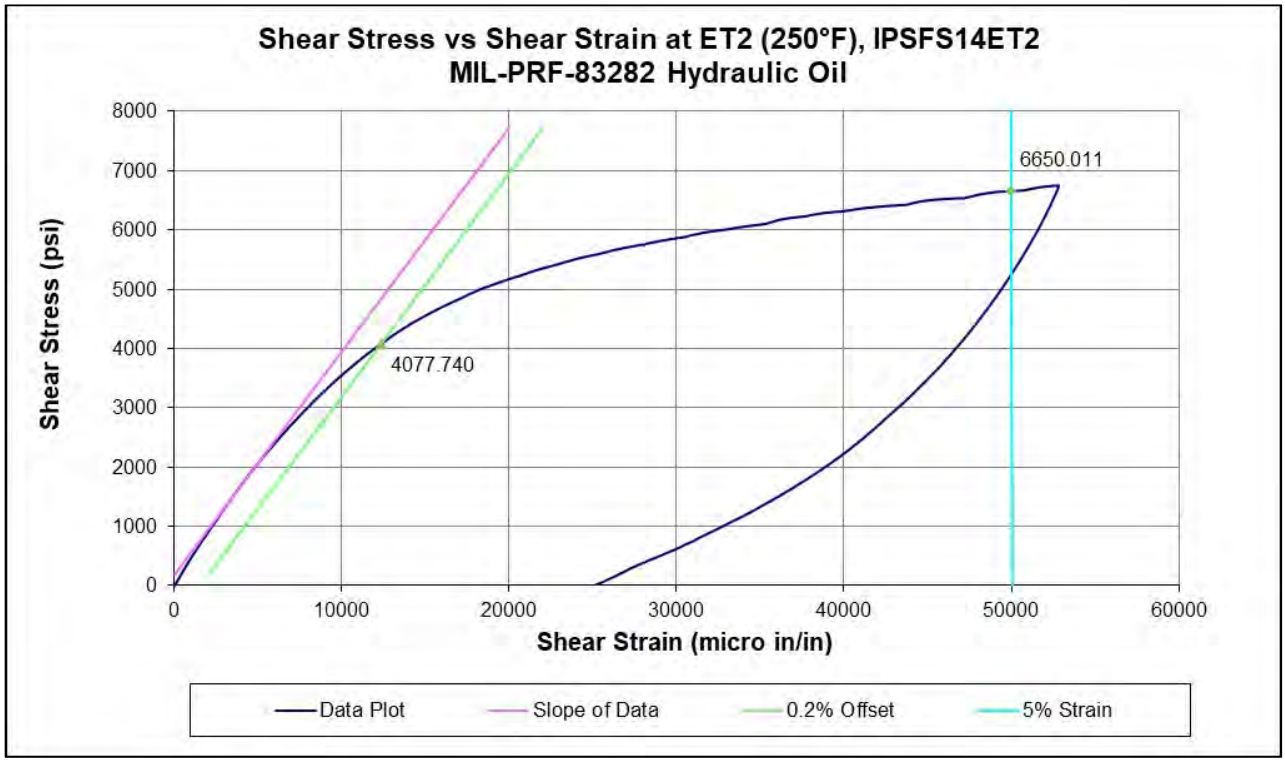



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS13ET2
MIL-PRF-5606 Hydraulic Oil
Shear Stress (psi)
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
6918.196
4454.237
Data Plot
Slope of Data
0.2% Offset
5% Strain

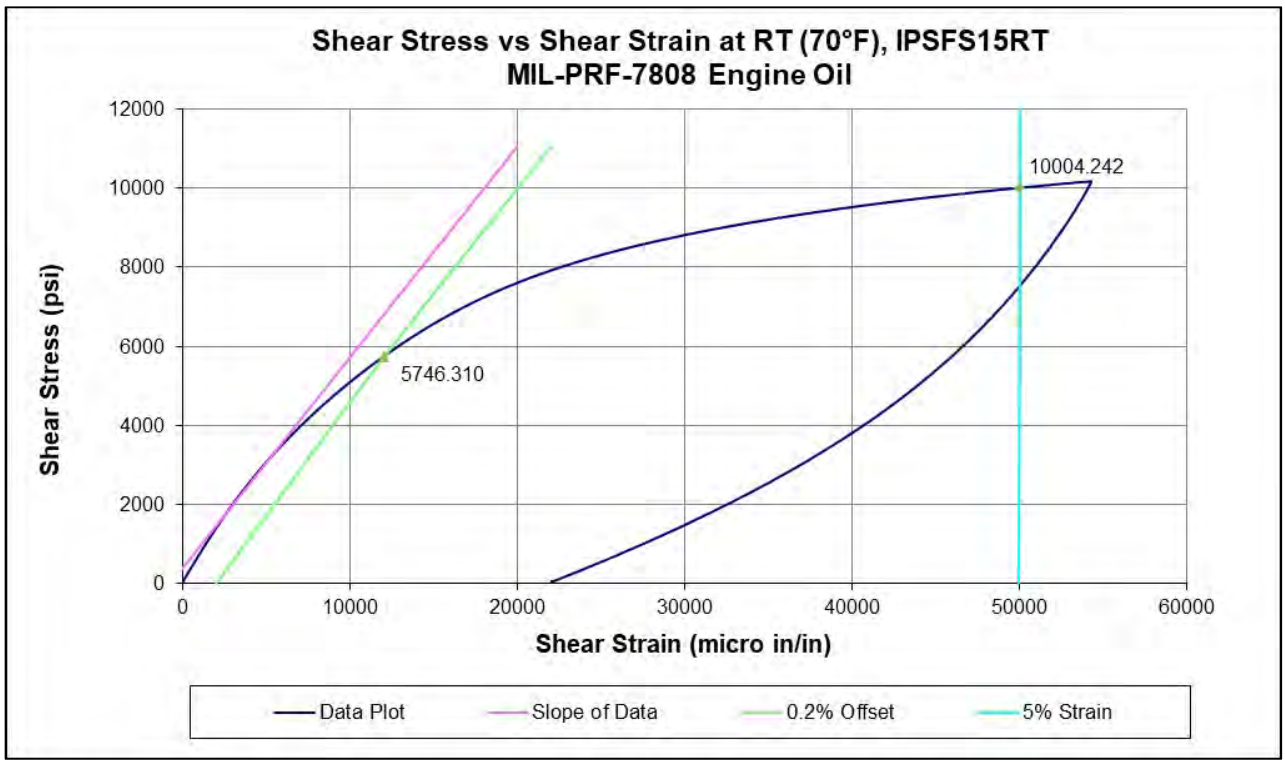
7.2.4.4 MIL-PRF-83282 Hydraulic Oil (IPSFS14RT / IPSFS14ET1 / IPSFS14ET2)

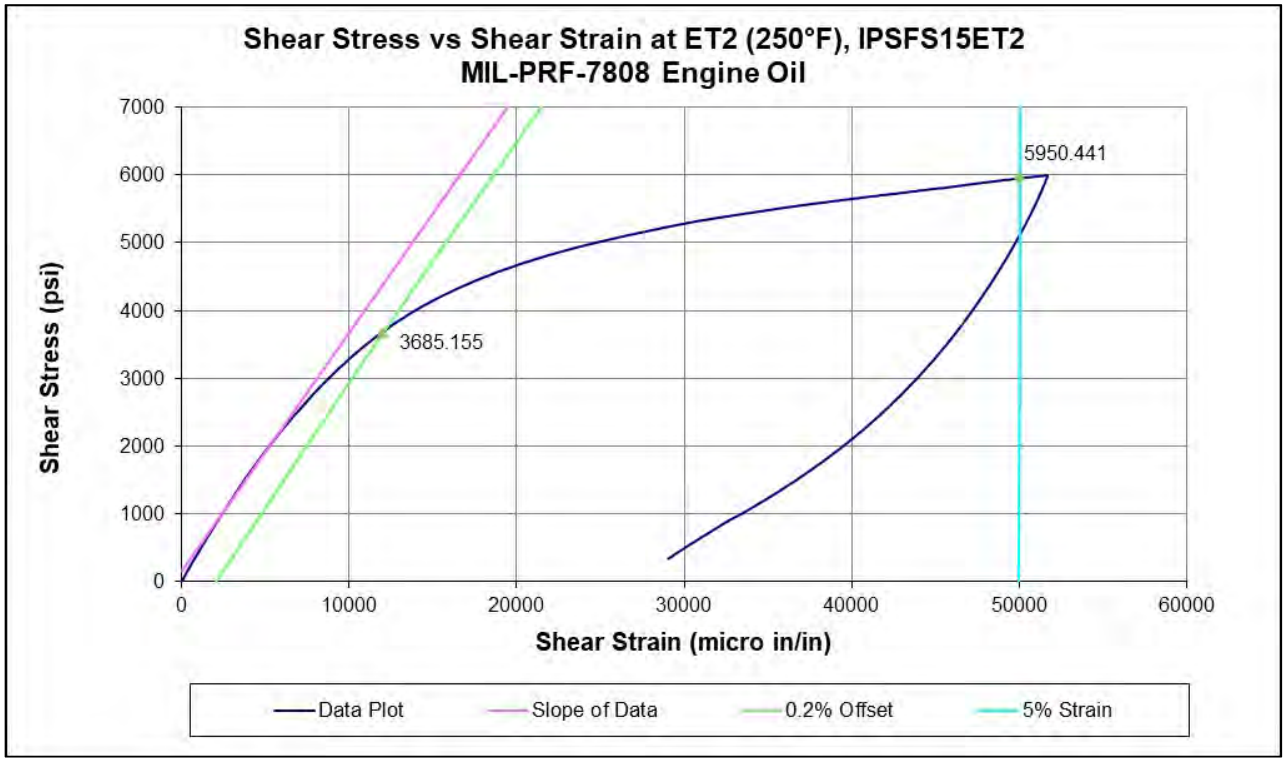




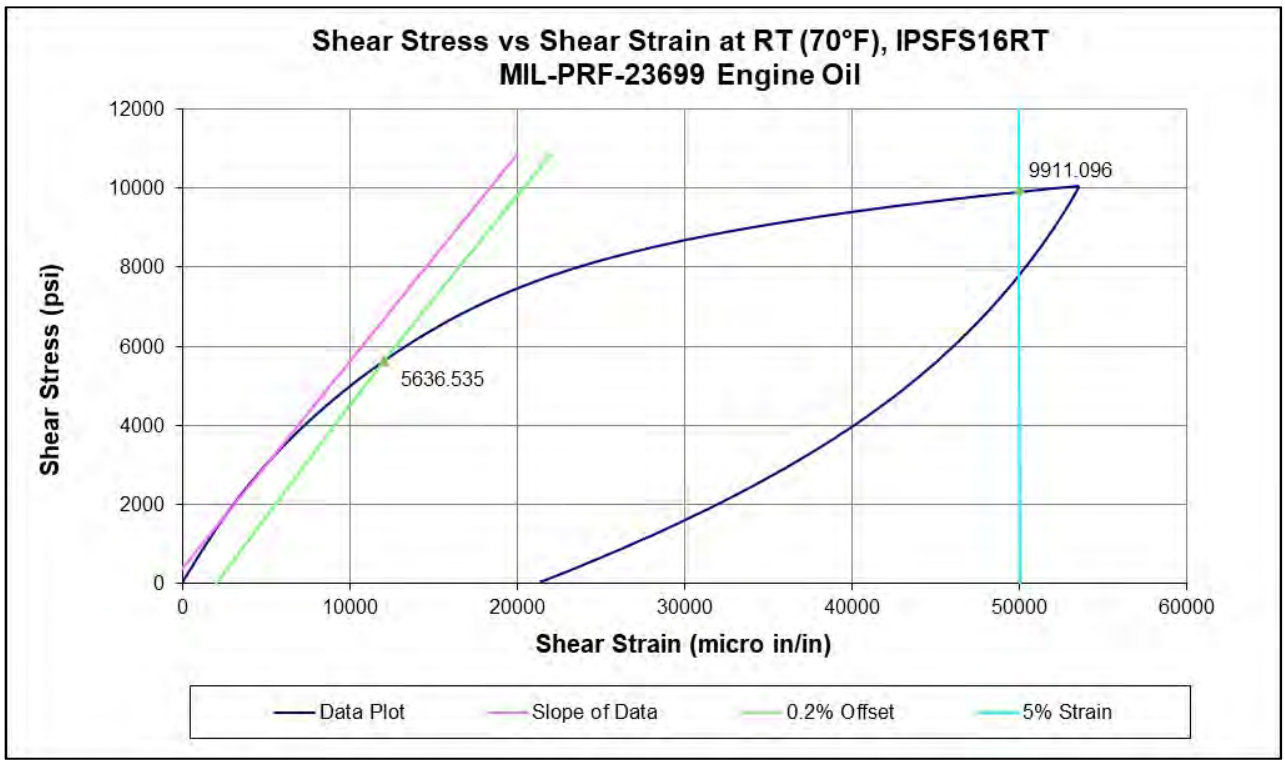

Shear Stress vs Shear Strain at ET2 (250°F), IPSFS14ET2
MIL-PRF-83282 Hydraulic Oil
Shear Stress (psi)
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
6650.011
4077.740
Data Plot
Slope of Data
0.2% Offset
5% Strain

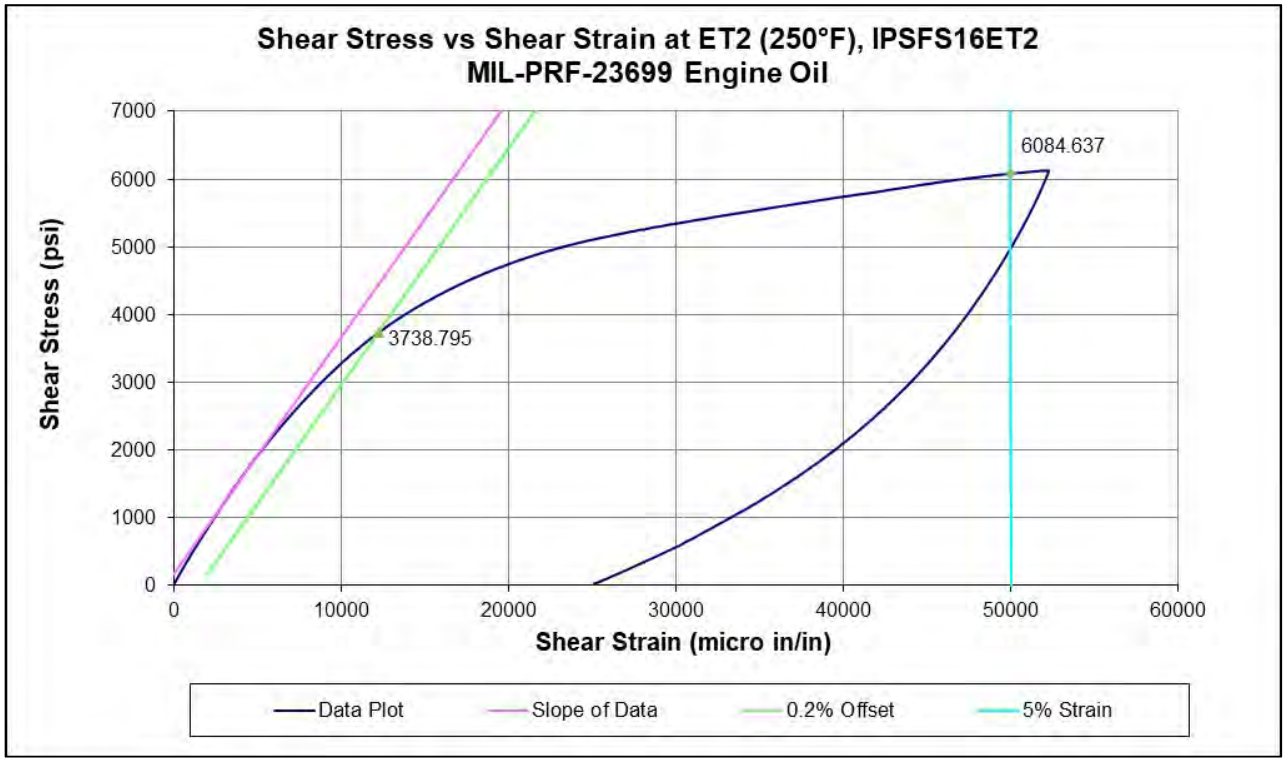
7.2.4.5 MIL-PRF-7808 Engine Oil (IPSFS15RT / IPSFS15ET2)



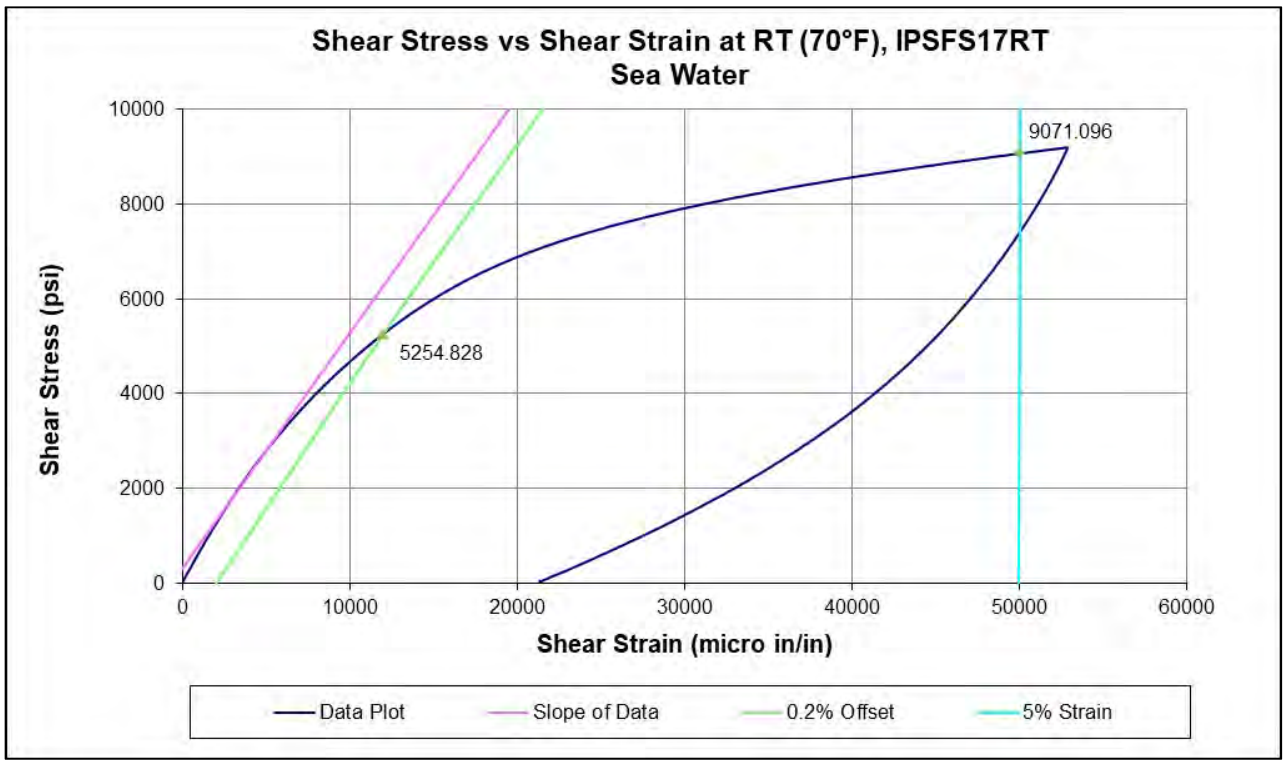


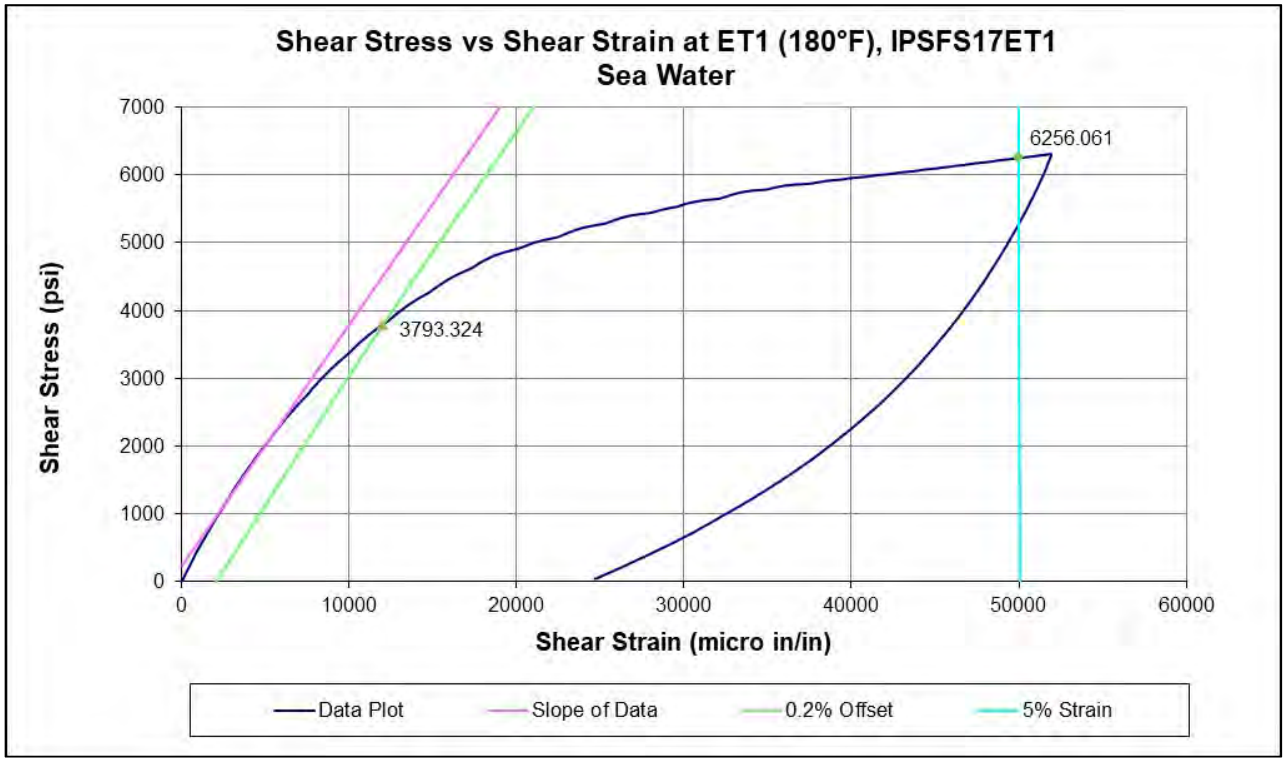
7.2.4.6 MIL-PRF-23699 Engine Oil (IPSFS16RT / IPSFS16ET2)

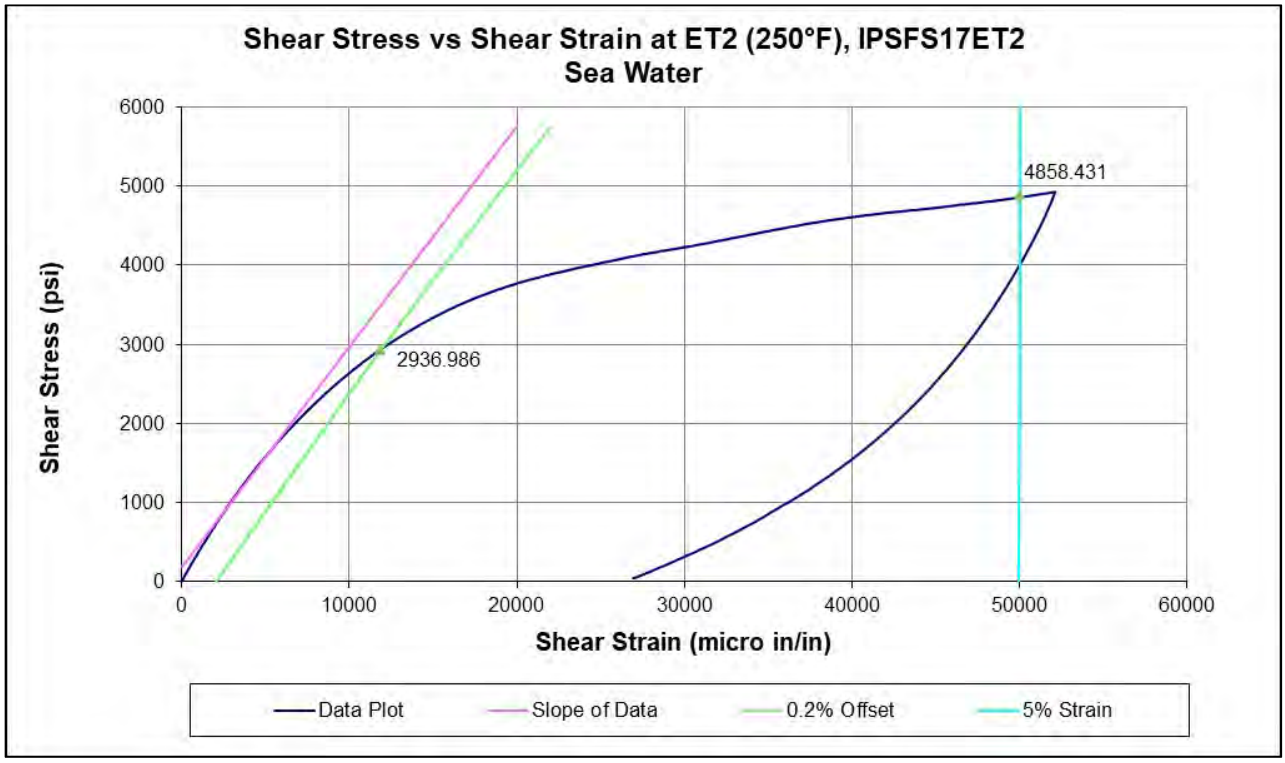




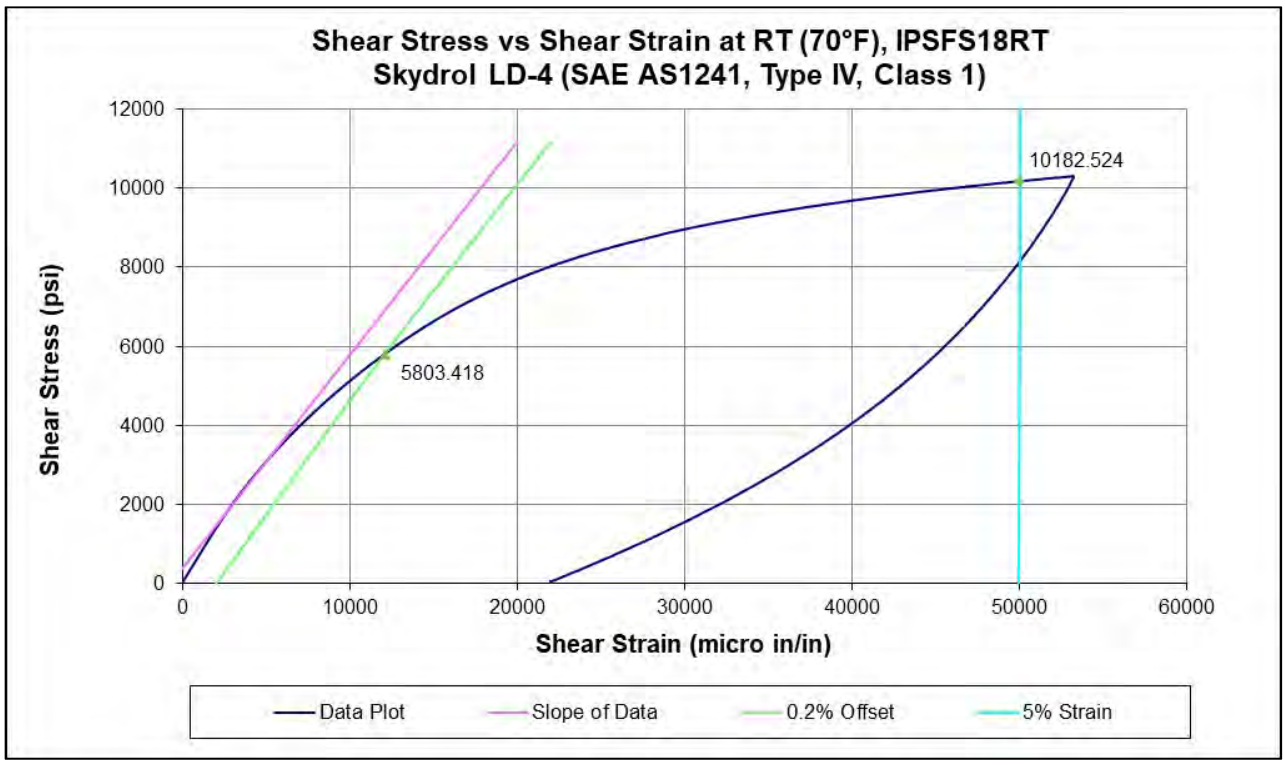
7.2.4.7 Sea Water (IPSFS17RT / IPSFS17ET1 / IPSFS17ET2)

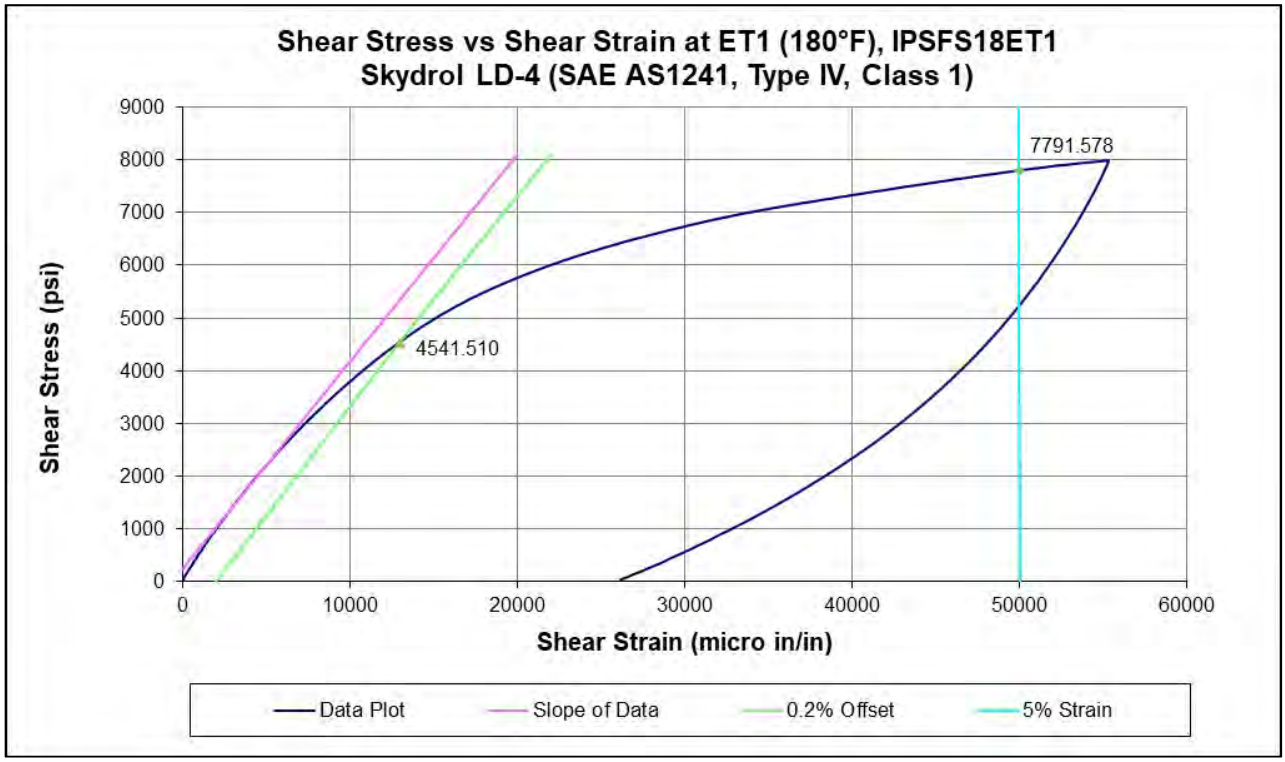


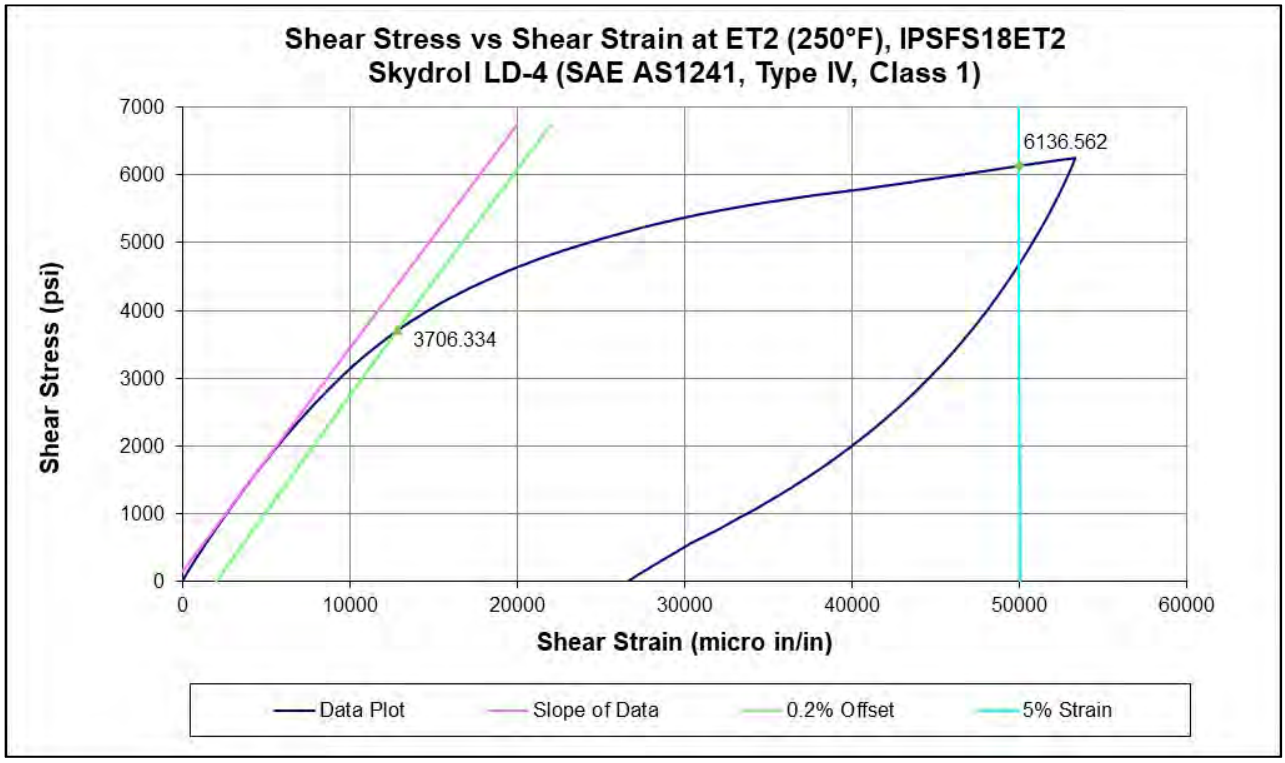



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS17ET2
Sea Water
Shear Stress (psi)
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
4858.431
2936.986
Data Plot
Slope of Data
0.2% Offset
5% Strain

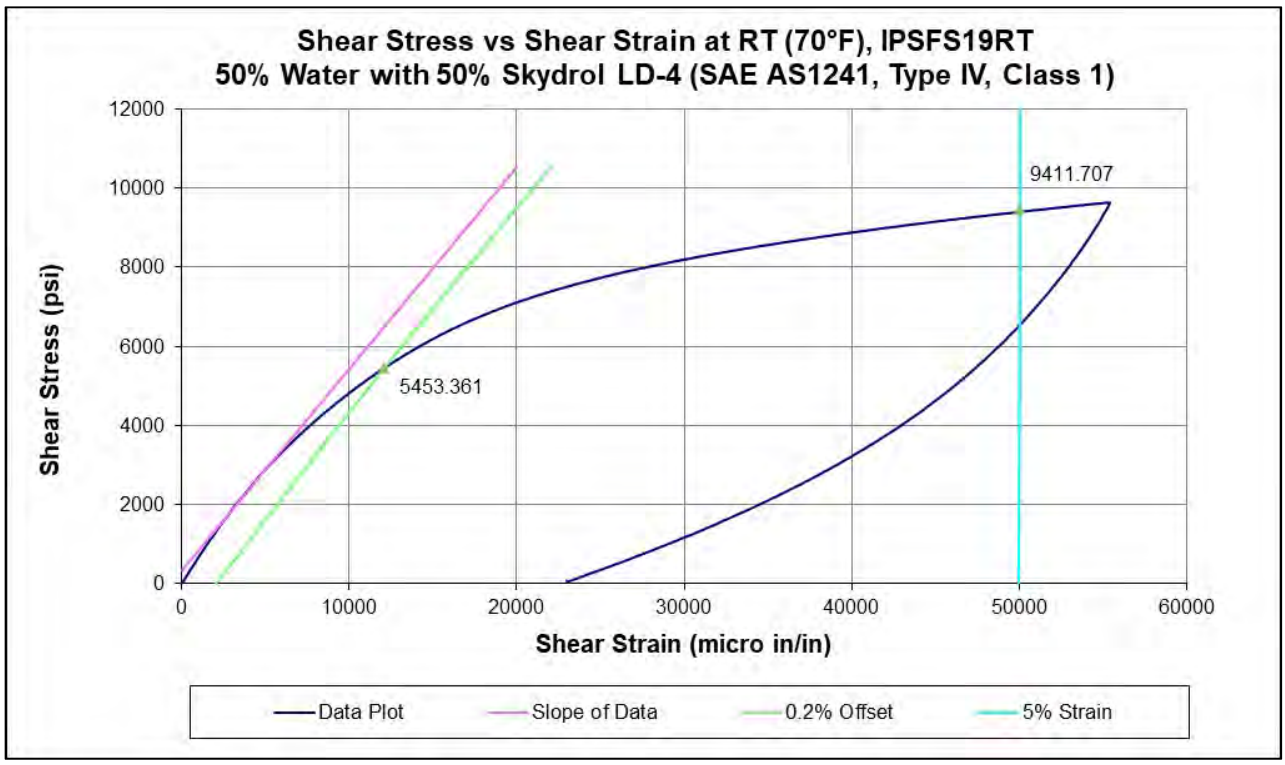
7.2.4.8 Skydrol LD-4 (IPSFS18RT / IPSFS18ET1 / IPSFS18ET2)





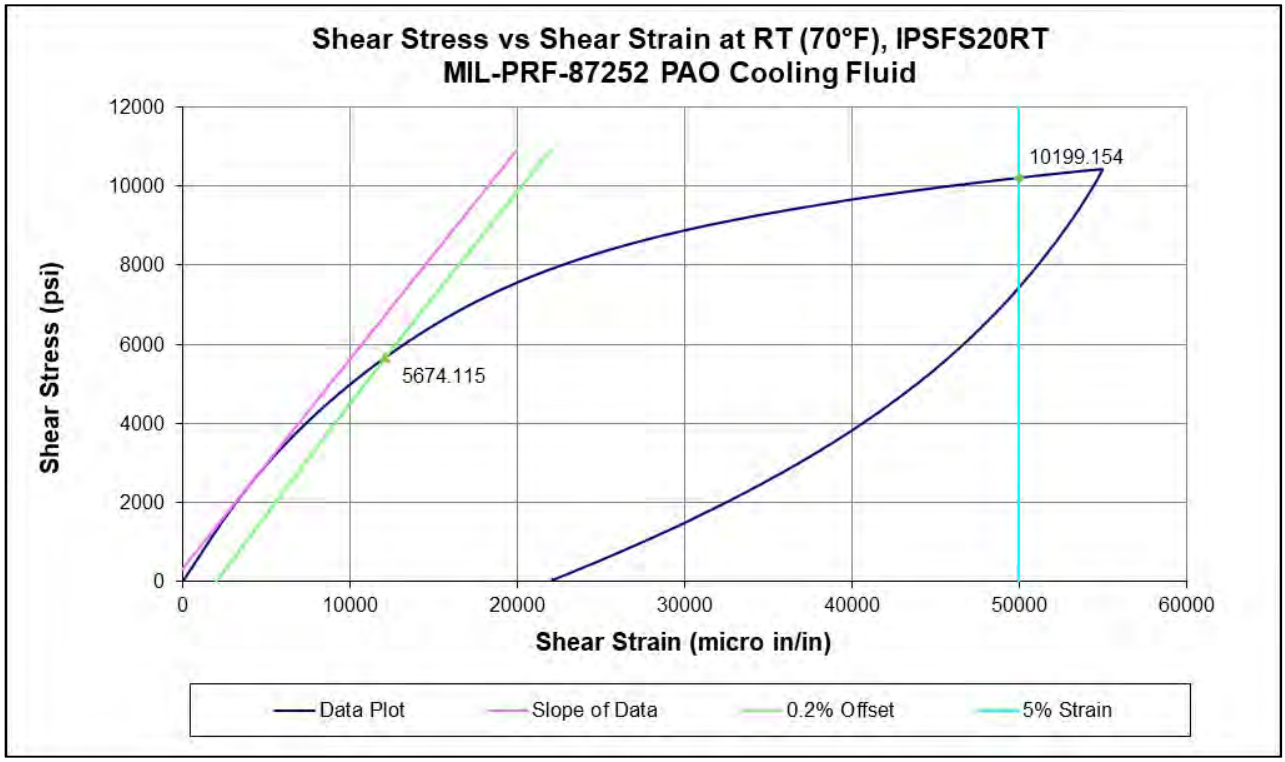

Shear Stress vs Shear Strain at ET2 (250°F), IPSFS18ET2
Skydrol LD-4 (SAE AS1241, Type IV, Class 1)
Shear Stress (psi)
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
6136.562
3706.334
Data Plot
Slope of Data
0.2% Offset
5% Strain

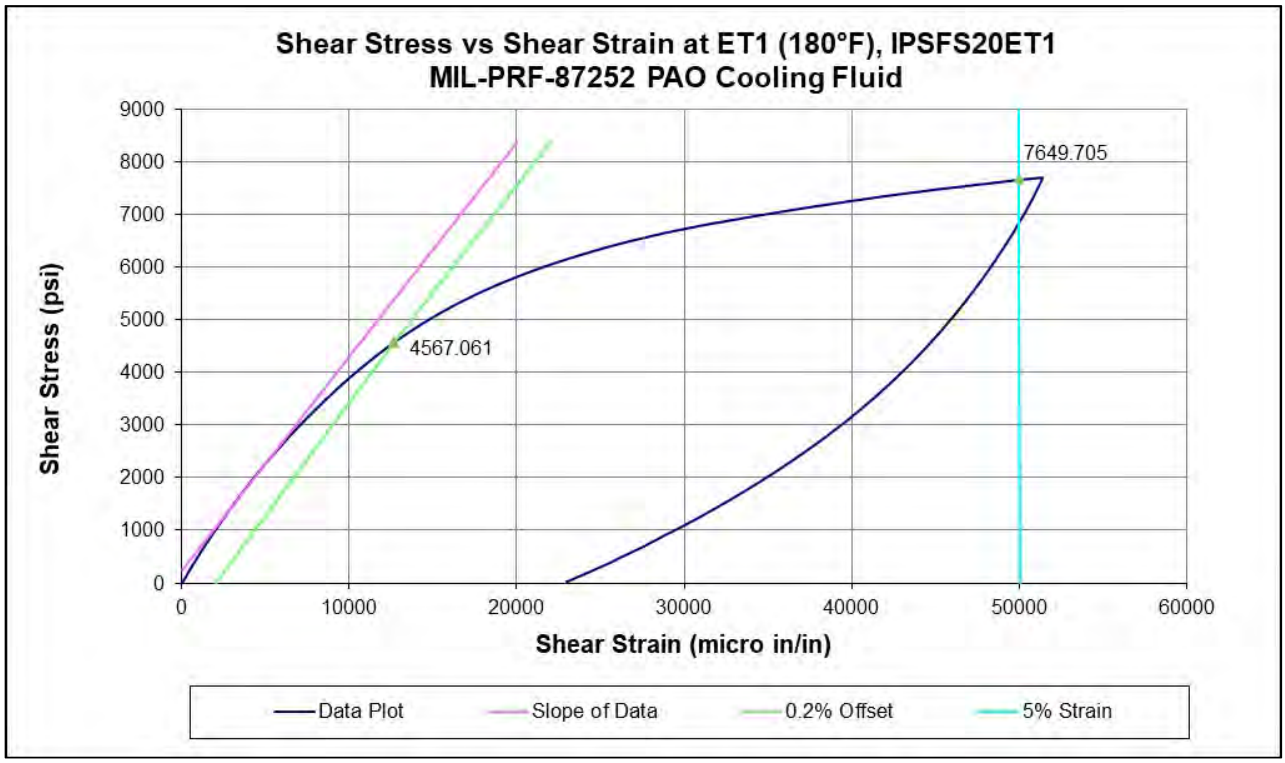
7.2.4.9 50% Water with 50% Skydrol LD-4 (IPSFS19RT / IPSFS19ET2)

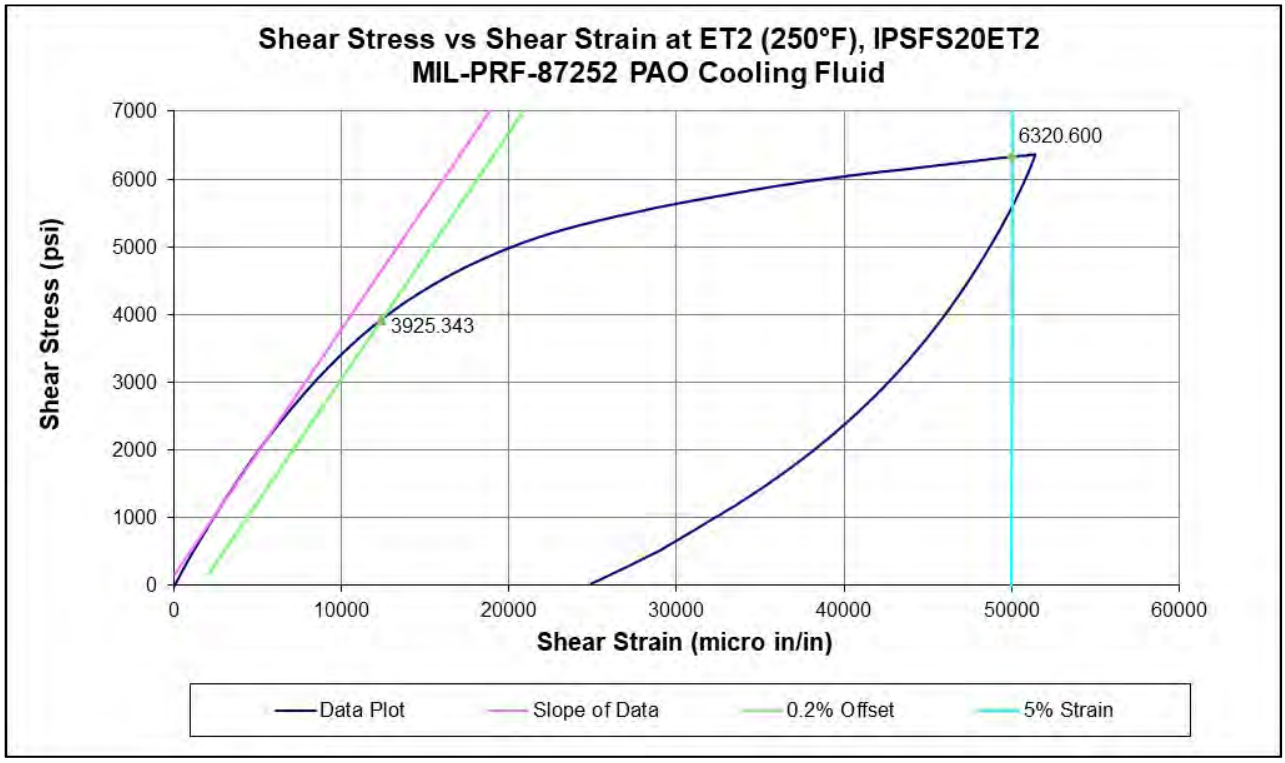




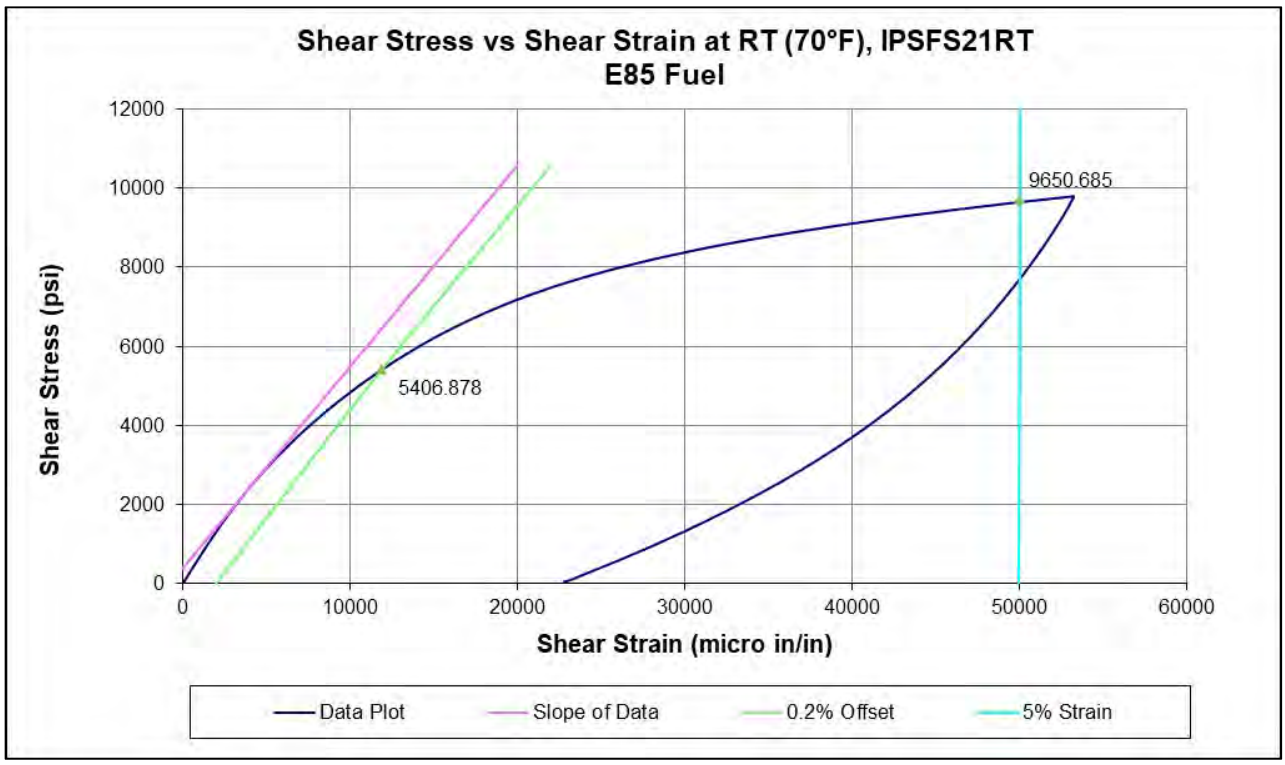
7.2.4.10 MIL-PRF-87252 PAO Cooling Fluid (IPSFS20RT / IPSFS20ET1 / IPSFS20ET2)

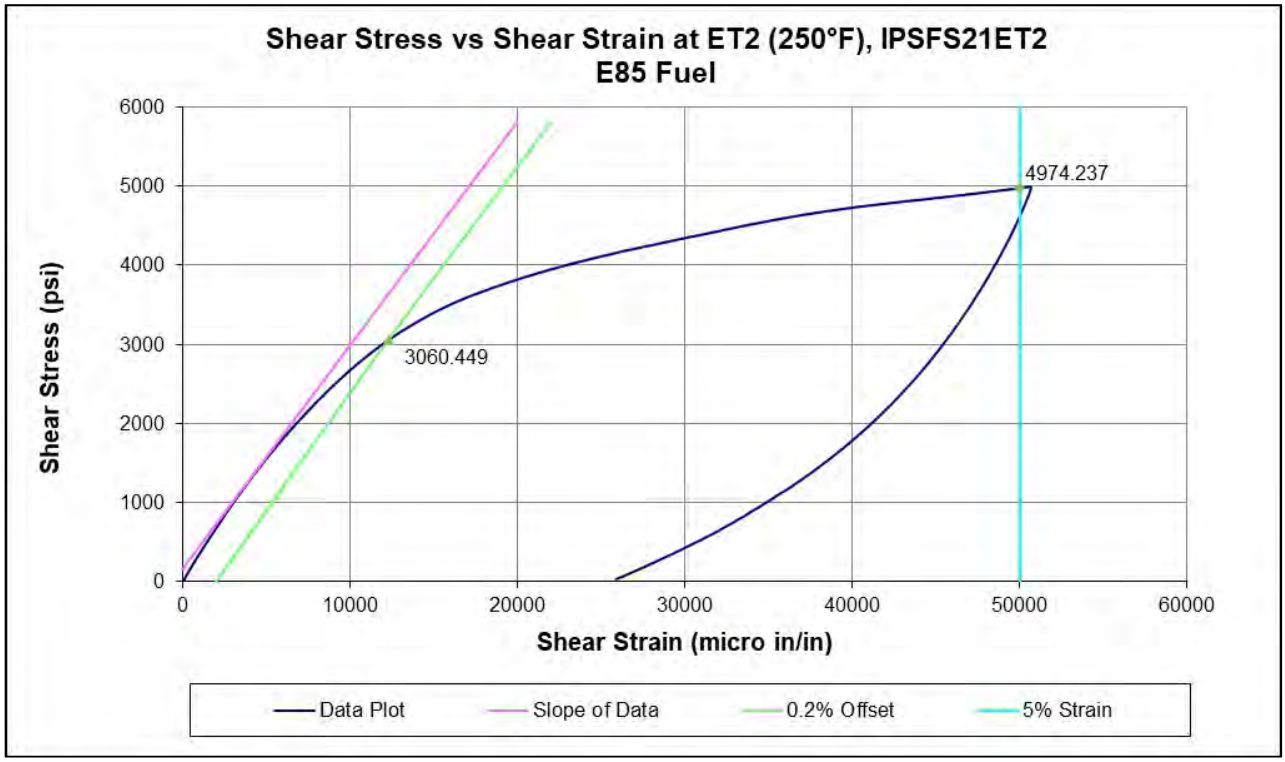




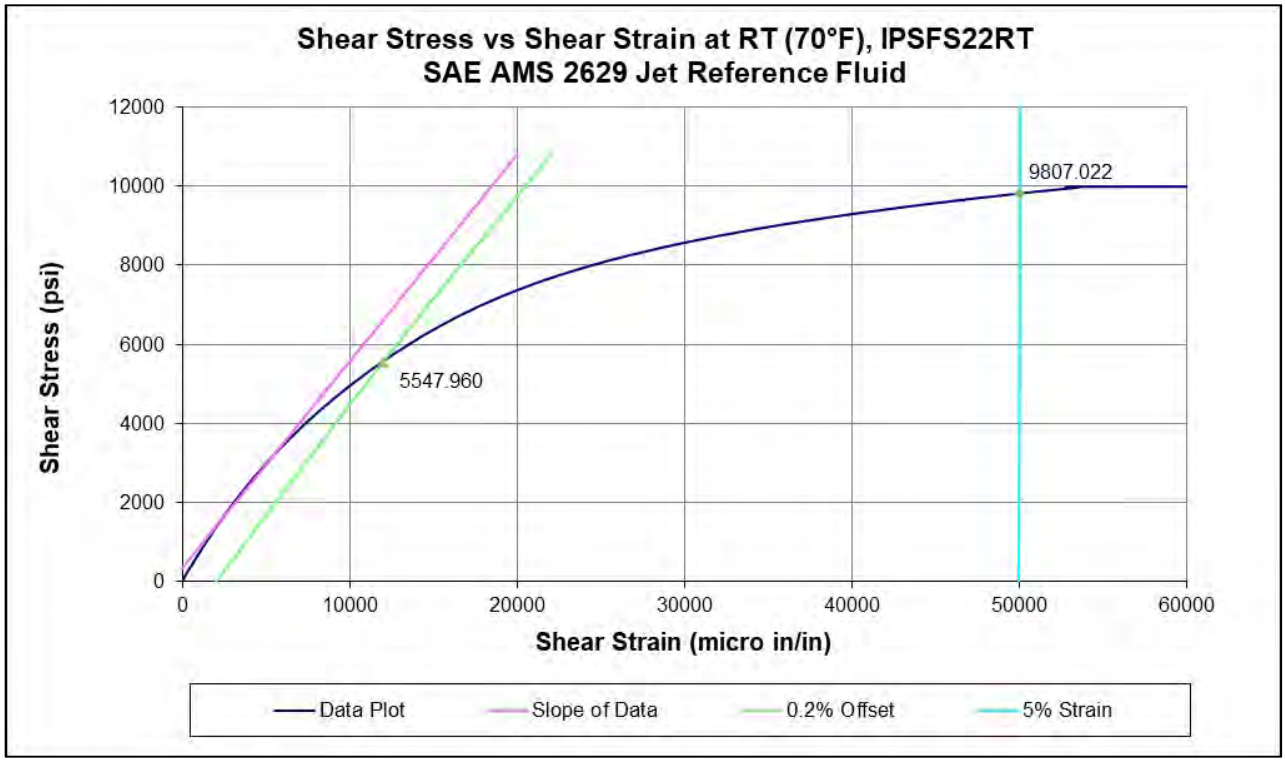

Shear Stress vs Shear Strain at ET2 (250°F), IPSFS20ET2
MIL-PRF-87252 PAO Cooling Fluid
Shear Stress (psi)
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
6320.600
3925.343
Data Plot
Slope of Data
0.2% Offset
5% Strain

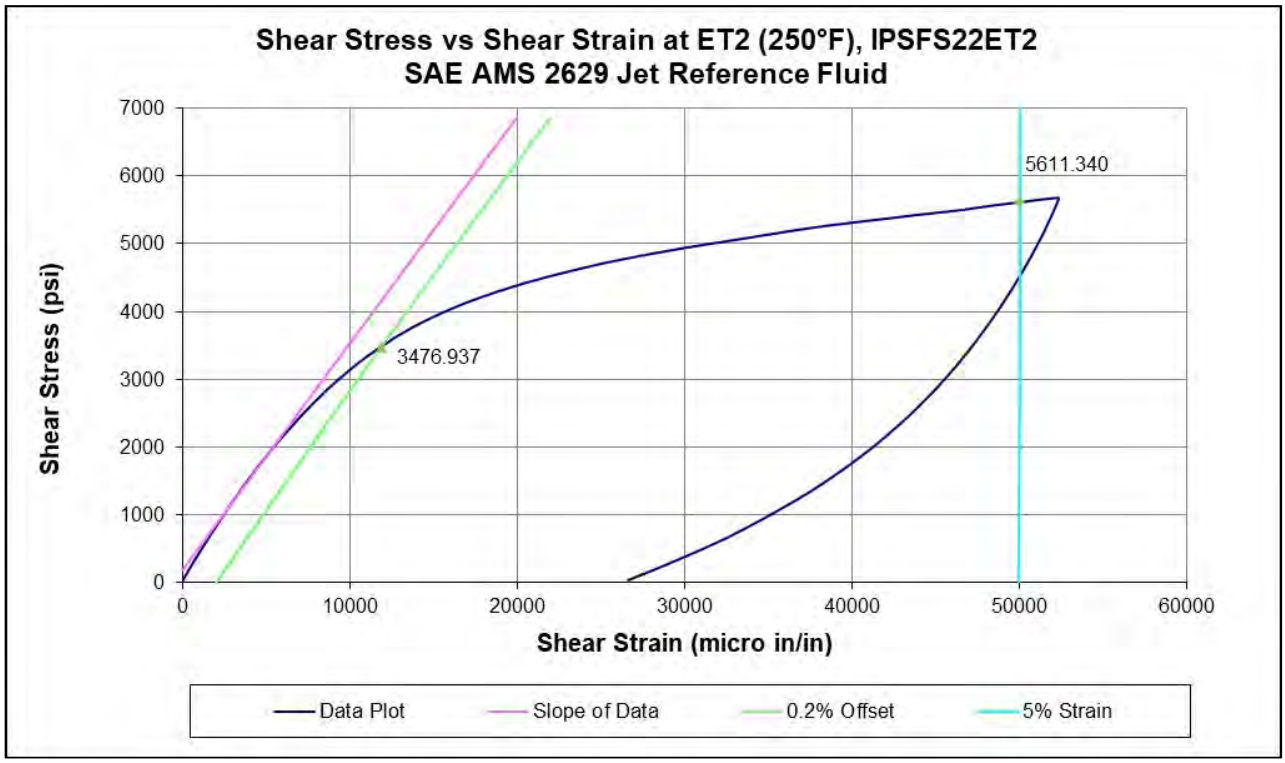
7.2.4.11 E85 Fuel (IPSFS21RT / IPSFS21ET2)



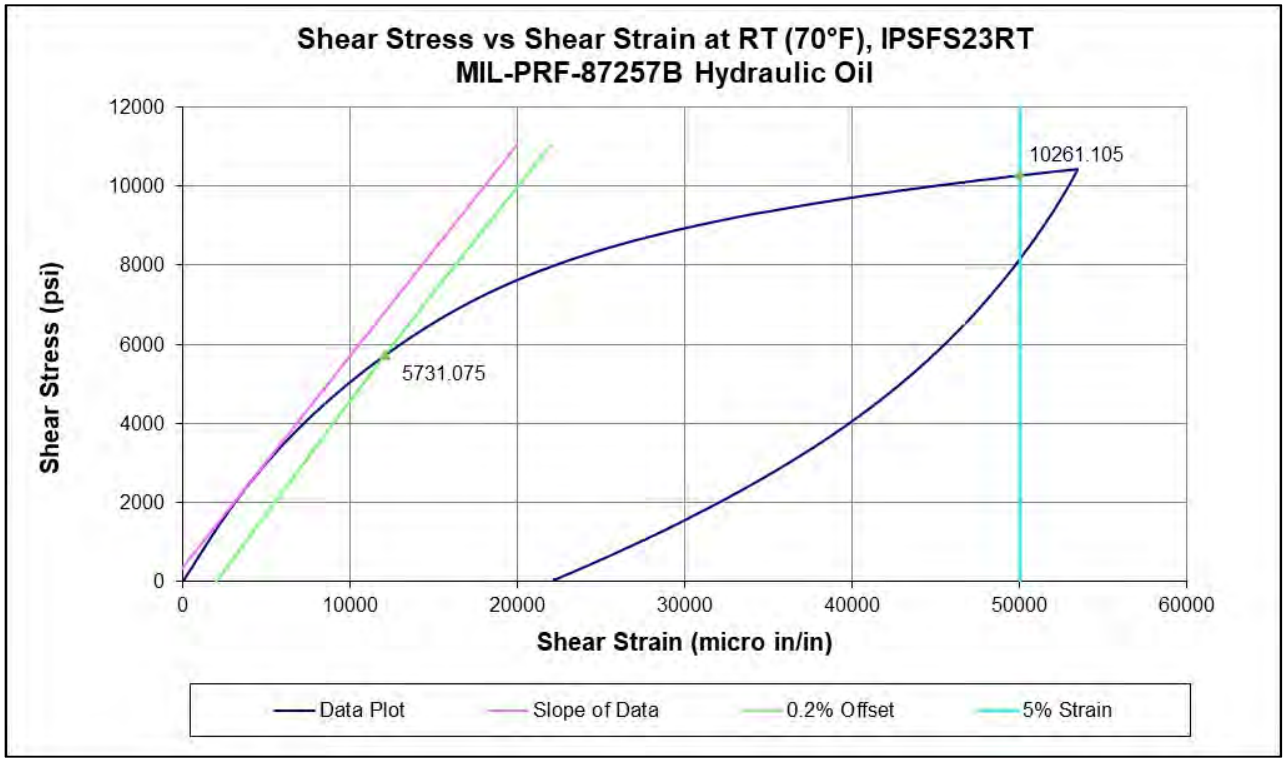


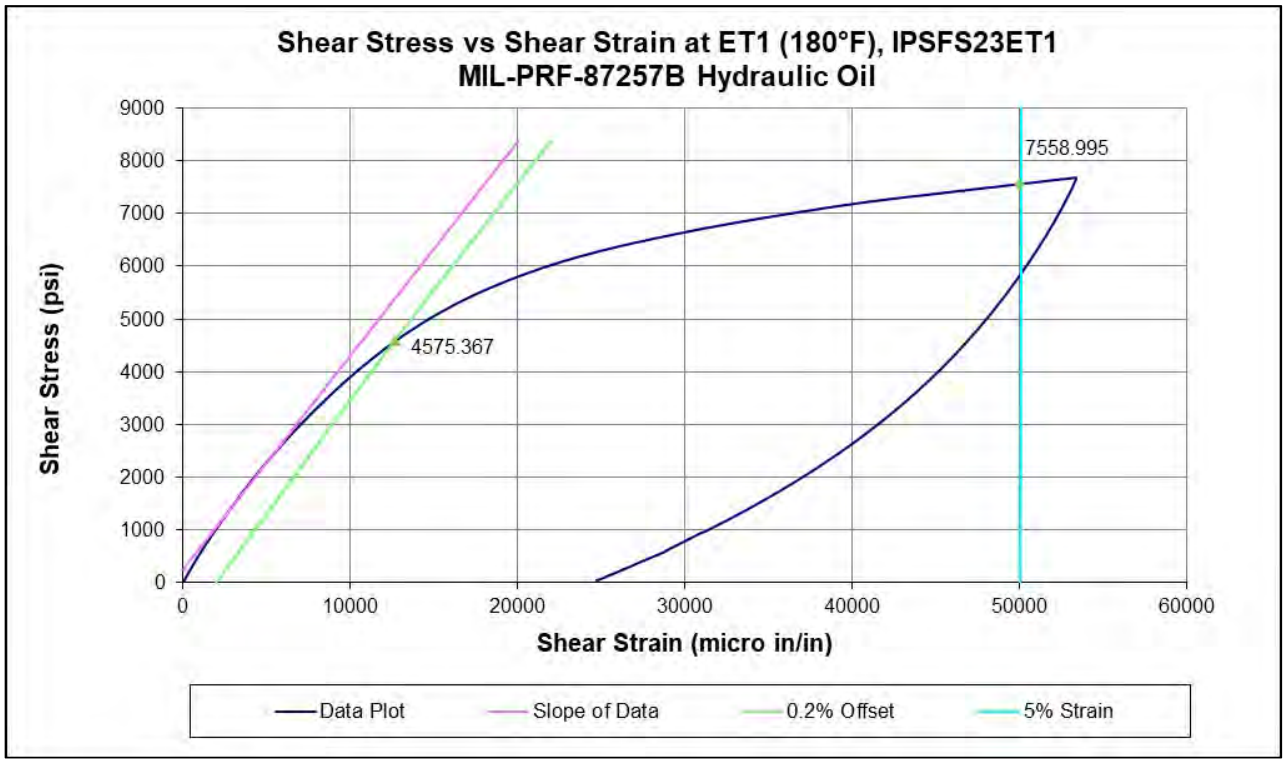
7.2.4.12 SAE AMS 2629 Jet Reference Fluid (IPSFS22RT / IPSFS22ET2)

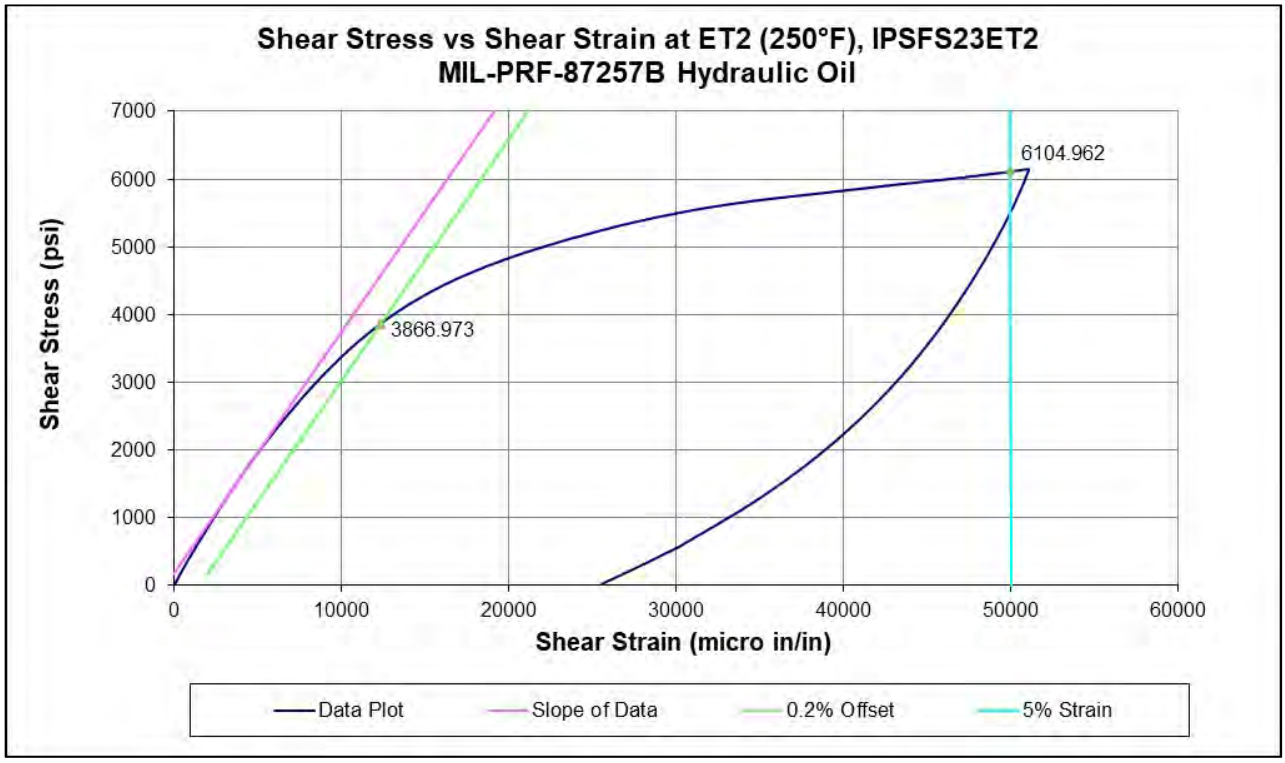




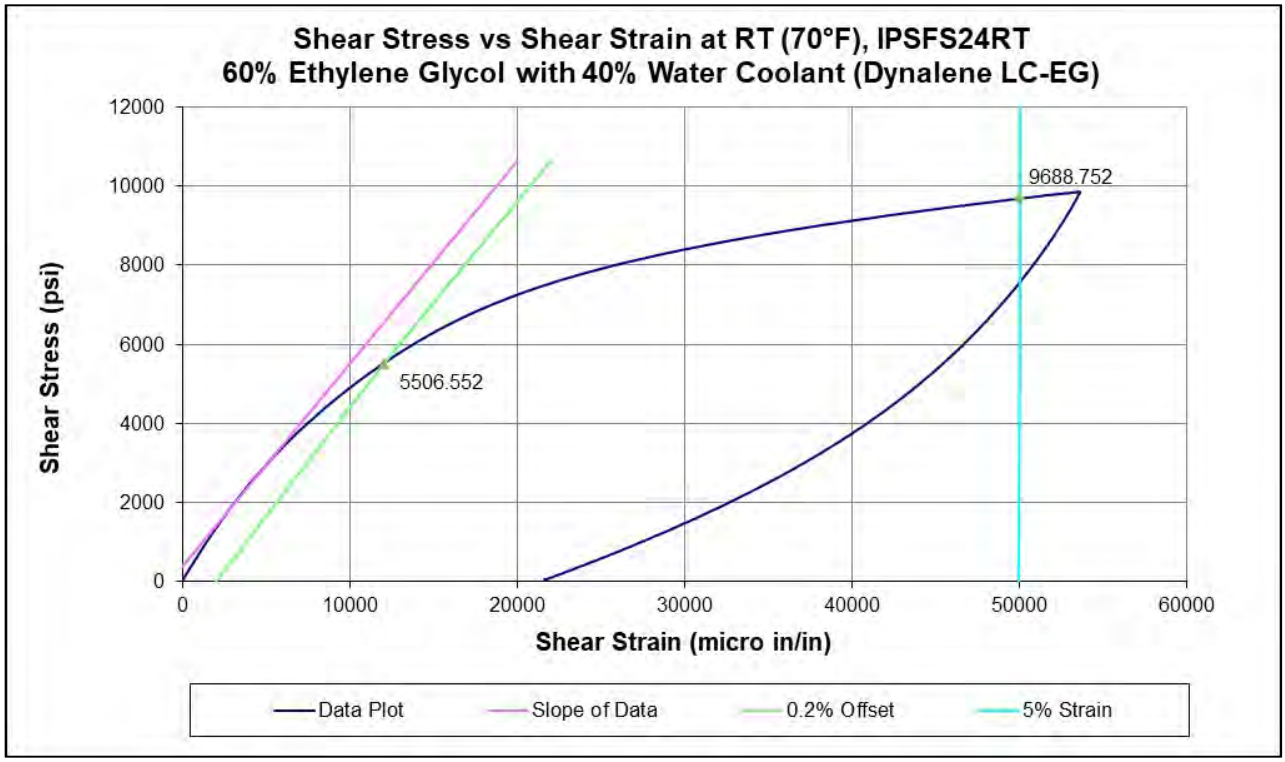
7.2.4.13 MIL-PRF-87257B Hydraulic Oil (IPSFS23RT / IPSFS23ET1 / IPSFS23ET2)

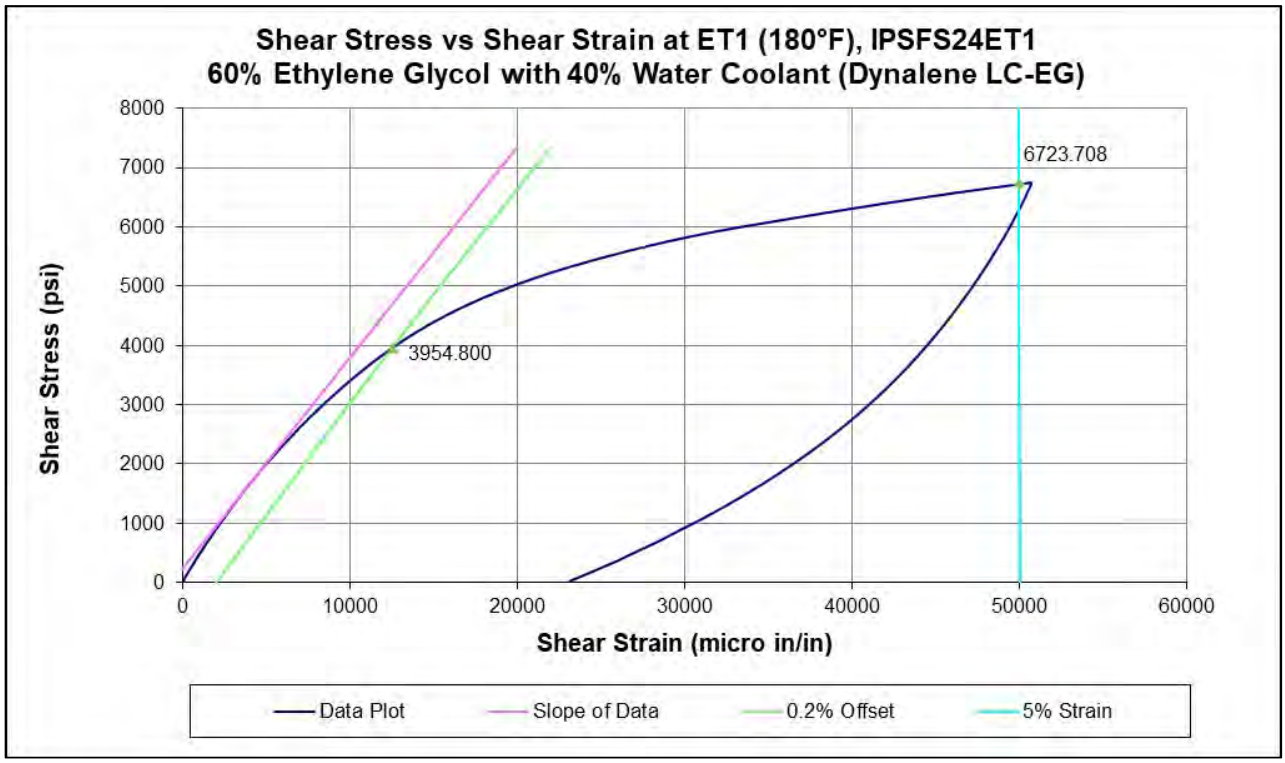


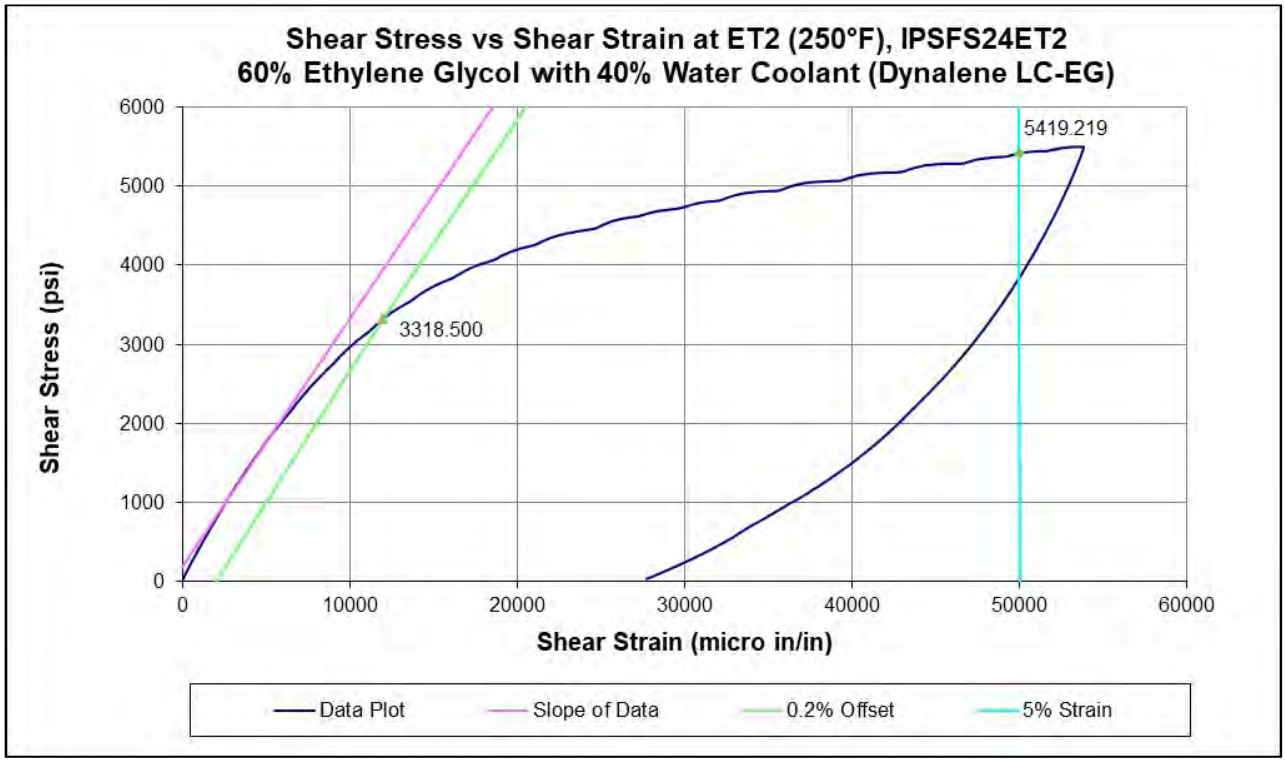



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS23ET2
MIL-PRF-87257B Hydraulic Oil
Shear Stress (psi)
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
6104.962
3866.973
Data Plot
Slope of Data
0.2% Offset
5% Strain

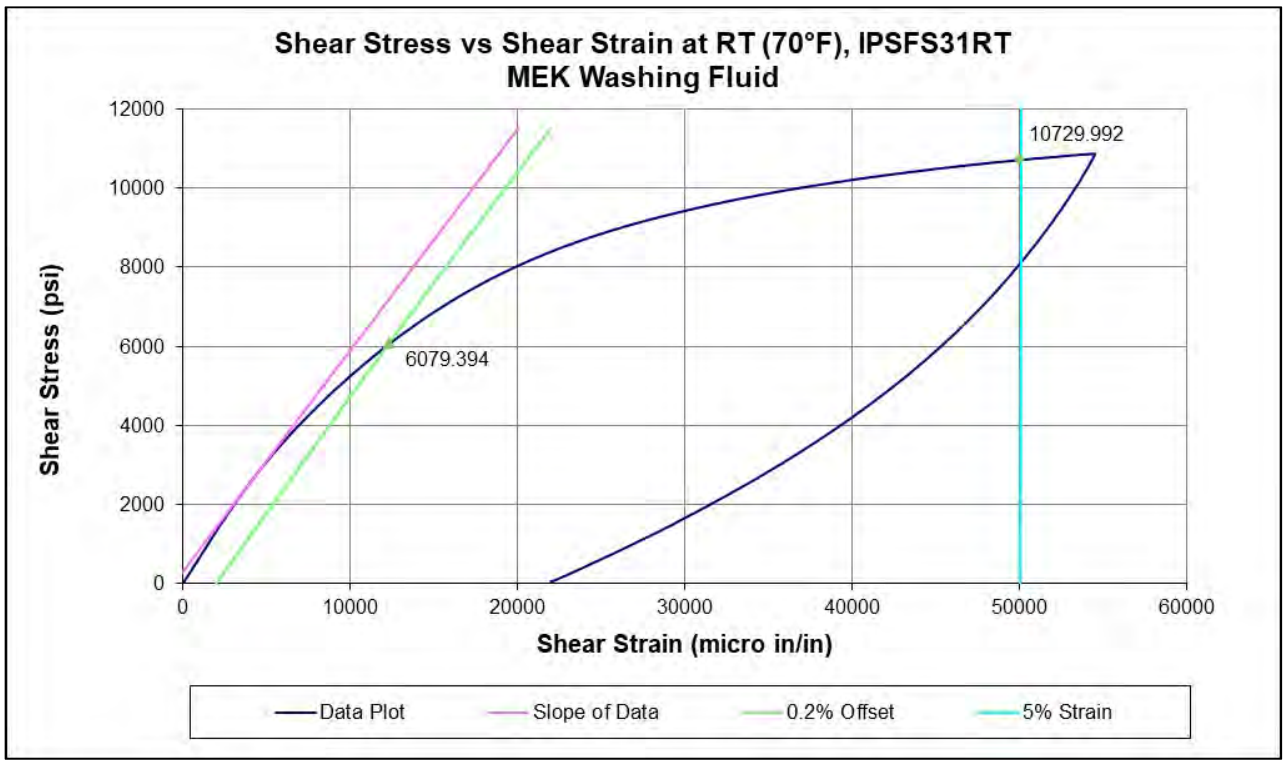
7.2.4.14 60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG) (IPSFS24RT / IPSFS24ET1 / IPSFS24ET2)

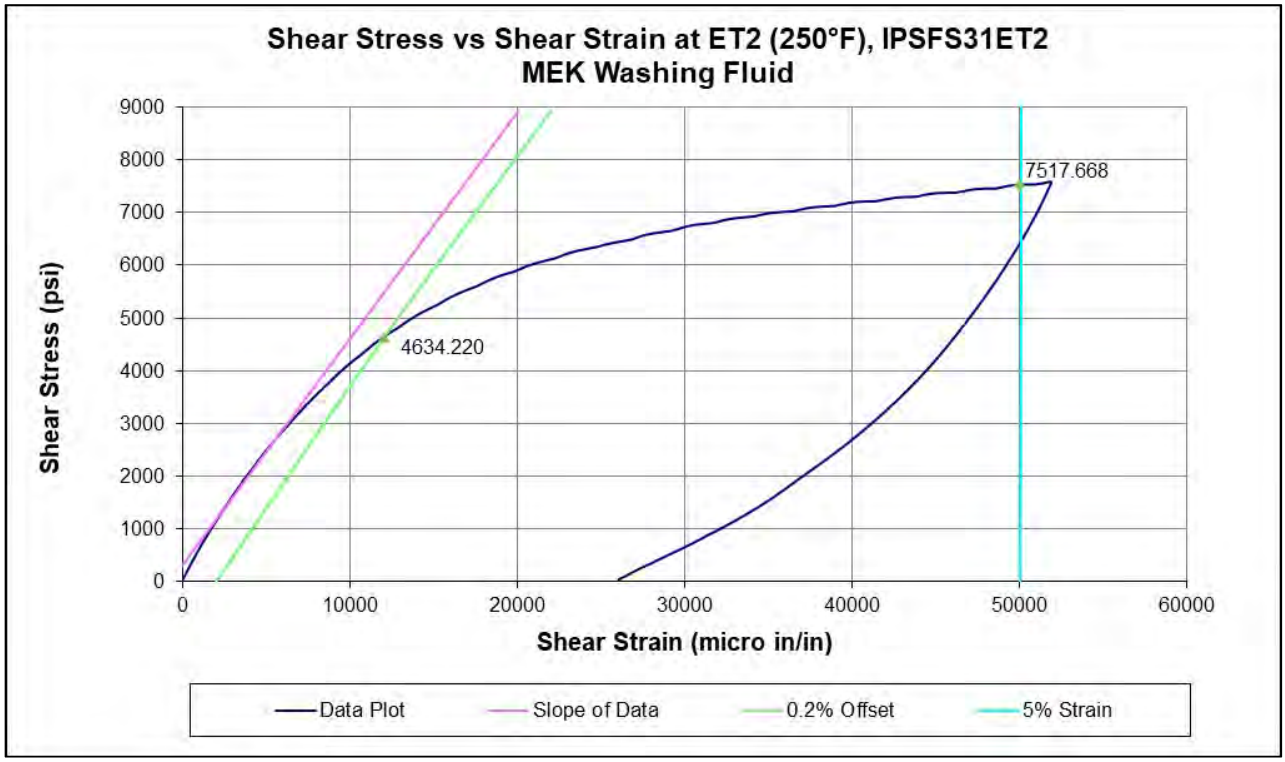




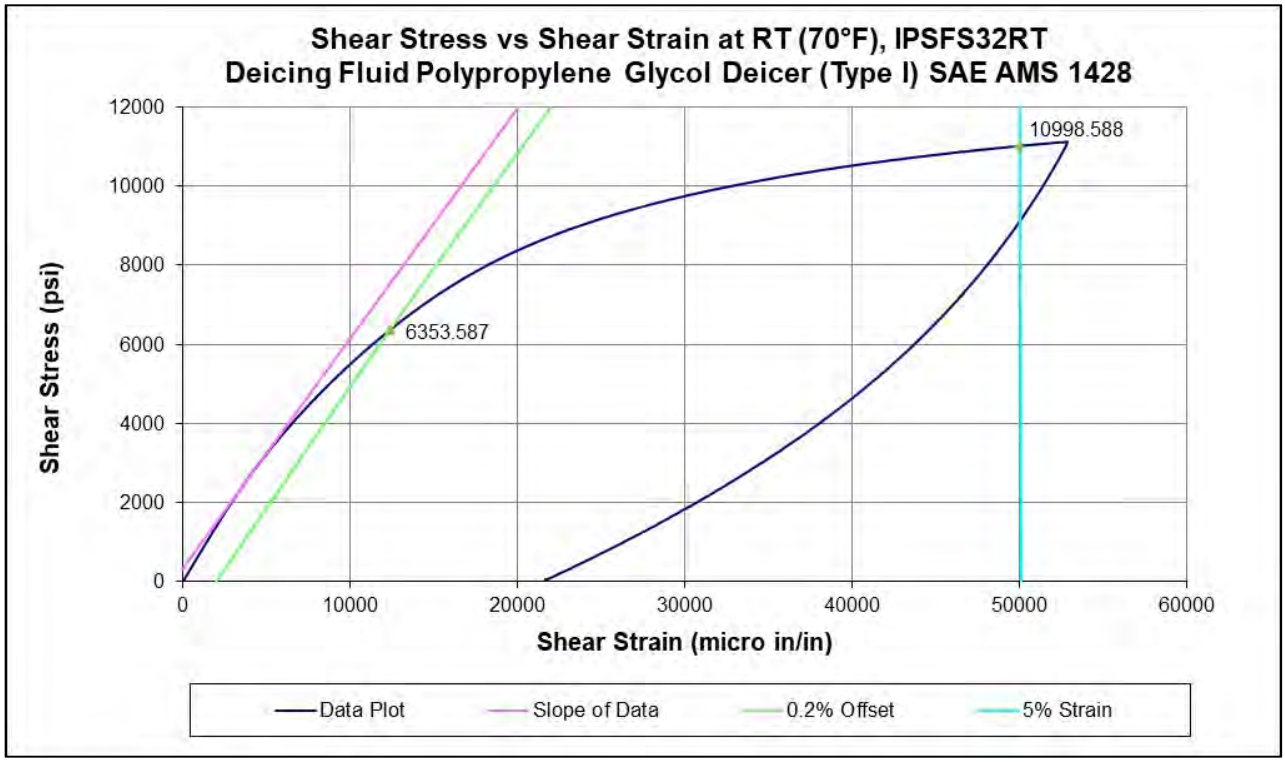

Shear Stress vs Shear Strain at ET2 (250°F), IPSFS24ET2
60% Ethylene Glycol with 40% Water Coolant (Dynalene LC-EG)
Shear Stress (psi)
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
5419.219
3318.500
Data Plot
Slope of Data
0.2% Offset
5% Strain

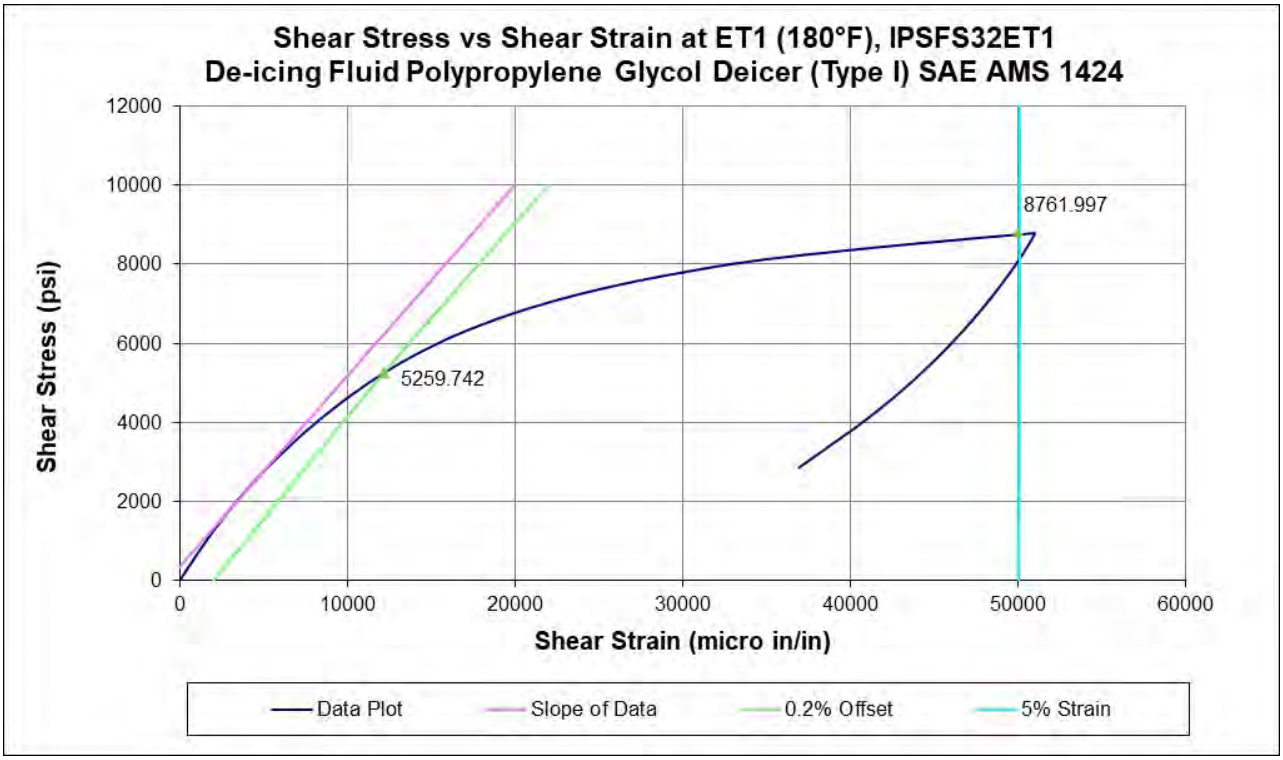
7.2.4.15 MEK Washing Fluid (IPSFS31RT / IPSFS31ET2)

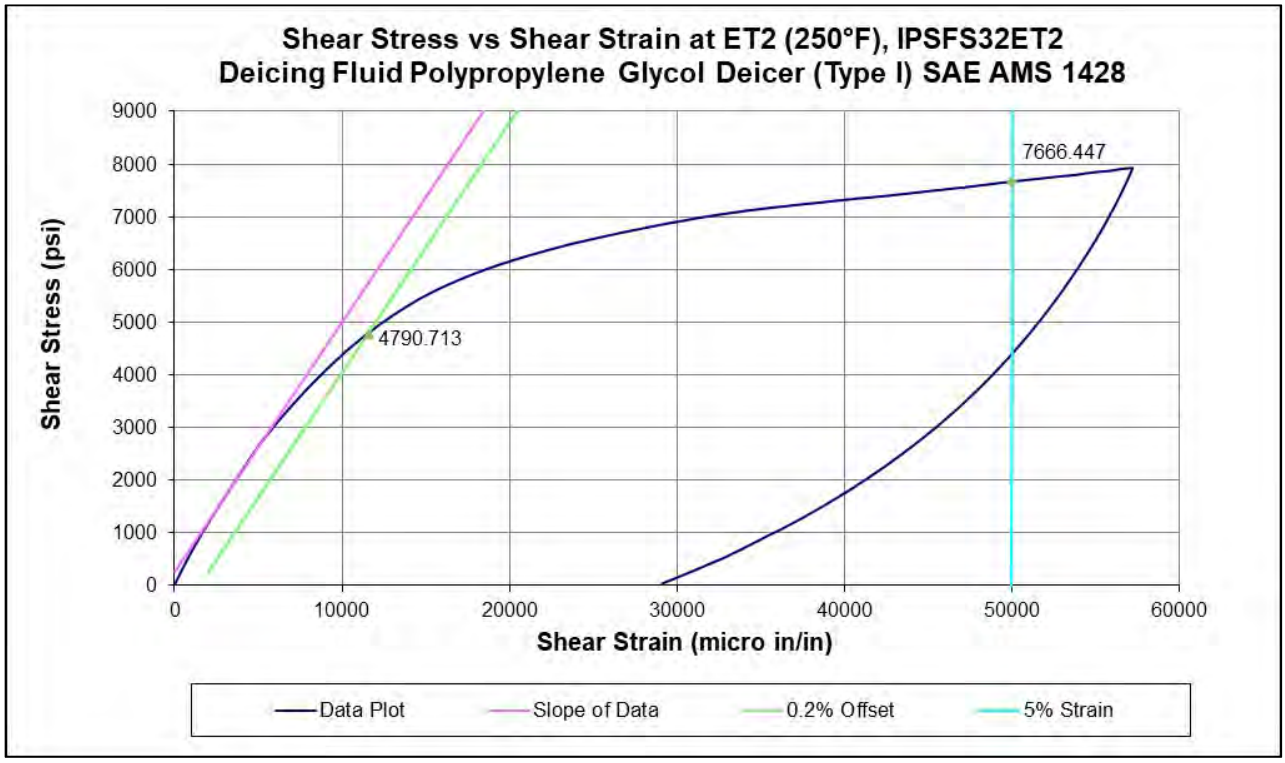




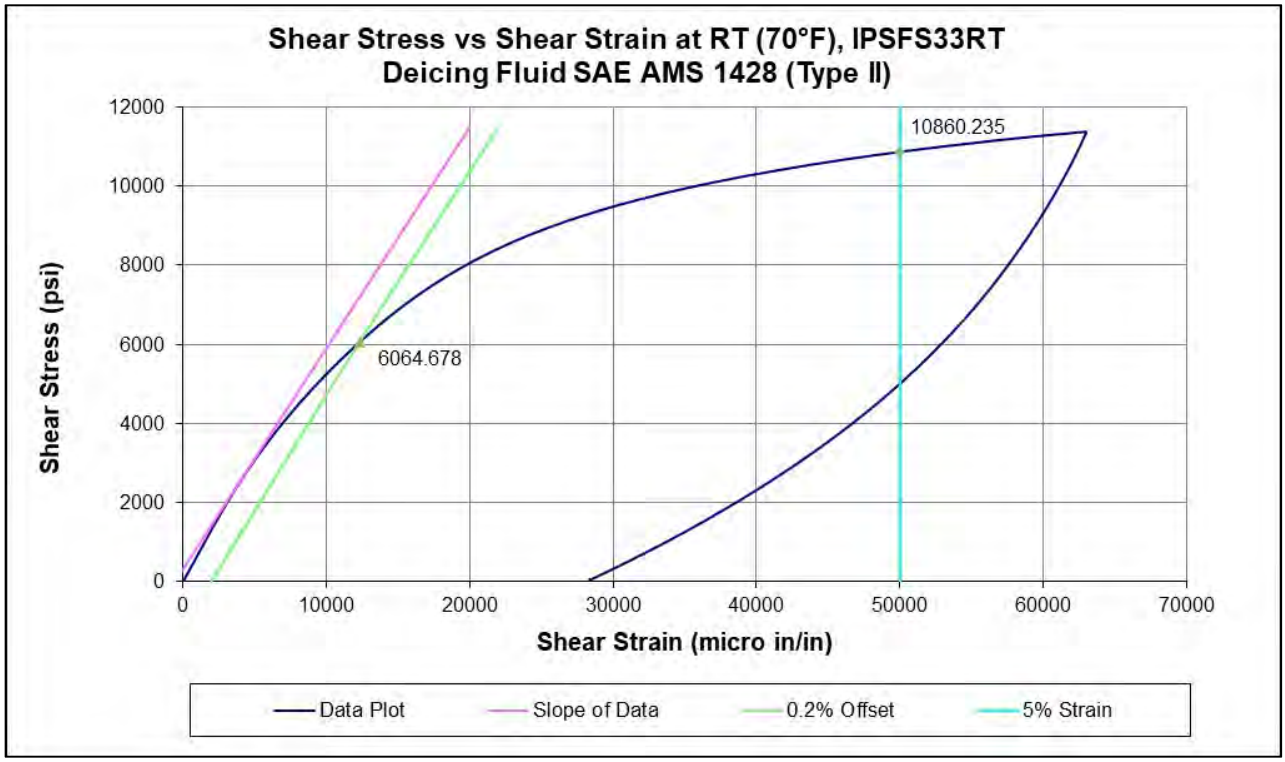
7.2.4.16 Deicing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1428 (IPSFS32RT / IPSFS32ET1 / IPSFS32ET2)

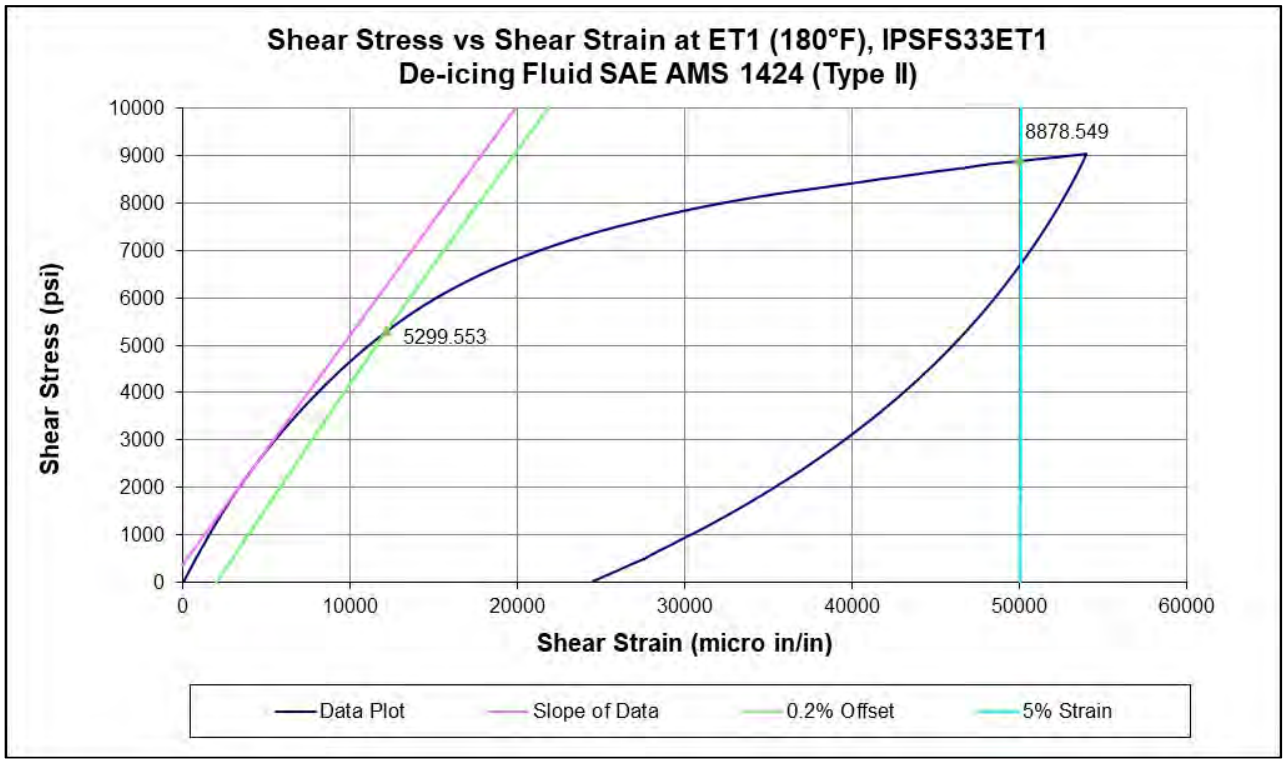


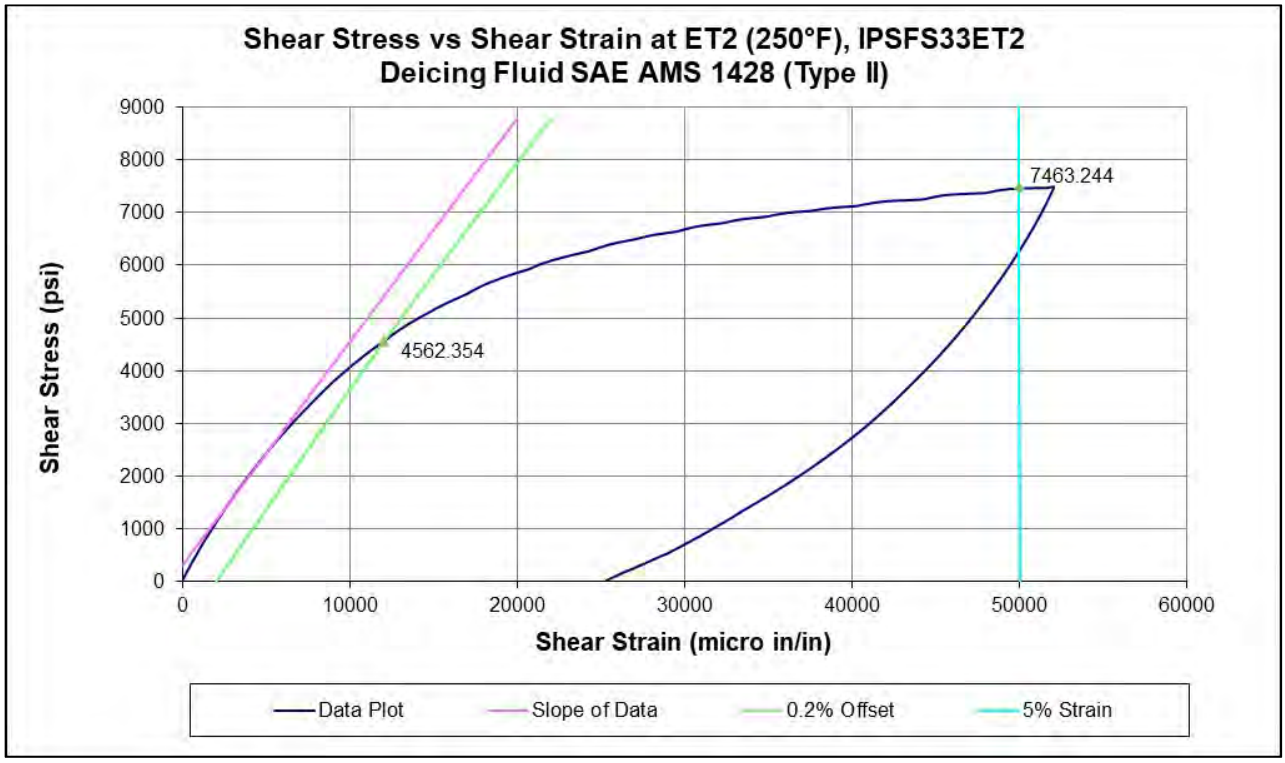



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS32ET2
Deicing Fluid Polypropylene Glycol Deicer (Type I) SAE AMS 1428
Shear Stress (psi)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
7666.447
4790.713
Data Plot
Slope of Data
0.2% Offset
5% Strain

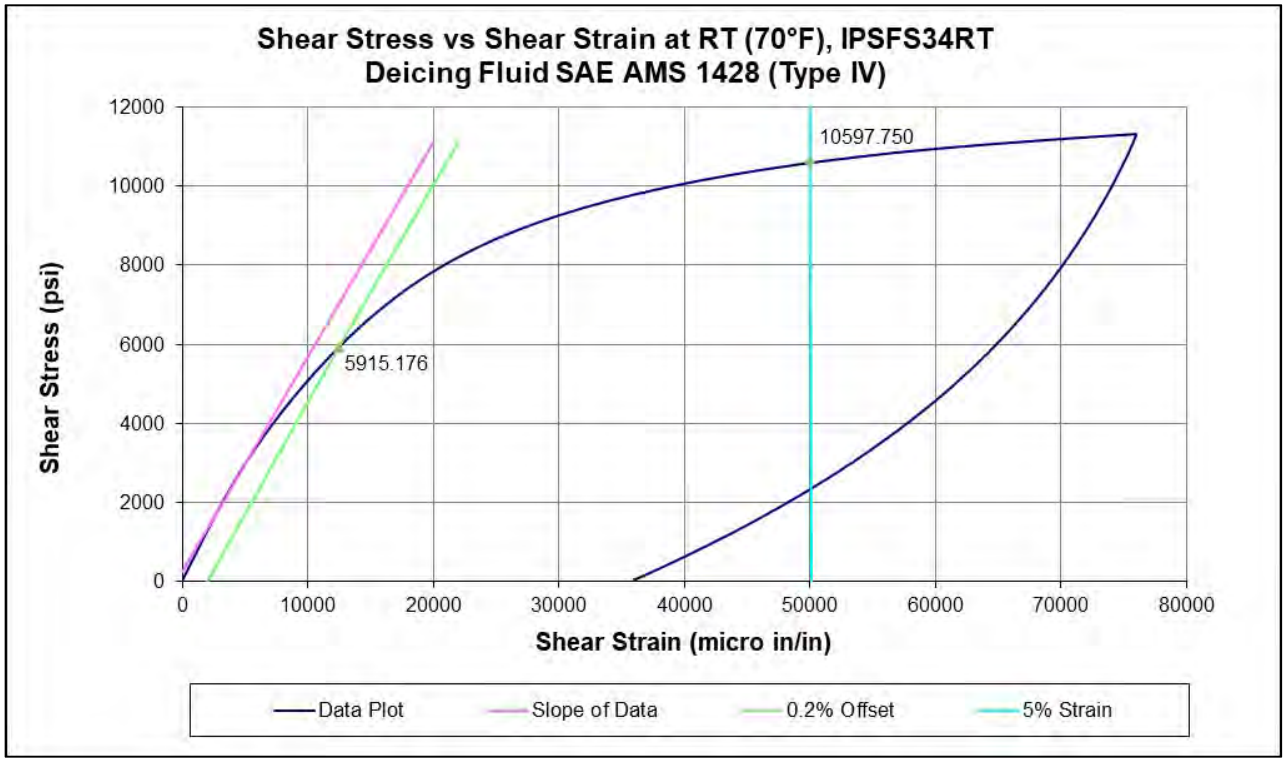
7.2.4.17 Deicing Fluid SAE AMS 1428 (Type II) (IPSFS33RT / IPSFS33ET1 / IPSFS33ET2)

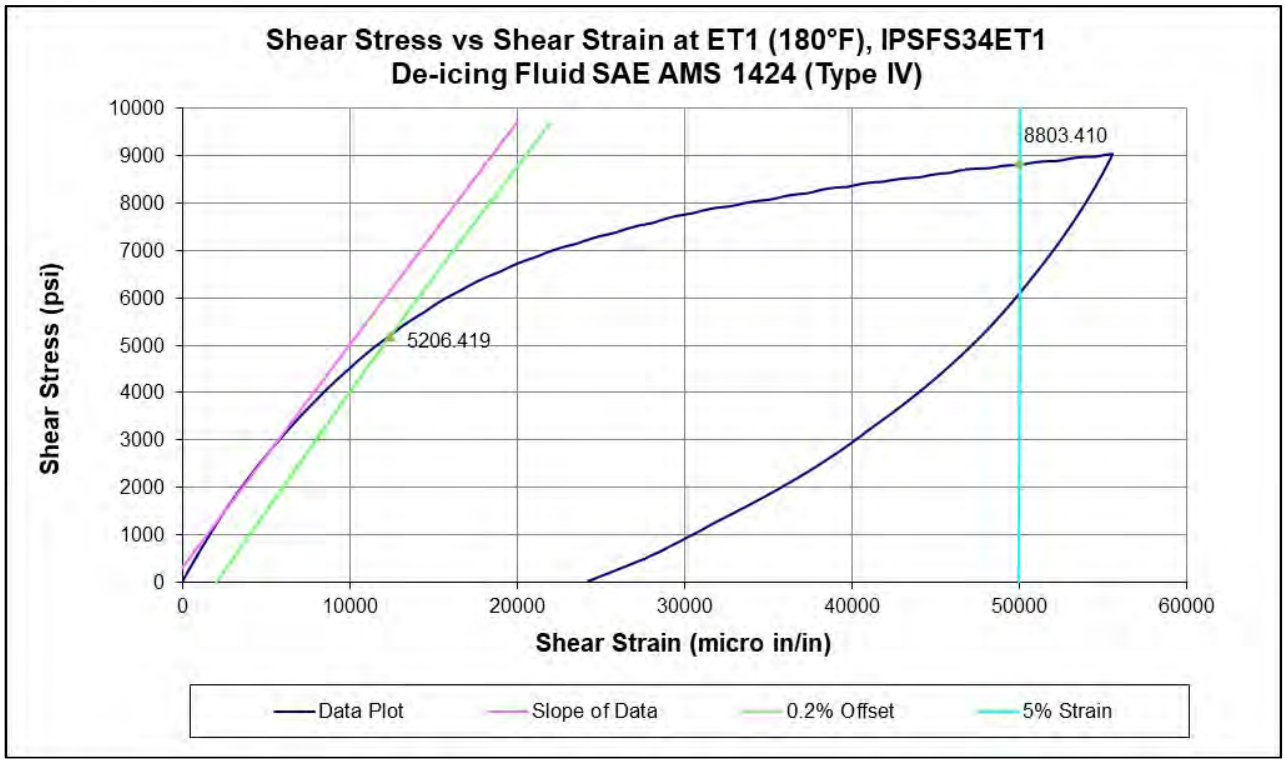


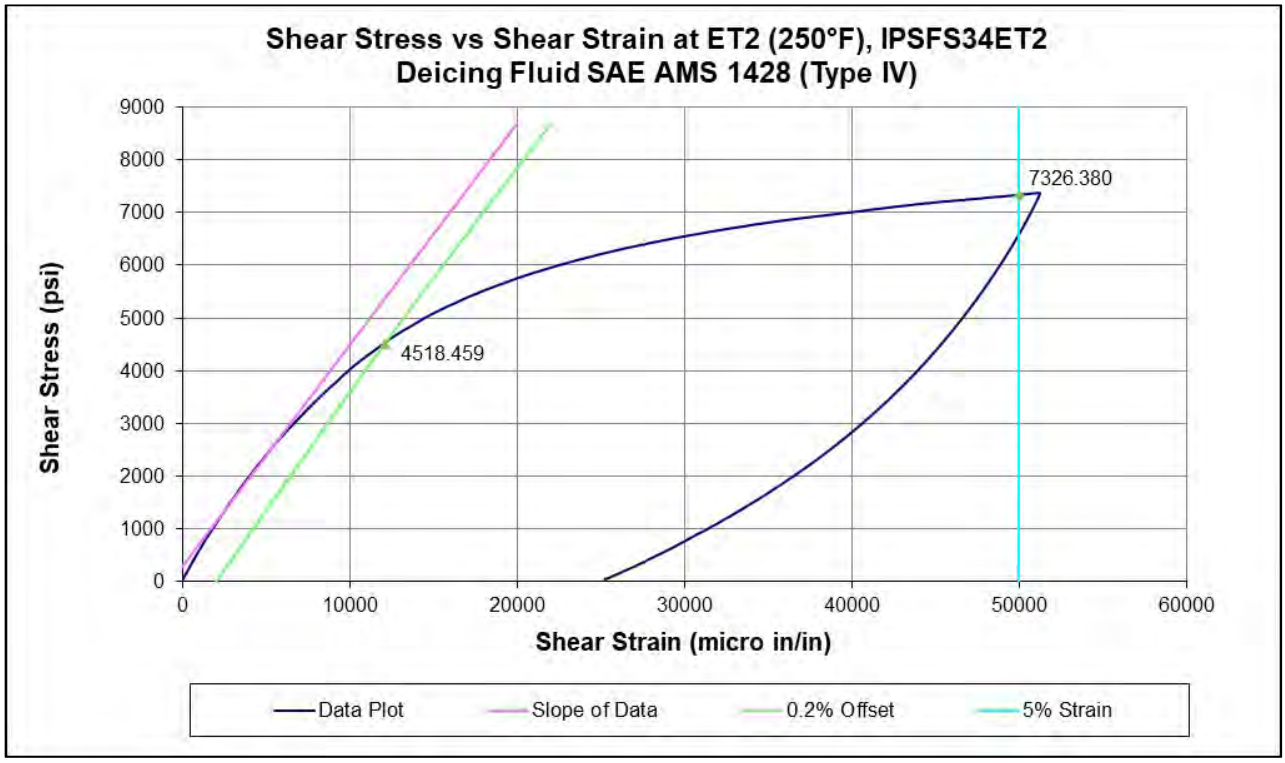



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS33ET2
Deicing Fluid SAE AMS 1428 (Type II)
Shear Stress (psi)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
7463.244
4562.354
Data Plot
Slope of Data
0.2% Offset
5% Strain

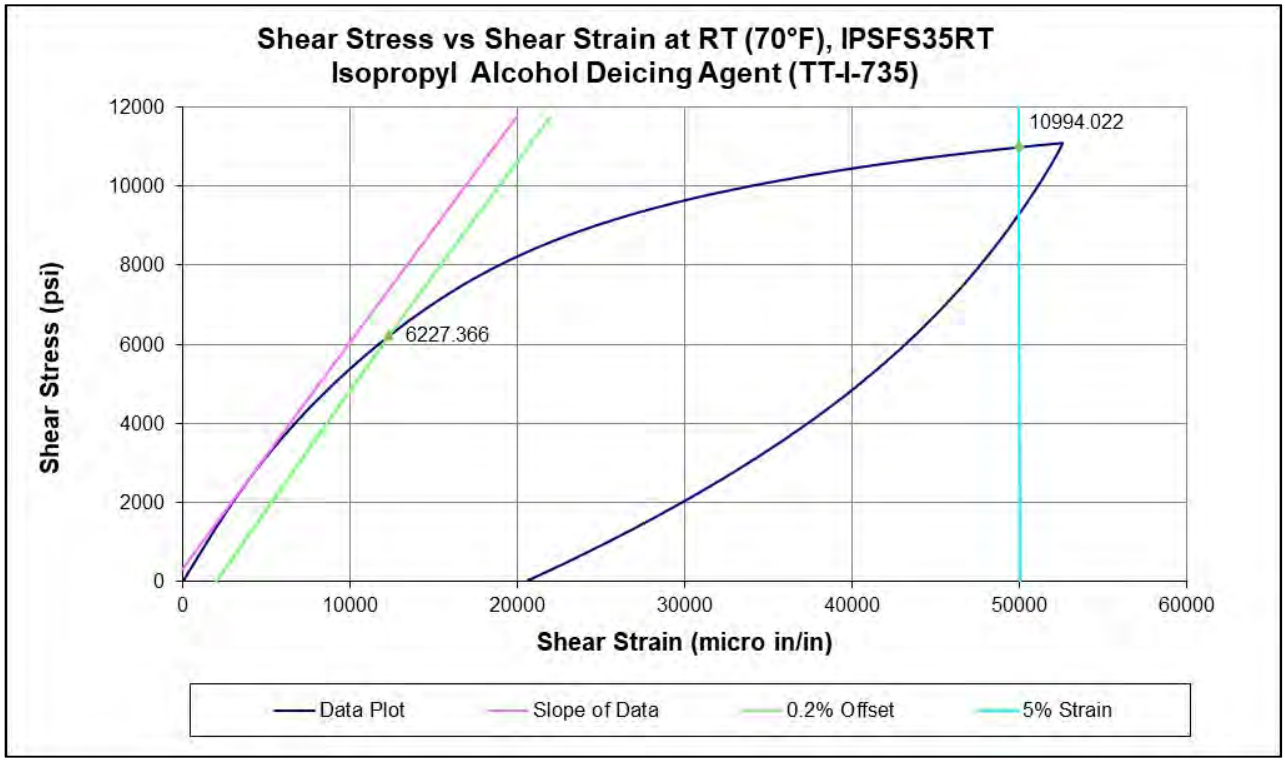
7.2.4.18 Deicing Fluid SAE AMS 1428 (Type IV) (IPSFS34RT / IPSFS34ET1 / IPSFS34ET2)

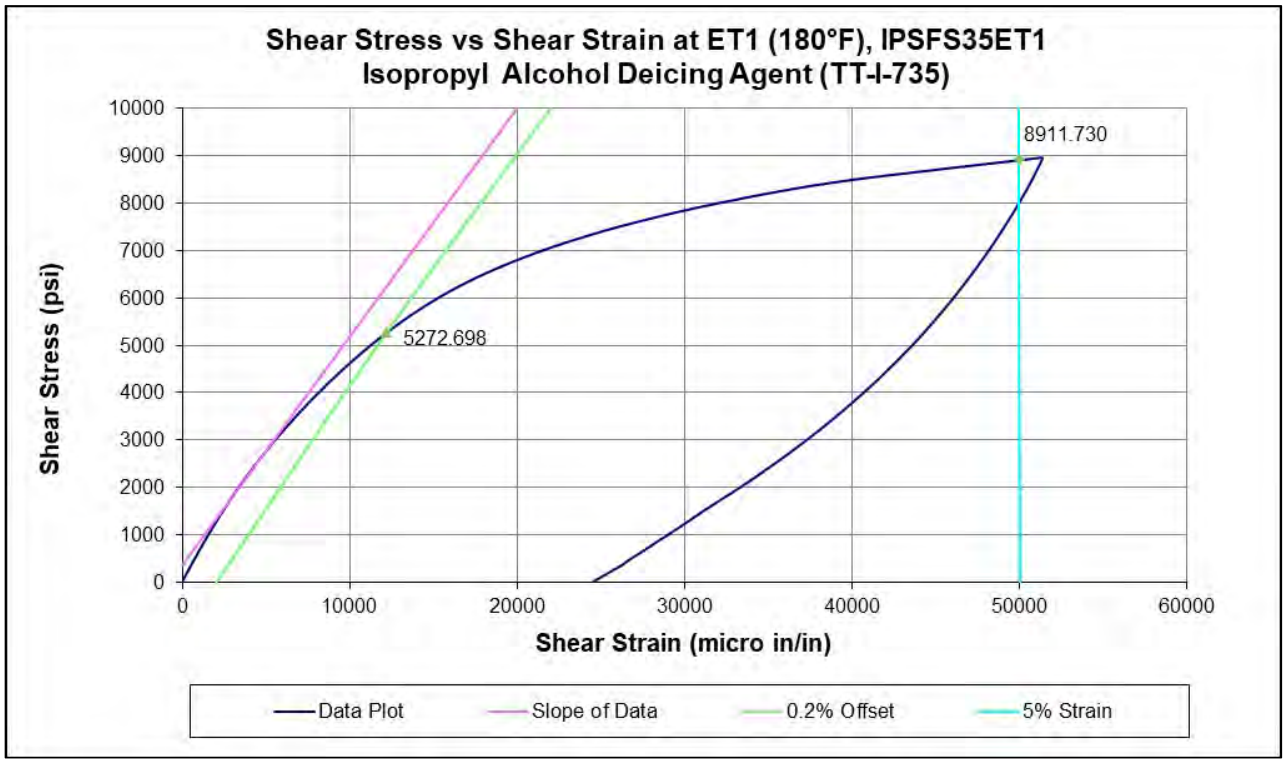


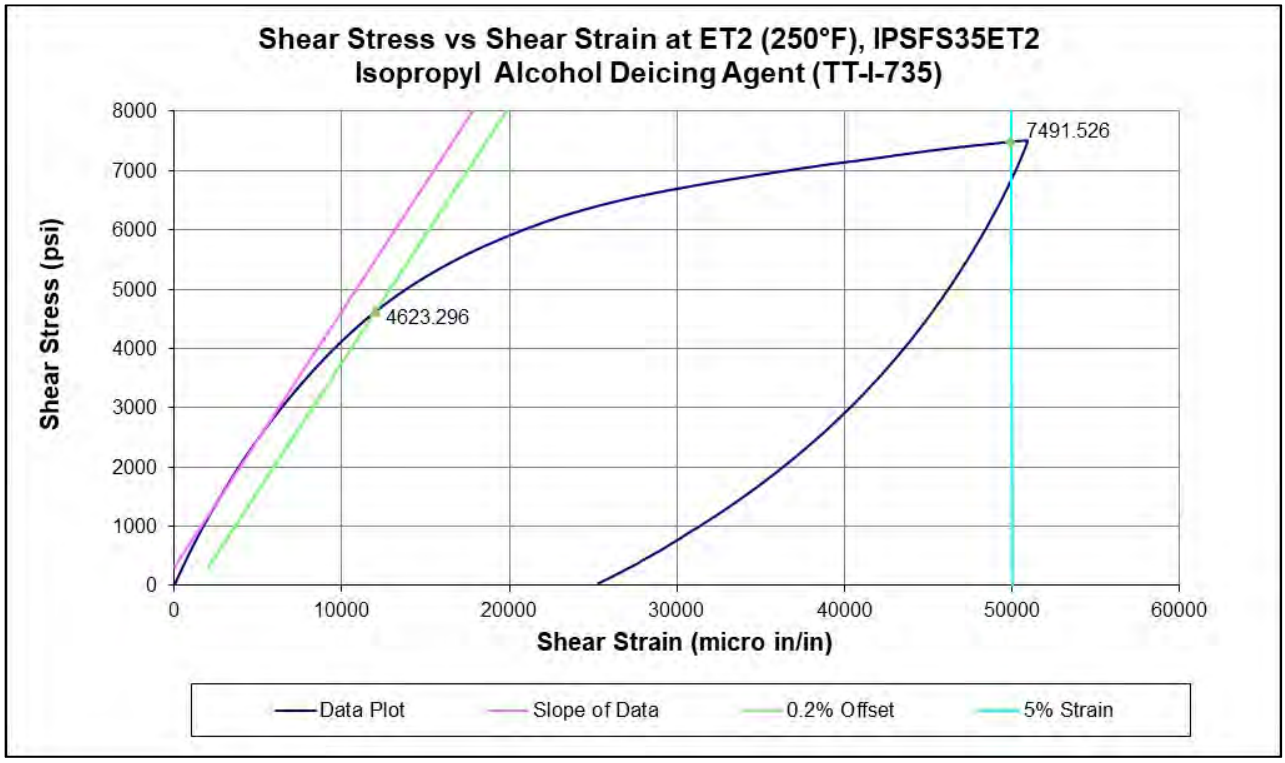



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS34ET2
Deicing Fluid SAE AMS 1428 (Type IV)
Shear Stress (psi)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
7326.380
4518.459
Data Plot
Slope of Data
0.2% Offset
5% Strain

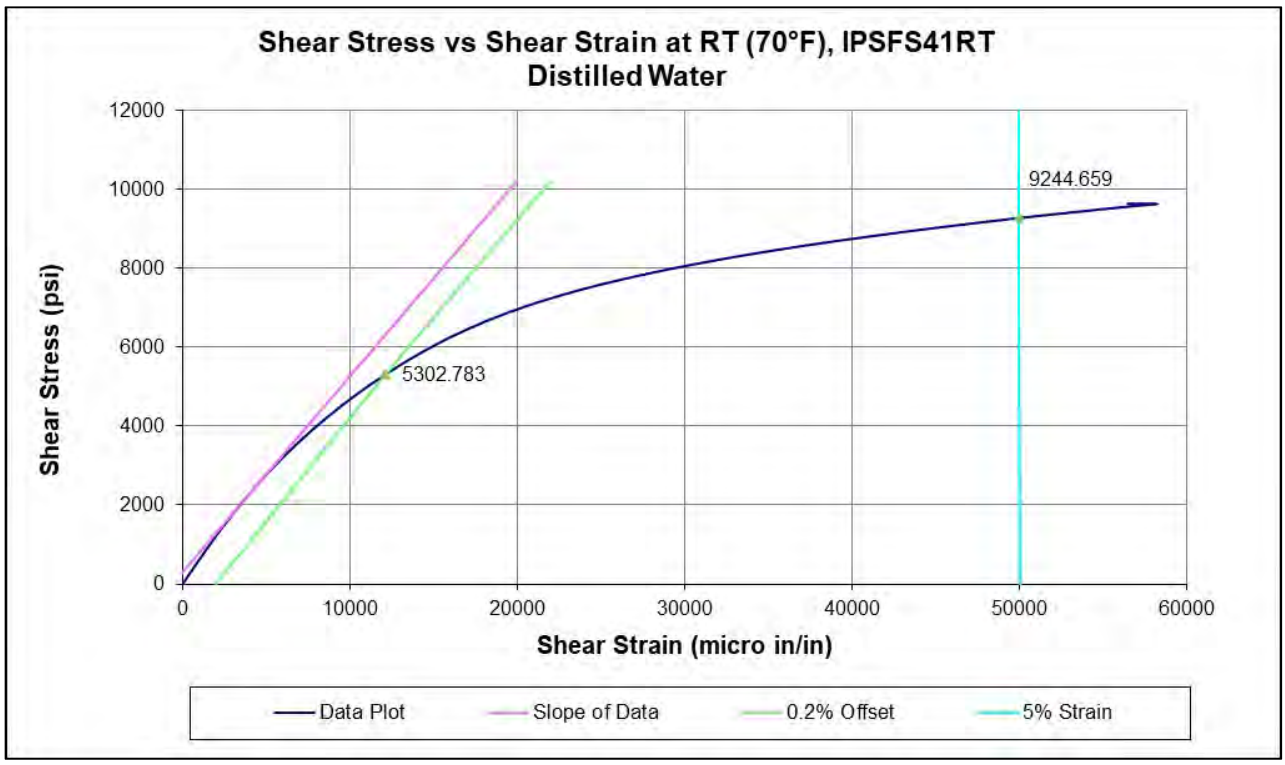
7.2.4.19 Isopropyl Alcohol Deicing Agent (TT-I-735) (IPSFS35RT / IPSFS35ET1 / IPSFS35ET2)

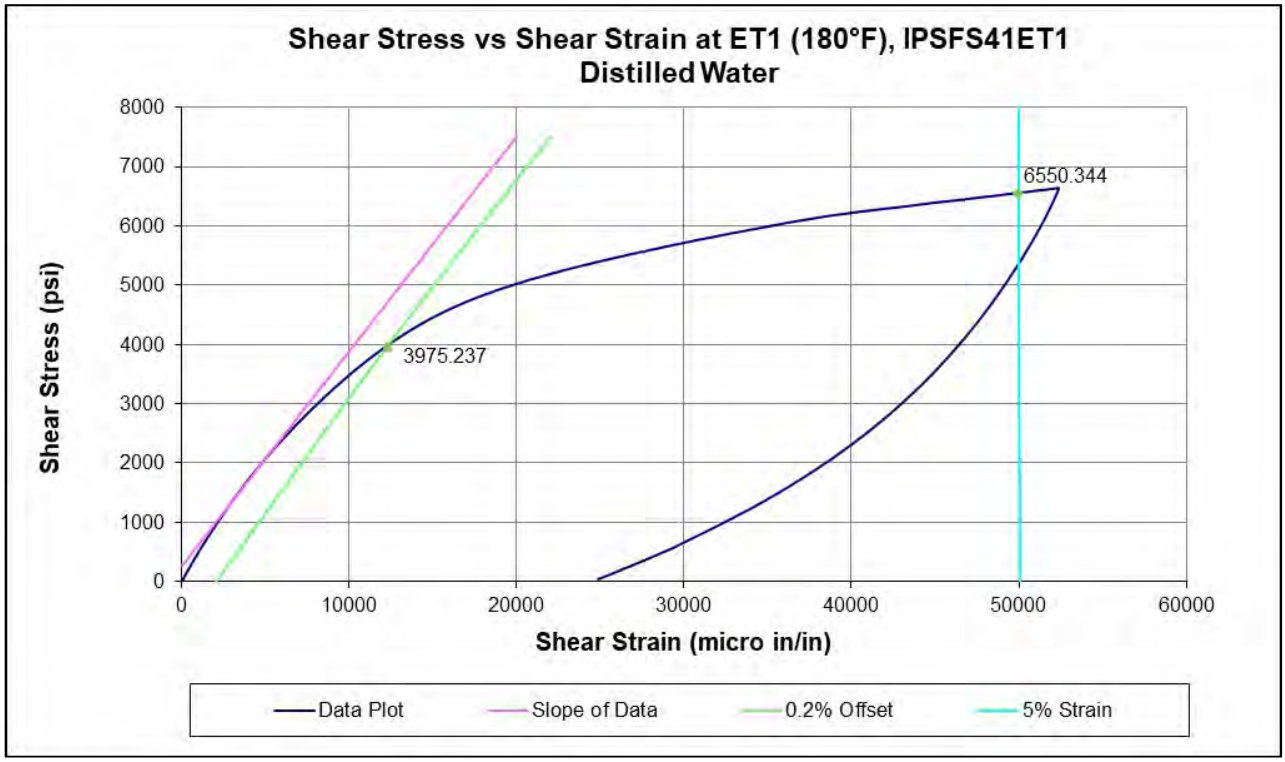


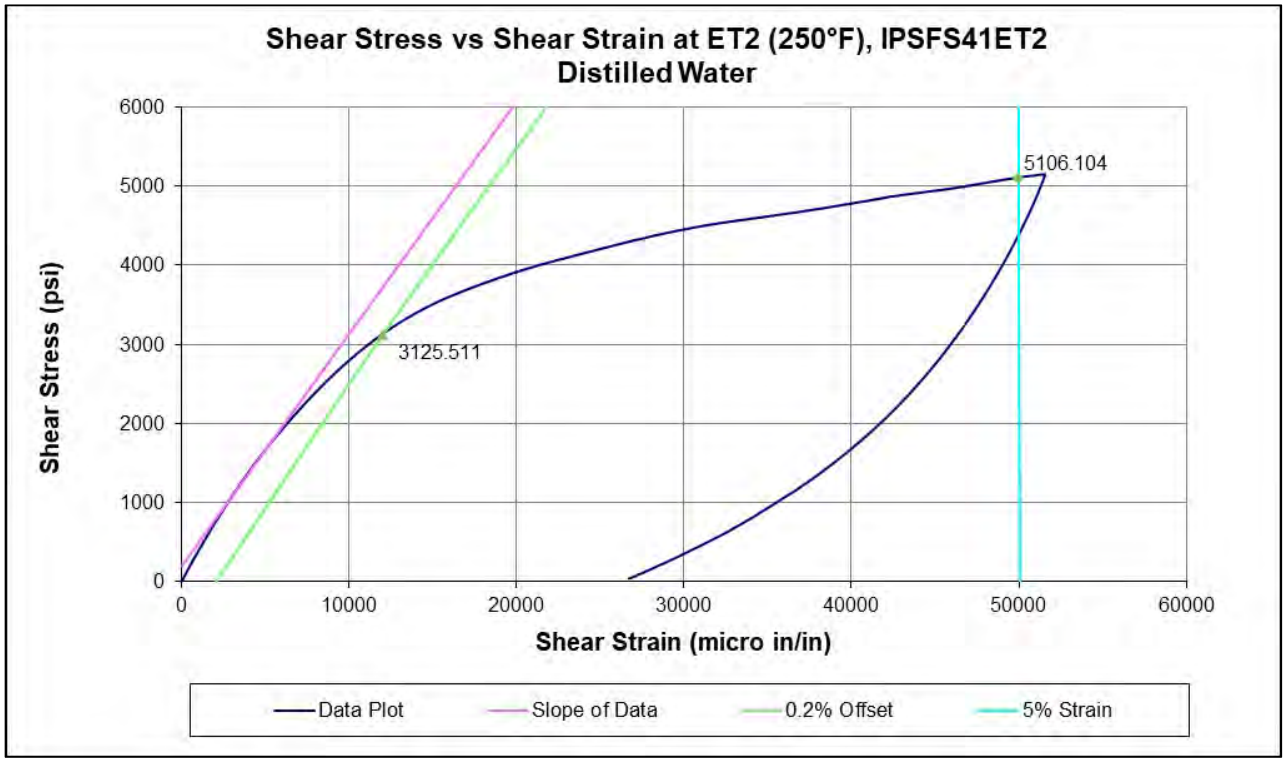



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS35ET2
Isopropyl Alcohol Deicing Agent (TT-I-735)
Shear Stress (psi)
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
7491.526
4623.296
Data Plot
Slope of Data
0.2% Offset
5% Strain

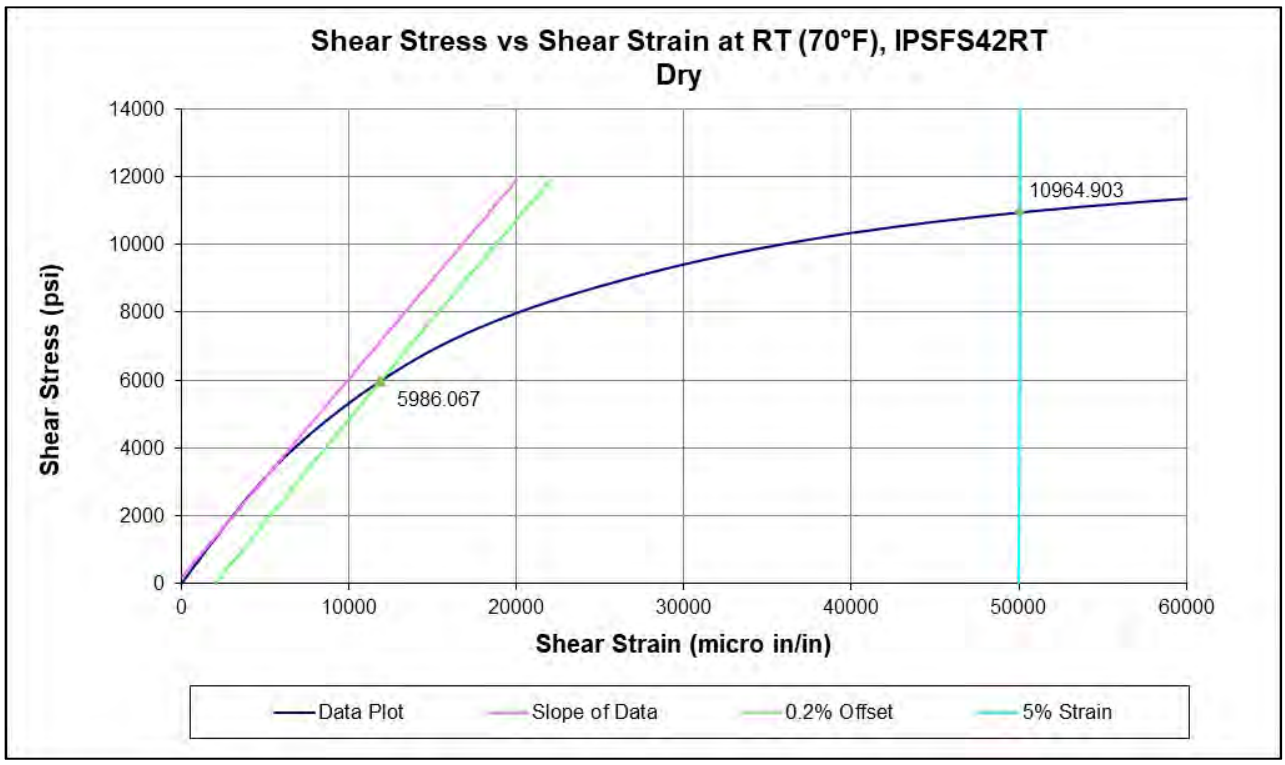
7.2.4.20 Distilled Water (IPSFS41RT / IPSFS41ET1 / IPSFS41ET2)

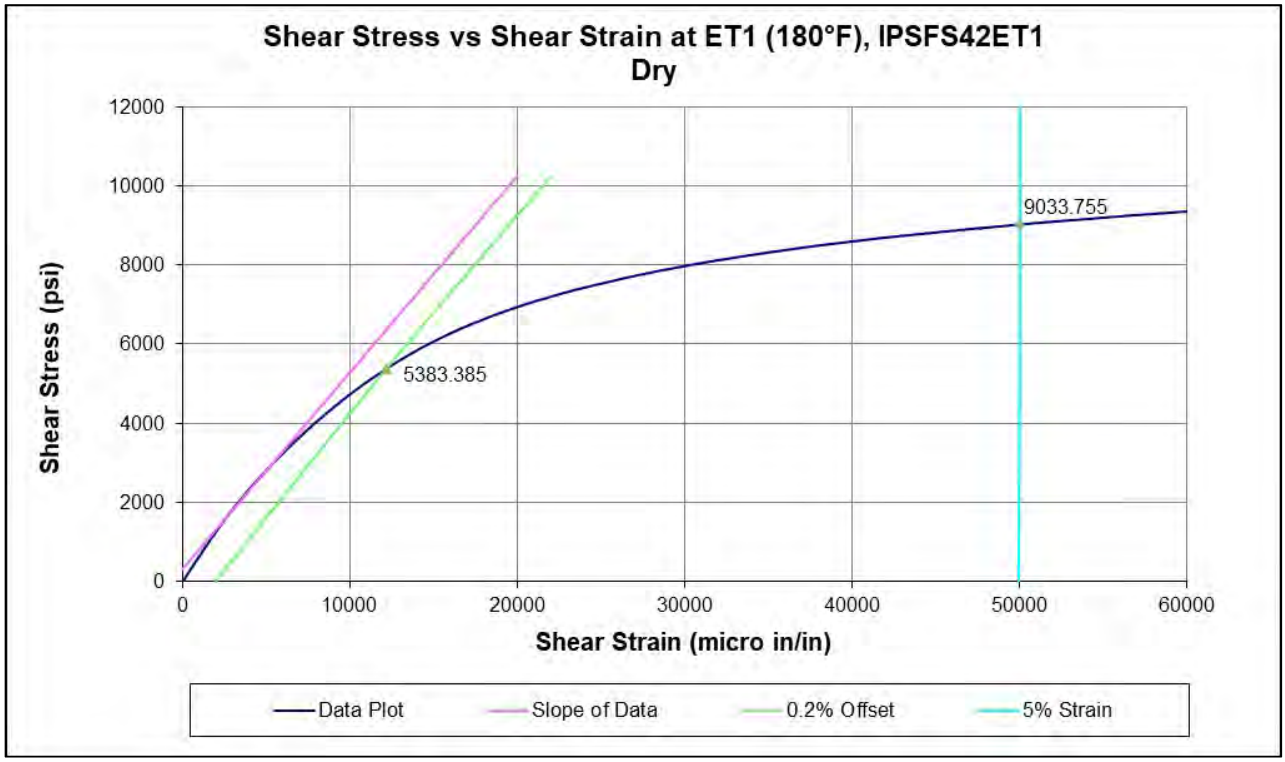


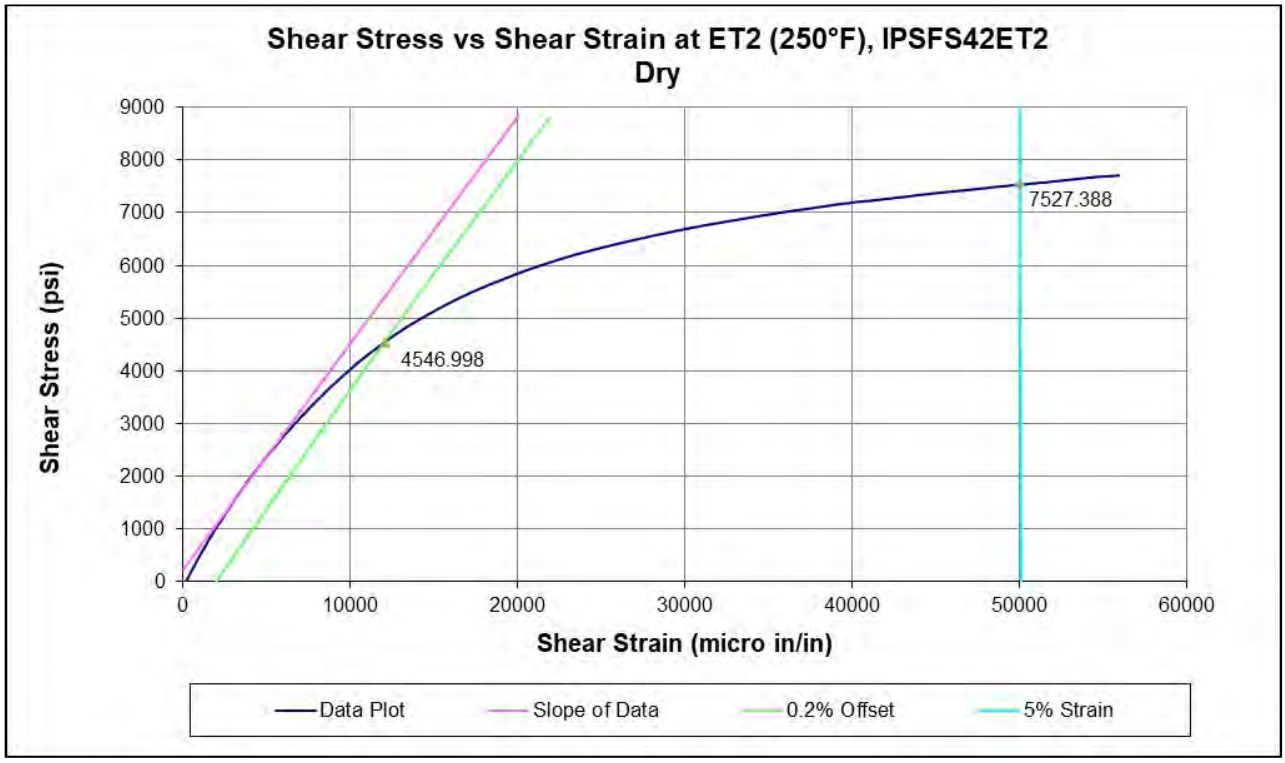



Shear Stress vs Shear Strain at ET2 (250°F), IPSFS41ET2
Distilled Water
Shear Stress (psi)
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
5106.104
3125.511
Data Plot
Slope of Data
0.2% Offset
5% Strain

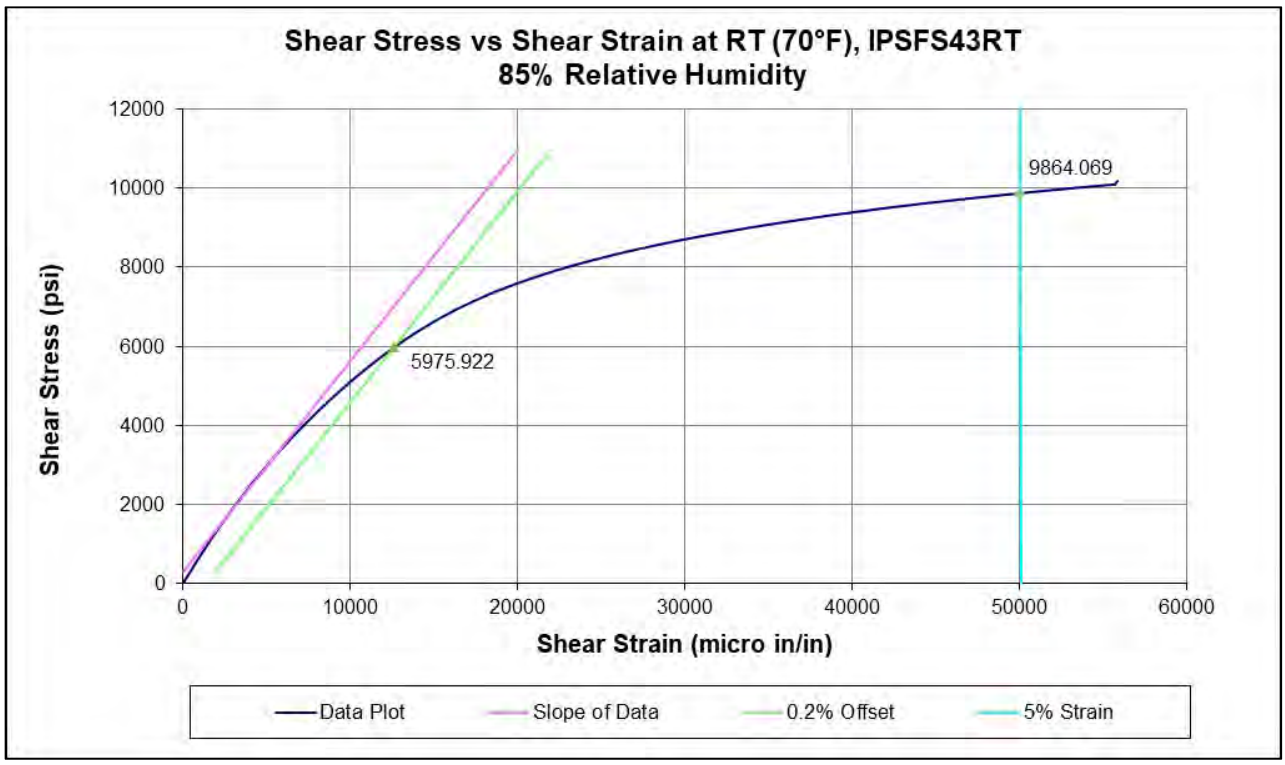
7.2.4.21 Dry (IPSFS42RT / IPSFS42ET1 / IPSFS42ET2)

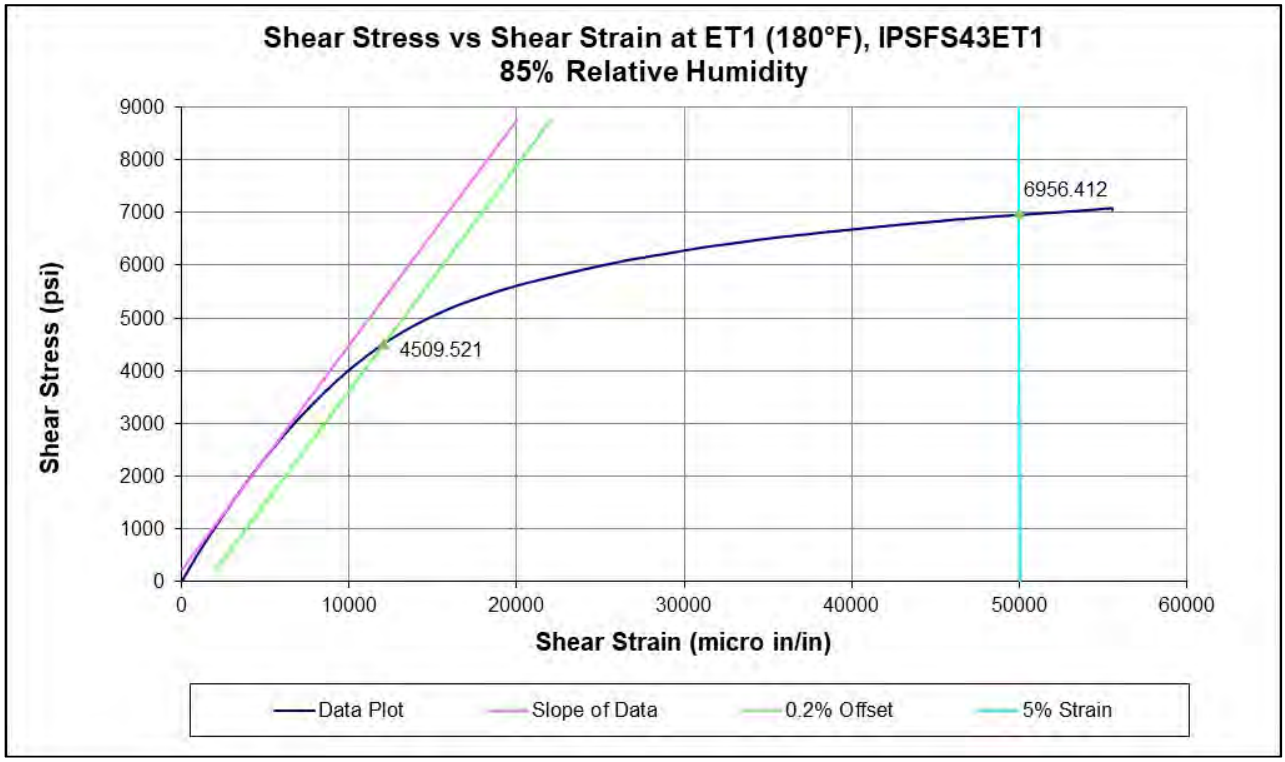





Shear Stress vs Shear Strain at ET2 (250°F), IPSFS42ET2
Dry
Shear Stress (psi)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10000
20000
30000
40000
50000
60000
Shear Strain (micro in/in)
4546.998
7527.388
Data Plot
Slope of Data
0.2% Offset
5% Strain

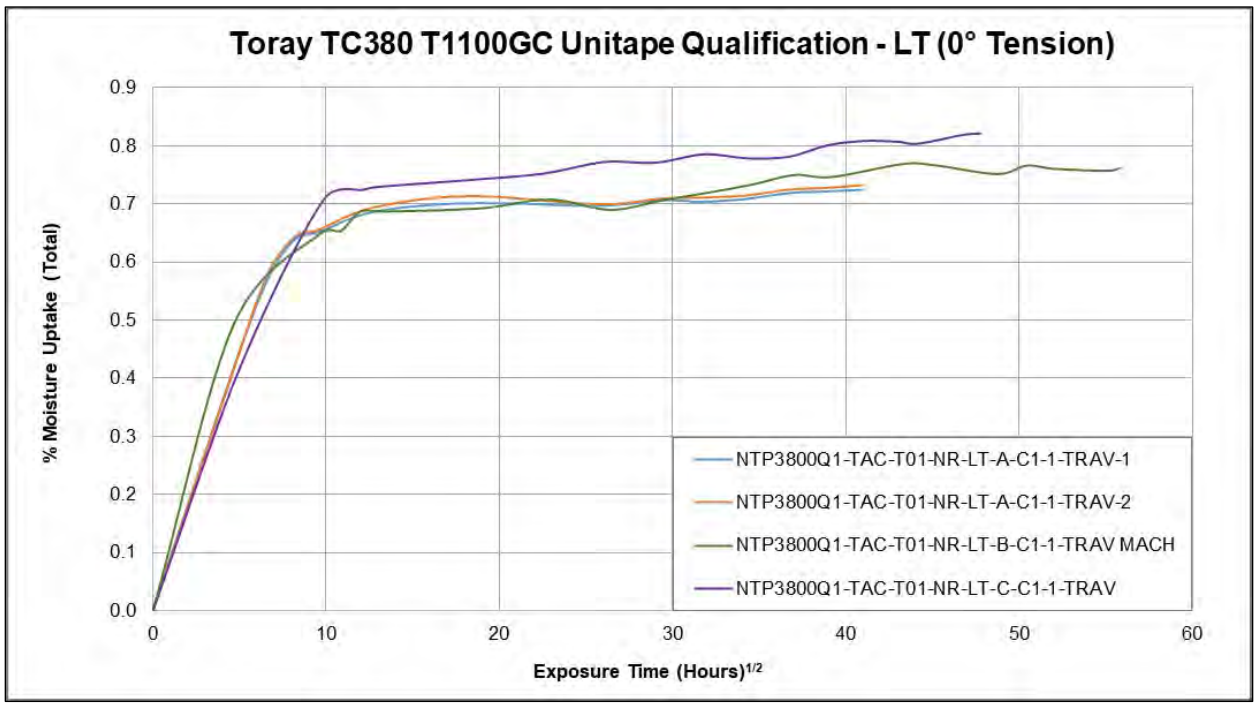
7.2.4.22 85% Relative Humidity (IPSFS43RT / IPSFS43ET1)



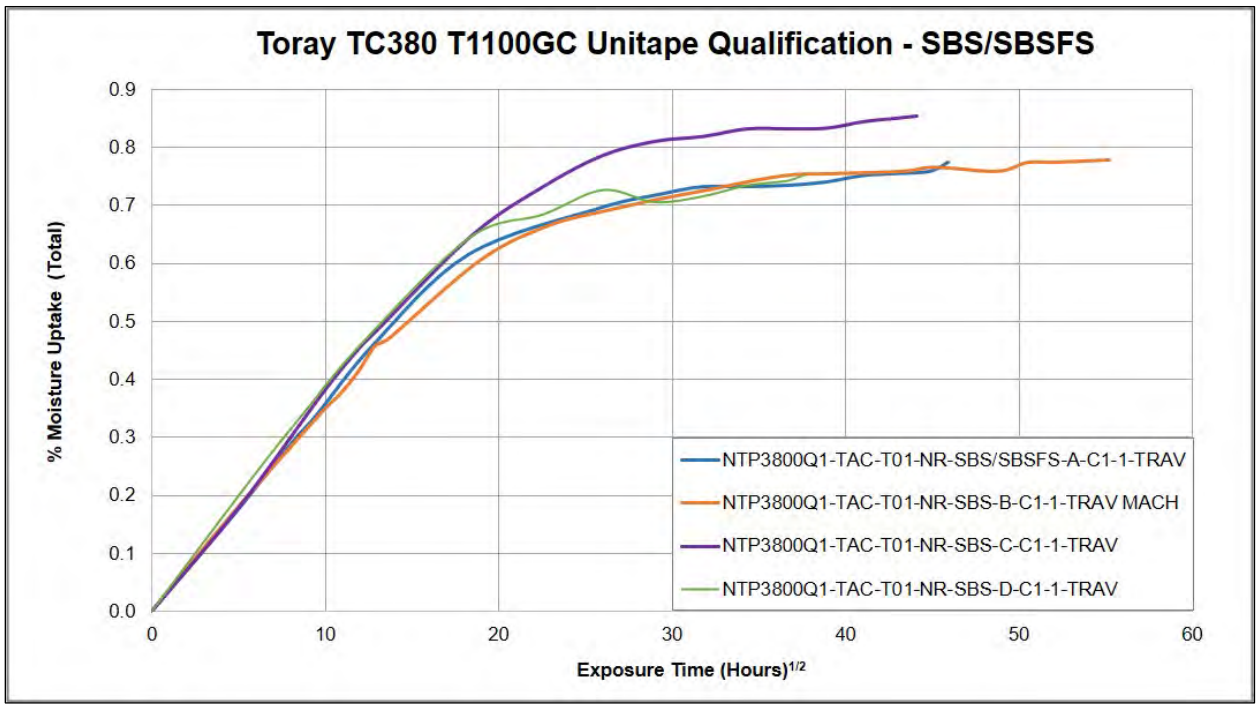


8. Moisture Conditioning Charts

8.1 Longitudinal Tension (LT) – Thinnest Panel



8.2 Short Beam Strength (SBS) / Short Beam Strength Fluid Sensitivity (SBSFS) – Thickest Panel



9. DMA Results

9.1 DMA Dry Data

DMA Results Summary

Toray Advanced Composites TC380 T1100GC Unitape Qualification DMA Dry

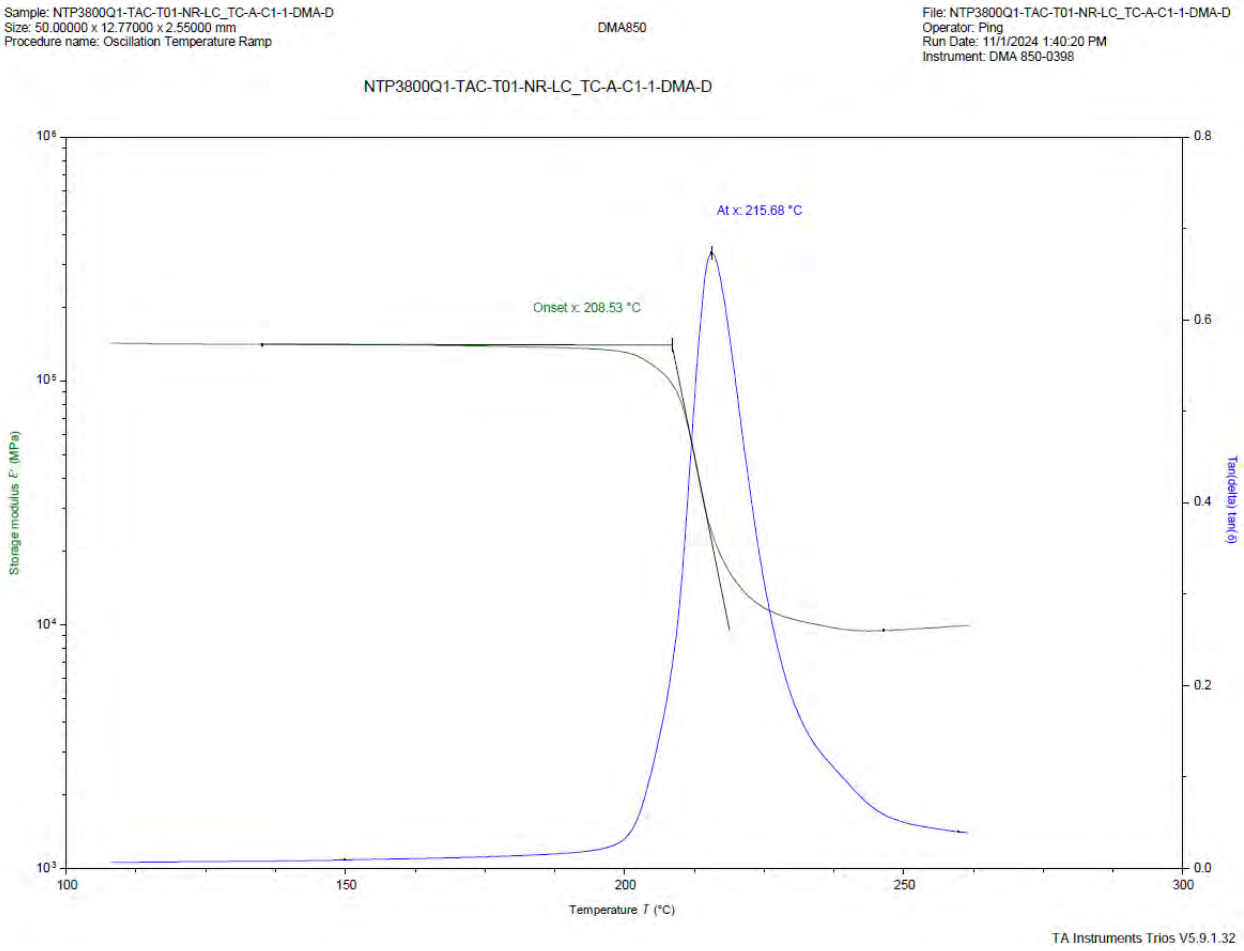
Sample ID	Onset Storage Modulus		Peak of Tangent Delta	
	T_g [°C]	T_g [°F]	T_g [°C]	T_g [°F]
NTP3800Q1-TAC-T01-NR-LC/TC-A-C1-1-DMA-D	208.53	407.35	215.68	420.22
NTP3800Q1-TAC-T01-NR-LC/TC-A-C2-1-DMA-D	209.43	408.97	216.66	421.99
NTP3800Q1-TAC-T01-NR-LC/TC-B-C1-1-DMA-D	209.74	409.53	216.33	421.39
NTP3800Q1-TAC-T01-NR-LC/TC-B-C2-1-DMA-D	209.84	409.71	216.51	421.72
NTP3800Q1-TAC-T01-NR-LC/TC-C-C1-1-DMA-D	209.33	408.79	216.19	421.14
NTP3800Q1-TAC-T01-NR-LC/TC-C-C2-1-DMA-D	205.00	401.00	212.83	415.09
NTP3800Q1-TAC-T01-NR-LT-A-C1-1-DMA-D	209.71	409.48	217.36	423.25
NTP3800Q1-TAC-T01-NR-LT-A-C2-1-DMA-D	210.35	410.63	218.57	425.43
NTP3800Q1-TAC-T01-NR-LT-B-C1-1-DMA-D	210.28	410.50	218.40	425.12
NTP3800Q1-TAC-T01-NR-LT-B-C2-1-DMA-D	210.21	410.38	218.06	424.51
NTP3800Q1-TAC-T01-NR-LT-C-C1-1-DMA-D	207.99	406.38	216.57	421.83
NTP3800Q1-TAC-T01-NR-LT-C-C2-1-DMA-D	208.88	407.98	217.24	423.03
NTP3800Q1-TAC-T01-NR-LT-D-C1-1-DMA-D	209.72	409.50	217.36	423.25
NTP3800Q1-TAC-T01-NR-LT-D-C2-1-DMA-D	209.10	408.38	217.34	423.21
NTP3800Q1-TAC-T01-NR-LT-E-C1-1-DMA-D	209.43	408.97	217.38	423.28
NTP3800Q1-TAC-T01-NR-LT-E-C2-1-DMA-D	209.54	409.17	217.09	422.76
NTP3800Q1-TAC-T01-NR-SSB1-A-C1-1-DMA-D	209.85	409.73	217.88	424.18
NTP3800Q1-TAC-T01-NR-SSB1-A-C2-1-DMA-D	210.64	411.15	218.83	425.89
NTP3800Q1-TAC-T01-NR-SSB1-B-C1-1-DMA-D	209.85	409.73	217.73	423.91
NTP3800Q1-TAC-T01-NR-SSB1-B-C2-1-DMA-D	208.82	407.88	216.58	421.84
NTP3800Q1-TAC-T01-NR-SSB1-C-C1-1-DMA-D	207.19	404.94	215.59	420.06
NTP3800Q1-TAC-T01-NR-SSB1-C-C2-1-DMA-D	207.67	405.81	215.70	420.26
NTP3800Q1-TAC-T01-NR-SSB2-A-C1-1-DMA-D	208.71	407.68	218.73	425.71
NTP3800Q1-TAC-T01-NR-SSB2-A-C2-1-DMA-D	209.22	408.60	218.79	425.82
NTP3800Q1-TAC-T01-NR-SSB2-B-C1-1-DMA-D	209.91	409.84	219.26	426.67
NTP3800Q1-TAC-T01-NR-SSB2-B-C2-1-DMA-D	209.93	409.87	218.63	425.53
NTP3800Q1-TAC-T01-NR-SSB2-C-C1-1-DMA-D	207.68	405.82	216.85	422.33
NTP3800Q1-TAC-T01-NR-SSB2-C-C2-1-DMA-D	207.38	405.28	216.69	422.04
NTP3800Q1-TAC-T01-NR-TT-D-C1-1-DMA-D	208.44	407.19	215.97	420.75
NTP3800Q1-TAC-T01-NR-TT-D-C2-1-DMA-D	208.19	406.74	215.60	420.08
NTP3800Q1-TAC-T01-NR-TT-E-C1-1-DMA-D	208.73	407.71	216.11	421.00
NTP3800Q1-TAC-T01-NR-TT-E-C2-1-DMA-D	208.33	406.99	215.41	419.74
NTP3800Q1-TAC-T01-NR-TT-E-C3-1-DMA-D	208.27	406.89	215.97	420.75
NTP3800Q1-TAC-T01-NR-UNC2-D-C1-1-DMA-D	208.30	406.94	217.85	424.13
NTP3800Q1-TAC-T01-NR-UNC2-D-C2-1-DMA-D	207.66	405.79	217.51	423.52
NTP3800Q1-TAC-T01-NR-UNC2-E-C1-1-DMA-D	207.79	406.02	217.59	423.66
NTP3800Q1-TAC-T01-NR-UNC2-E-C2-1-DMA-D	207.28	405.10	217.10	422.78
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-D-C1-1-DMA-D	208.25	406.85	216.32	421.38
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-D-C2-1-DMA-D	208.35	407.03	216.54	421.77
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-E-C1-1-DMA-D	208.65	407.57	216.29	421.32
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-E-C2-1-DMA-D	208.72	407.70	216.53	421.75
Average	208.80	407.84	216.97	422.54
Standard Deviation	1.11	1.99	1.22	2.20

9.2 DMA Wet Data

DMA Results Summary Toray Advanced Composites TC380 T1100GC Unitape Qualification DMA Wet				
Sample ID	Onset Storage Modulus		Peak of Tangent Delta	
	T_g [°C]	T_g [°F]	T_g [°C]	T_g [°F]
NTP3800Q1-TAC-T01-NR-LC/TC-A-C1-1-DMA-W	163.75	326.75	175.90	348.62
NTP3800Q1-TAC-T01-NR-LC/TC-A-C2-1-DMA-W	164.93	328.87	176.88	350.38
NTP3800Q1-TAC-T01-NR-LC/TC-B-C1-1-DMA-W	164.46	328.03	175.76	348.37
NTP3800Q1-TAC-T01-NR-LC/TC-B-C2-1-DMA-W	164.01	327.22	175.36	347.65
NTP3800Q1-TAC-T01-NR-LC/TC-C-C1-1-DMA-W	163.06	325.51	174.41	345.94
NTP3800Q1-TAC-T01-NR-LC/TC-C-C2-1-DMA-W	161.67	323.01	173.99	345.18
NTP3800Q1-TAC-T01-NR-LT-A-C1-1-DMA-W	170.85	339.53	199.91	391.84
NTP3800Q1-TAC-T01-NR-LT-A-C2-1-DMA-W	172.66	342.79	201.50	394.70
NTP3800Q1-TAC-T01-NR-LT-B-C1-1-DMA-W	171.12	340.02	199.57	391.23
NTP3800Q1-TAC-T01-NR-LT-B-C2-1-DMA-W	170.40	338.72	199.61	391.30
NTP3800Q1-TAC-T01-NR-LT-C-C1-1-DMA-W	169.13	336.43	196.27	385.29
NTP3800Q1-TAC-T01-NR-LT-C-C2-1-DMA-W	169.71	337.48	199.39	390.90
NTP3800Q1-TAC-T01-NR-LT-D-C1-1-DMA-W	175.39	347.70	201.00	393.80
NTP3800Q1-TAC-T01-NR-LT-D-C2-1-DMA-W	175.71	348.28	199.35	390.83
NTP3800Q1-TAC-T01-NR-LT-E-C1-1-DMA-W	175.13	347.23	200.06	392.11
NTP3800Q1-TAC-T01-NR-LT-E-C2-1-DMA-W	175.06	347.11	199.39	390.90
NTP3800Q1-TAC-T01-NR-SSB1-A-C1-1-DMA-W	165.34	329.61	189.07	372.33
NTP3800Q1-TAC-T01-NR-SSB1-A-C2-1-DMA-W	166.94	332.49	189.08	372.34
NTP3800Q1-TAC-T01-NR-SSB1-B-C1-1-DMA-W	163.95	327.11	189.86	373.75
NTP3800Q1-TAC-T01-NR-SSB1-B-C2-1-DMA-W	164.59	328.26	191.13	376.03
NTP3800Q1-TAC-T01-NR-SSB1-C-C1-1-DMA-W	162.37	324.27	185.99	366.78
NTP3800Q1-TAC-T01-NR-SSB1-C-C2-1-DMA-W	162.99	325.38	186.93	368.47
NTP3800Q1-TAC-T01-NR-SSB2-A-C1-1-DMA-W	170.82	339.48	198.33	388.99
NTP3800Q1-TAC-T01-NR-SSB2-A-C2-1-DMA-W	171.60	340.88	198.76	389.77
NTP3800Q1-TAC-T01-NR-SSB2-B-C1-1-DMA-W	168.82	335.88	198.72	389.70
NTP3800Q1-TAC-T01-NR-SSB2-B-C2-1-DMA-W	168.33	334.99	198.17	388.71
NTP3800Q1-TAC-T01-NR-SSB2-C-C1-1-DMA-W	166.91	332.44	198.59	389.46
NTP3800Q1-TAC-T01-NR-SSB2-C-C2-1-DMA-W	166.63	331.93	198.68	389.62
NTP3800Q1-TAC-T01-NR-TT-D-C1-1-DMA-W	166.68	332.02	183.42	362.16
NTP3800Q1-TAC-T01-NR-TT-D-C2-1-DMA-W	167.86	334.15	184.36	363.85
NTP3800Q1-TAC-T01-NR-TT-E-C1-1-DMA-W	167.56	333.61	182.01	359.62
NTP3800Q1-TAC-T01-NR-TT-E-C2-1-DMA-W	166.69	332.04	182.54	360.57
NTP3800Q1-TAC-T01-NR-TT-E-C3-1-DMA-W	166.76	332.17	180.74	357.33
NTP3800Q1-TAC-T01-NR-UNC2-D-C1-1-DMA-W	171.14	340.05	198.95	390.11
NTP3800Q1-TAC-T01-NR-UNC2-D-C2-1-DMA-W	168.96	336.13	198.32	388.98
NTP3800Q1-TAC-T01-NR-UNC2-E-C1-1-DMA-W	170.00	338.00	200.14	392.25
NTP3800Q1-TAC-T01-NR-UNC2-E-C2-1-DMA-W	169.12	336.42	198.84	389.91
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-D-C1-1-DMA-W	167.45	333.41	186.83	368.29
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-D-C2-1-DMA-W	165.82	330.48	184.63	364.33
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-E-C1-1-DMA-W	166.07	330.93	184.54	364.17
NTP3800Q1-TAC-T01-NR-UNC3/OHT3-E-C2-1-DMA-W	165.69	330.24	183.83	362.89
Average	167.95	334.32	190.75	375.35
Standard Deviation	3.67	6.60	9.20	16.57

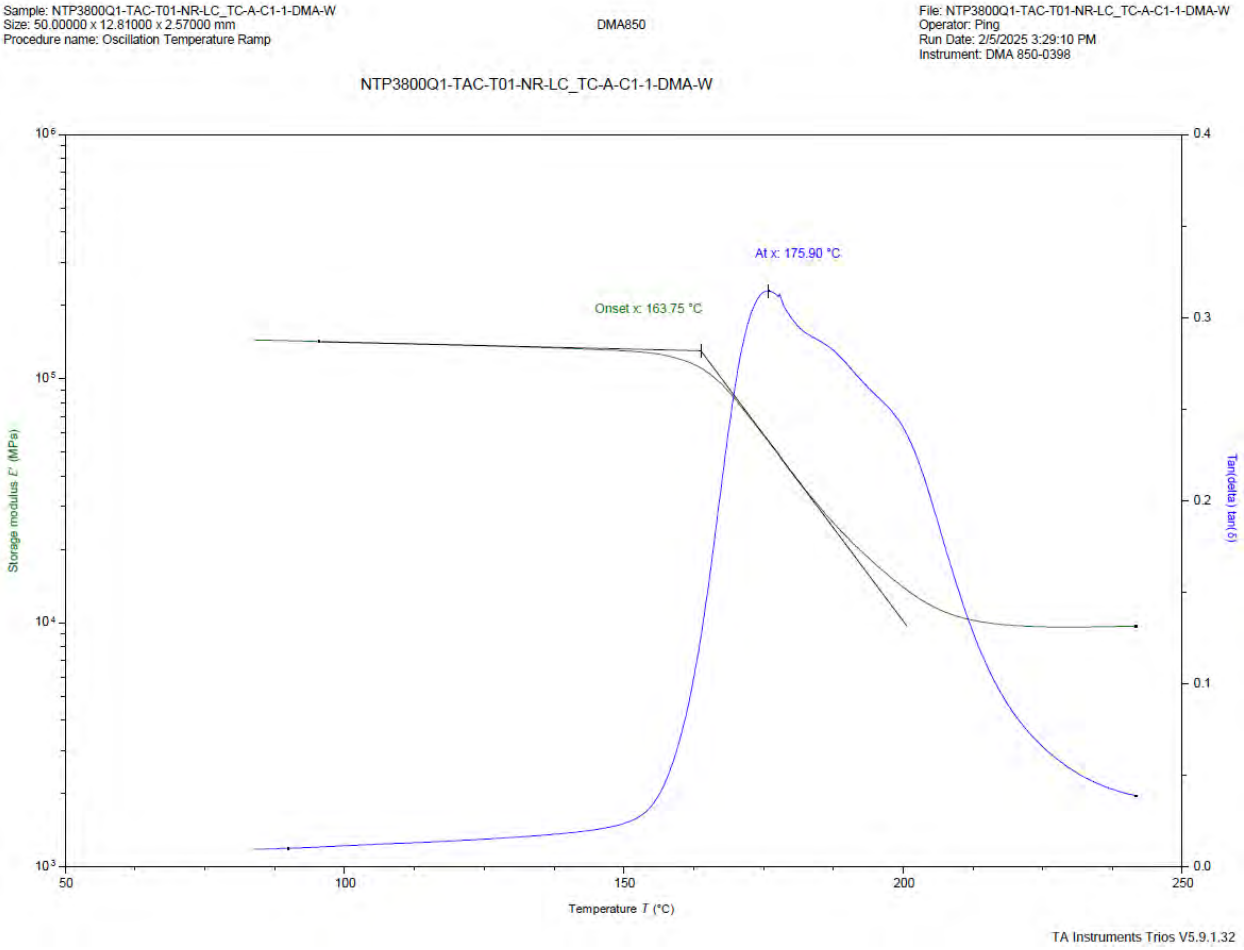
9.3 DMA Dry Batch A

A representative of DMA Dry profile from Batch A is provided below.



9.4 DMA Wet Batch A

A representative of DMA Wet profile from Batch A is provided below.



10. Moisture Loss

A representative specimen was used to measure the moisture loss for every combination of test temperature and stacking sequence.

Layup	Test Type	Test Temperature	Specimen ID	Weight Pre-Test (g)	Weight Post-Test (g)	Moisture Loss (g)
[0]10	LT	ETW1(180°F)	T01-NR-LT-A-C1-1-TRAV-1	19.25	19.23	0.02340
		ETW2(250°F)	T-01-NR-LT-A-C1-1-TRAV-2	19.43	19.39	0.03910
[0]20	LC	ETW1(180°F)	TCDLA115D	6.914	6.908	0.00600
		ETW2(250°F)	TCDLA115E	6.939	6.928	0.01060
[90]18	TT	ETW1(180°F)	TCDUA115D	22.39	22.38	0.01180
		ETW2(250°F)	TCDUA111E	21.96	21.94	0.01750
[45/-45]4S	IPS	ETW1(180°F)	TCDNA115D	19.24	19.22	0.01650
		ETW2(250°F)	TCDNA115E	18.78	18.76	0.01690
[0]32	SBS	ETW1(180°F)	TCDQA115D	1.088	1.087	0.00070
		ETW2(250°F)	TCDQA115E	1.090	1.088	0.00150
[45/0/-45/90]3S	UNT1	ETW1(180°F)	TCDAA115D	29.08	29.06	0.01570
[45/-45/0/45/-45/45/-45/90/45/-45]S	UNT2	ETW1(180°F)	TCDBA115D	24.09	24.07	0.01700
		ETW2(250°F)	TCDBA115E	24.00	23.98	0.02190
[45/90/-45/0/0/45/0/0/-45/0]S	UNT3	ETW1(180°F)	TCDCA115D	24.47	24.45	0.01340
[90/0/90]7	UNC0	ETW2(250°F)	TCDRA115E	7.073	7.065	0.00880
[45/0/-45/90]3S	UNC1	ETW1(180°F)	TCDWA115D	8.002	7.998	0.00390
		ETW2(250°F)	TCDWA115E	8.054	8.043	0.01040
[45/-45/0/45/-45/45/-45/90/45/-45]S	UNC2	ETW1(180°F)	TCDXA115D	6.663	6.659	0.00430
		ETW2(250°F)	TCDXA115E	6.699	6.686	0.01270
[45/0/-45/90]3S	OHT1	ETW1(180°F)	TCDDA115D	53.10	53.07	0.02580
		ETW2(250°F)	TCDDA115E	51.64	51.58	0.05660
[45/-45/0/45/-45/45/-45/90/45/-45]S	OHT2	ETW1(180°F)	TCDEA115D	44.15	44.12	0.03340
		ETW2(250°F)	TCDEA115E	43.17	43.12	0.05640
[45/90/-45/0/0/45/0/0/-45/0]S	OHT3	ETW1(180°F)	TCDFA115D	44.36	44.34	0.02310
		ETW2(250°F)	TCDFA115E	43.46	43.41	0.04380
[45/0/-45/90]3S	FHT1	ETW1(180°F)	TCD4A115D	52.59	52.57	0.02390
		ETW2(250°F)	TCD4A115E	52.78	52.72	0.05880
[45/-45/0/45/-45/45/-45/90/45/-45]S	FHT2	ETW1(180°F)	TCD5A215D	44.06	44.03	0.02860
		ETW2(250°F)	TCD5A215E	44.32	44.27	0.05280
[45/90/-45/0/0/45/0/0/-45/0]S	FHT3	ETW1(180°F)	TCD6A115D	44.55	44.51	0.03500
		ETW2(250°F)	TCD6A115E	44.79	44.74	0.04940
[45/0/-45/90]3S	FHC1	ETW1(180°F)	TCD7A115D	52.78	52.76	0.02840
		ETW2(250°F)	TCD7A115E	52.96	52.91	0.05020
[45/-45/0/45/-45/45/-45/90/45/-45]S	FHC2	ETW1(180°F)	TCD8A115D	43.94	43.92	0.02570
		ETW2(250°F)	TCD8A115E	44.24	44.12	0.12020
[45/90/-45/0/0/45/0/0/-45/0]S	FHC3	ETW1(180°F)	TCD9A115D	44.21	44.18	0.02870
		ETW2(250°F)	TCD9A115E	44.60	44.55	0.05690
[45/0/-45/90]3S	OHC1	ETW1(180°F)	TCDGA115D	52.44	52.41	0.02510
		ETW2(250°F)	TCDGA115E	51.22	51.16	0.05430
[45/-45/0/45/-45/45/-45/90/45/-45]S	OHC2	ETW1(180°F)	TCDHA115D	43.86	43.83	0.02570
		ETW2(250°F)	TCDHA115E	42.80	42.73	0.06470
[45/90/-45/0/0/45/0/0/-45/0]S	OHC3	ETW1(180°F)	TCDIA115D	44.20	44.17	0.03080
		ETW2(250°F)	TCDIA115E	43.18	43.13	0.05270
[45/0/-45/90]3S	SSB1	ETW1(180°F)	TCD1A115D	23.97	23.96	0.01580
		ETW2(250°F)	TCD1A115E	23.79	23.75	0.03040
[45/-45/0/45/-45/45/-45/90/45/-45]S	SSB2	ETW1(180°F)	TCD2A115D	19.66	19.64	0.01810
		ETW2(250°F)	TCD2A115E	19.45	19.42	0.03060
[45/90/-45/0/0/45/0/0/-45/0]S	SSB3	ETW1(180°F)	TCD3A115D	20.24	20.22	0.01780
		ETW2(250°F)	TCD3A115E	19.89	19.86	0.02880
[0]16S	ILT	ETW1(180°F)	TCDMA115D	31.08	31.07	0.01387

11. Composite Material Data Collection

11.1 Fiber, Resin, Prepreg Manufacturing Dates

	Lot 1 (Batch A)	Lot 2 (Batch B)	Lot 3 (Batch C)	Lot 4 (Batch D)	Lot 5 (Batch E)
Fiber Lot ID	A1122J2	A1123M1	A1123B3	A1125J2	A1124M1
Date of Fiber Manufacture	9/1/2022	12/1/2023	2/1/2023	9/1/2025	12/1/2024
Resin Lot ID	032624-47M	052024-75M	061224-21M 061224-23M	010726-17M	010726-16M
Date of Resin Manufacture	3/26/2024	5/20/2024	6/12/2024	1/7/2026	1/7/2026
Prepreg Lot ID	041124-1T2	052924-1T3	061924-1T2	011426-1T2	011426-2T2
Date of Prepreg Manufacture	4/11/2024	5/29/2024	6/19/2024	1/14/2026	1/14/2026

11.2 Prepreg, Testing and Data Submission Dates

		Start Date	End Date
Lot 1, 2 and 3 (Batch A, B and C)	Date of Composite Manufacture	9/16/2024	1/23/2025
	Date of Testing	1/14/2025	9/2/2025
	Date of Data Submittal	9/4/2025	
Lot 4 and 5 (Batch D and E)	Date of Composite Manufacture	3/2/2026	3/12/2026
	Date of Testing	4/22/2026	6/26/2026
	Date of Data Submittal	6/29/2026	

12. Deviations

N/A