TCAC 12k HTS40 SFP OSI/TC250 42% Fabric Prepreg Material Property Data Report

FAA Special Project SP4745WI-Q

NCAMP Test Report Number: CAM-RP-2011-005 Rev A

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Testing Facility:

National Institute for Aviation Research
Wichita State University
1845 N. Fairmount
Wichita, KS 67260-0093

Test Panel Fabrication Facility:

Advanced Composites Technologies
345 Coney Island Dr.
Sparks, NV 89431

Prepared by: ***(No longer available to sign)***

Allison Bonitati

Edited by: ***(No longer available to sign)***

Vinsensius Tanoto
Digitally signed by Vinsensius Tanoto
DN: cn=Vinsensius Tanoto, o=NIAR, ou=NCAMP, email=vstanoto@niar.wichita.edu, c=US
Date: 2017.03.09 14:59:16 -06'00'

Michelle Man **Vinsensius Tanoto**

Reviewed by: Evelyn Lian
Digitally signed by Evelyn Lian
DN: cn=Evelyn Lian, o=NIAR/NCAMP, ou=NIAR/NCAMP, email=evelyn@niar.wichita.edu, c=US
Date: 2017.03.10 08:47:09 -06'00'

Evelyn Lian

Approved by: Ed Hooper
Digitally signed by Ed Hooper
DN: cn=Ed Hooper, o=Aviation Consultant, Inc., ou=NCAMP AER, email=edhooper@cox.net, c=US
Date: 2017.03.10 08:50:20 -06'00'

Ed Hooper (NCAMP AER)

REVISIONS:

Rev	By	Date	Pages Revised or Added
N/C	Allison Bonitati	7/19/2011	Document Initial Release.
A	Michelle Man	7/20/2015	Typographical and Editorial changes; added signature page; Added CTD & RTD charts to 4.14, 4.15, 4.16, 4.17; Added RTD charts to 4.24, 4.25; Added ETW Ultimate Bearing chart to 4.26, 4.27, 4.28; Added 0.2% Offset chart to 3.5 and 4.5; Updated Section 9 and 10. **Data Changes** (all sections updated): updated Poissons for WT, WC & FC and removed it for UNC1,2,3; Added Strength data points to FC-RTD; Added 5% strain data points to IPS-ETW; Updated Analysis for ILT data; removed modulus data points from UNC2-ETW ; SBS1 RTD and ETW- data censored by engineering judgment; OHC1 ETW - data censored by engineering judgment

			Document Rev A Draft.
A	Vinsensius Tanoto	9/26/2016	Formatting changed, added CAI additional information in Section 5, and WC, FC, UNC1, UNC2, and UNC3 Stress-Strain Curves in Section 6. Changed Hard layup percentage to 40/20/40 in Table 2-2 Laminate Summary Data.

TABLE OF CONTENTS

List of Tables

List of Figures

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 MIL-HDBK-17-1F (currently known as CMH-17 Rev G)—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 FAA oversight through FAA Special Project Number SP4745WI-Q and also meet the requirements of NCAMP Standard Operating Procedure NSP 100; the test panels, test specimens, and test setups have been conformed by the FAA and the testing has been witnessed by the FAA. However, the data may not fulfill all the needs of any specific company's programs; 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, TCAC 12k HTS40 F13 SFP OSI (193gsm)/TC250 42% fabric prepreg Qualification Statistical Analysis Report NCP-RP-2010-076 N/C. The qualification material was procured to NCAMP Material Specification NMS 688/2 Rev B dated July 29, 2008. The qualification test panels were cured in accordance with NCAMP Process Specification NPS 81688 Rev C dated July 29 2008. The panels were fabricated at Advanced Composites Technologies, 345 Coney Island Dr., Sparks NV 89431. The NCAMP Test Plan NTP 6888Q2 Rev B dated July 29, 2008 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 MIL-HDBK-17-1F (currently known as CMH-17 Rev G). 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 MIL-HDBK-17-1F (currently known as CMH-17 Rev G) are adequate for the given program.

Aircraft companies should not use the data published in this report without specifying NCAMP Material Specification NMS 688/2. NMS 688/2 may have additional requirements that are listed in its prepreg process control document (PCD), fiber specification, fiber PCD, and other raw material specifications and PCDs which impose essential quality controls on the raw materials and raw material manufacturing equipment and processes. *Aircraft companies and certifying agencies should assume that the material property data published in this report is not applicable when the material is not procured to NMS 688/2.* NMS 688/2 is a free, publicly available, non-proprietary aerospace industry material specification.

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

1.2 Symbols Used

ν_{12}^{t}	major Poisson's ratio, tension
$\mu\varepsilon$	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

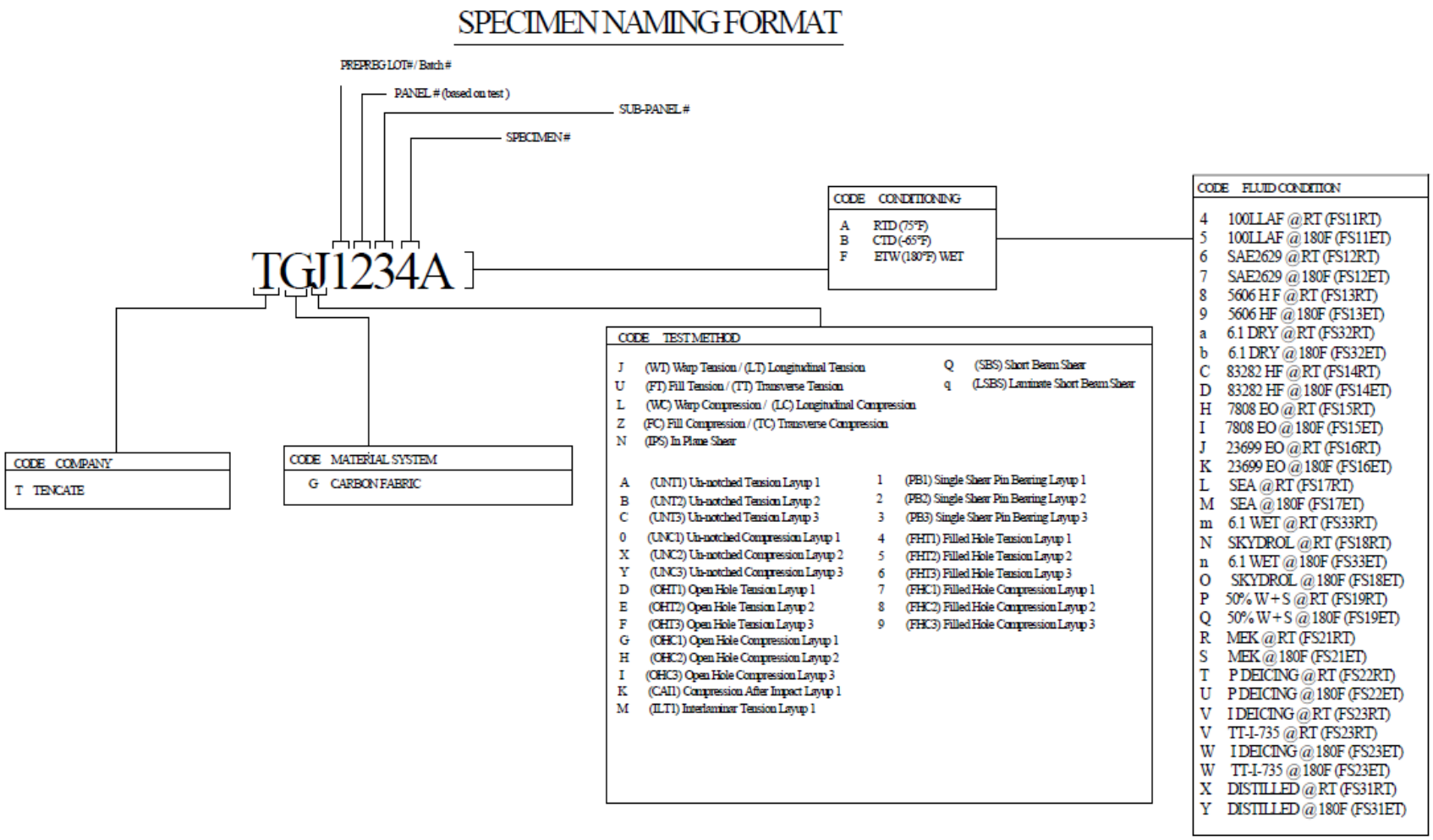
Subscripts

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– TenCate Naming Format



1.4 References

ASTM Standards

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

ASTM D2344/D2344M-00(2006) – Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates

ASTM D3039/D3039M-00(2006) – Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials

ASTM D3518/D3518M-94(2007) – Standard Test Method for In-Plane Shear Response of Polymer Matrix Composite Materials by Tensile Test of a ± 45º Laminate In-Plane Shear Strength and Modulus

ASTM D5766/D5766M-02a – Standard Test Method for Open Hole Tensile Strength of Polymer Matrix Composite Laminates

ASTM D5961/D5961M-05e1 – Standard Test Method for Bearing Response of Polymer Matrix Composite Laminates

ASTM D6415-06ae1 – Standard Test Method for Measuring the Curved Beam Strength of a Fiber-Reinforced Polymer-Matrix Composite

ASTM D6484/D6484M-04 – Standard Test Method for Open-Hole Compressive Strength of Polymer Matrix Composite Laminates

ASTM D6641/D6641M-01e1 – Standard Test Method for Determining the Compressive Properties of Polymer Matrix Composite Laminates Using a Combined Loading Compression (CLC) Test Fixture

ASTM D6742/D6742M-02 – Standard Practice for Filled-Hole Tension and Compression Testing of Polymer Matrix Composite Laminates

ASTM D7136/D7136M-05e1 – Standard Test Method for Measuring the Damage Resistance of a Fiber-Reinforced Polymer Matrix Composite to a Drop-Weight Impact Event

ASTM D7137/D7137M-05e1 – Standard Test Method for Compressive Residual Strength Properties of Damaged Polymer Matrix Composite Plates

1.5 Methodology

1.5.1 Process Definition

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

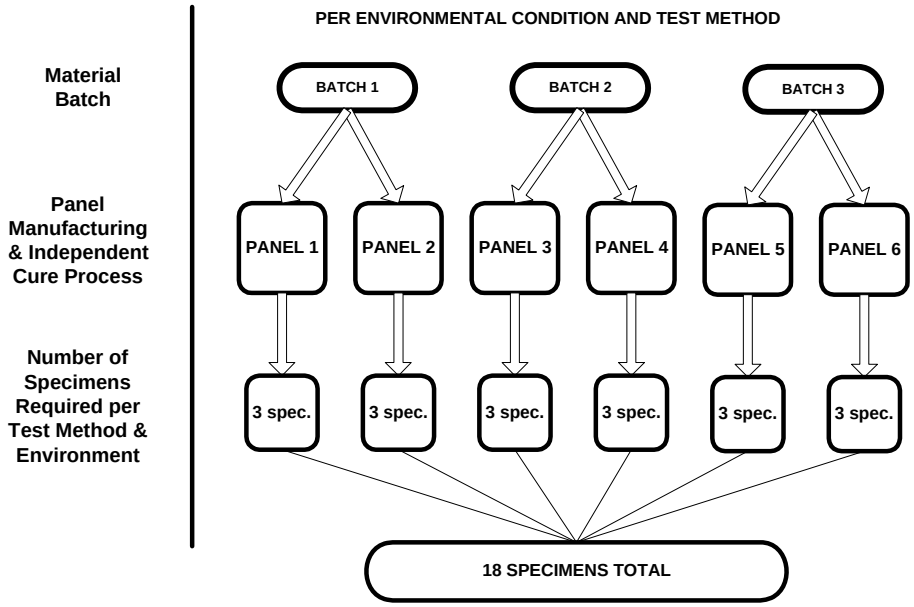


Figure 1-1: Specimen Selection Methodology

All panels were fabricated in accordance with TenCate process specification NPS 81688 HTS TC250.

In order to facilitate individual specimen trace ability, individual specimen numbering and/or skewed lines were written or drawn across each sub-panel as shown in Figure 1-2.

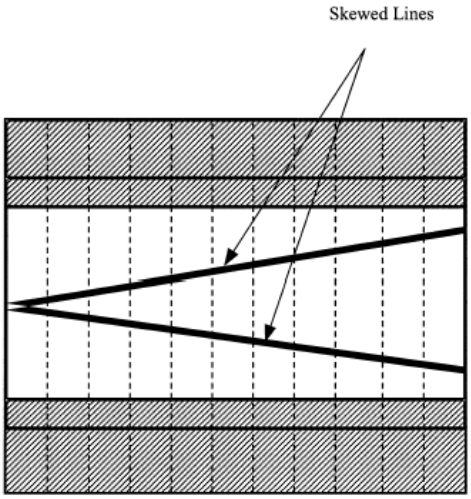


Figure 1-2: Specimen Traceability Line

For the single shear bearing tests, the ASTM D5961 was used with one of the pairs of specimens replaced by a steel fixture. The configuration is shown in Figure 1-3 below. Thickness of specimen fixture used was 0.685".

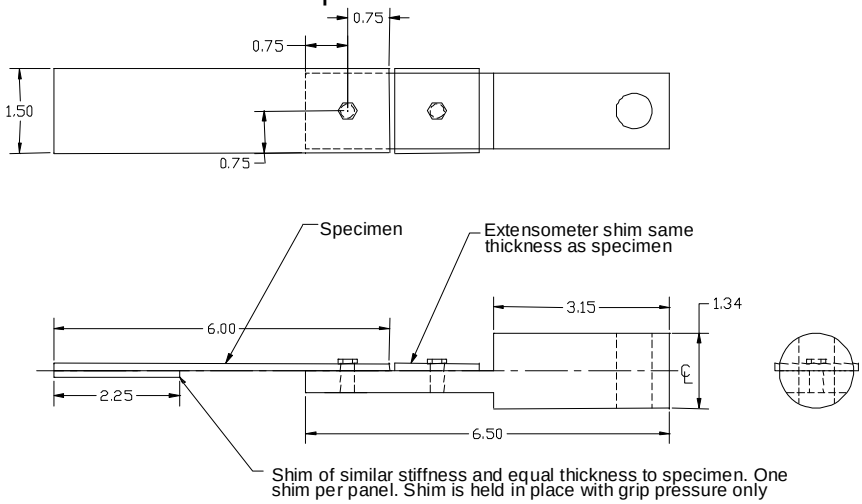


Figure 1-3: Modified ASTM D5961 (Single Shear Bearing) Specimen and Loading Arrangement

1.5.2 Specimen & Testing Details

1.5.2.1 Tabbing

No tabs were used for this material system.

1.5.2.2 Specimen Dimensions & Test Configuration

For filled-hole and bearing tests, the hole diameter was 0.25 in -0.000 +0.003 in. For filled-hole tension tests, the fasteners were installed to 85±5 in-lb. For filled-hole compression and bearing tests, the fasteners were installed to 30±5 in-lb. 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 tests, the hole diameter was 0.25 in -0.000 +0.003 in. The following fasteners were used:

1) NASM14181-04004 bolts with MS14182 nuts and MS14183 washers for FHT and FHC
2) NASM 21297-04013 bolts with MS 21084 nuts and MS21206 washers for SSB
3) NASM 21296 bolts with MS21085 nuts and MS21299 washers

1.5.3 Test Matrix

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

Layup (warp direction)	Test Type and Direction	Property	Number of Batches x Number of Panels x Number of Test Specimens			
			Test Temperature/Moisture Condition			
			CTD	RTD	ETD	ETW
$[0]_{12}$	ASTM D3039 Warp Tension	Strength, Modulus, and Poisson's Ratio	3x2x3	3x2x3		3x2x3
$[0]_{12}$	ASTM D6641 Warp Compression (Note 1)	Strength and Modulus	3x2x3	3x2x3	3x2x3	3x2x3
$[90]_{12}$	ASTM D3039 Fill Tension	Strength and Modulus	3x2x3	3x2x3		3x2x3
$[90]_{12}$	ASTM D6641 Fill Compression (Note 1)	Strength and Modulus	3x2x3	3x2x3	3x2x3	3x2x3
$[45/-45]_{2S}$	ASTM D3518 In-Plane Shear	Strength and Modulus	3x2x3	3x2x3		3x2x3
$[0]_{32}$	ASTM D2344 Short Beam	Strength	3x2x3	3x2x3	3x2x3	3x2x3

Table 1-1: Lamina Level Test Matrix

Table 1-2 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 1-2 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.

(%0º/%±45º/%90º) Actual Test Type	Test Type and Layup (5)	Property	Number of Batches x Number of Panels x Number of Test Specimens		
			Test Temperature/Moisture Condition		
			CTD	RTD	ETW
(25/50/25 - QI) UNT1	ASTM D3039 Un-notched Tension [45/0/-45/90]2S	Strength & modulus	3x2x3	3x2x3	3x2x3
(10/80/10) UNT2	ASTM D3039 Un-notched Tension [45/-45/0/45/-45/45/-45/90/45/-45]S	Strength & modulus	3x2x3	3x2x3	3x2x3
(40/20/40) UNT3	ASTM D3039 Un-notched Tension [0/90/0/45/90/0/90/-45/90/0/90/45/0/90/0]	Strength & modulus	3x2x3	3x2x3	3x2x3
(25/50/25 - QI) UNC1	ASTM D6641 Un-notched Compression (4) [45/0/-45/90]2S	Strength & modulus		3x2x3	3x2x3
(10/80/10) UNC2	ASTM D6641 Un-notched Compression (4) [45/-45/0/45/-45/45/-45/90/45/-45]S	Strength & modulus		3x2x3	3x2x3
(40/20/40) UNC3	ASTM D6641 Un-notched Compression (4) [0/90/45/0/90/0/90/-45/0/90]S	Strength & modulus		3x2x3	3x2x3
(25/50/25 - QI) SBS1	ASTM D2344 Short Beam (specimens may be taken from panels designed for (25/50/25 - QI) CAI1)	Strength		3x2x3	3x2x3
(25/50/25 - QI) OHT1	ASTM D5766 Open Hole Tension (1) [45/0/-45/90]2S	Strength	3x2x3	3x2x3	3x2x3
(10/80/10) OHT2	ASTM D5766 Open Hole Tension (1) [45/-45/0/45/-45/45/-45/90/45/-45]S	Strength	3x2x3	3x2x3	3x2x3
(40/20/40) OHT3	ASTM D5766 Open Hole Tension (1) [0/90/0/45/90/0/90/-45/90/0/90/45/0/90/0]	Strength	3x2x3	3x2x3	3x2x3
(25/50/25 - QI) FHT1	ASTM D6742 Filled Hole Tension (2) [45/0/-45/90]2S	Strength	3x2x3	3x2x3	3x2x3
(10/80/10) FHT2	ASTM D6742 Filled Hole Tension (2) [45/-45/0/45/-45/45/-45/90/45/-45]S	Strength	3x2x3	3x2x3	3x2x3
(40/20/40) FHT3	ASTM D6742 Filled Hole Tension (2) [0/90/0/45/90/0/90/-45/90/0/90/45/0/90/0]	Strength	3x2x3	3x2x3	3x2x3
(25/50/25 - QI) OHC1	ASTM D6484 Open Hole Compression (1)(4) [45/0/-45/90/45/0/-45/90/-45/90]S	Strength		3x2x3	3x2x3
(10/80/10) OHC2	ASTM D6484 Open Hole Compression (1)(4) [45/-45/0/45/-45/45/-45/90/45/-45]S	Strength		3x2x3	3x2x3
(40/20/40) OHC3	ASTM D6484 Open Hole Compression (1)(4) [0/90/45/90/0/0/90/-45/90/0]S	Strength		3x2x3	3x2x3
(25/50/25 - QI) FHC1	ASTM D6484 Filled Hole Compression (2) [45/0/-45/90/45/0/-45/90/-45/90]S	Strength		3x2x3	3x2x3
(10/80/10) FHC2	ASTM D6484 Filled Hole Compression (2) [45/-45/0/45/-45/45/-45/90/45/-45]S	Strength		3x2x3	3x2x3
(40/20/40) FHC3	ASTM D6484 Filled Hole Compression (2) [0/90/45/90/0/0/90/-45/90/0]S	Strength		3x2x3	3x2x3
(25/50/25 - QI) SSB1	ASTM D5961 Single Shear Bearing (3) (6) [45/0/-45/90]S	Strength		3x2x3	3x2x3
(10/80/10) SSB2	ASTM D5961 Single Shear Bearing (3) (6) [45/-45/90/45/-45]S	Strength		3x2x3	3x2x3
(40/20/40) SSB3	ASTM D5961 Single Shear Bearing (3) (6) [0/90/45/0/90]S	Strength		3x2x3	3x2x3
(50/0/50) ILT	ASTM D6415 Interlaminar Tension [0]21	Strength	1x1x6	1x1x6	1x1x6
(25/50/25 - QI) CAI1	ASTM D7136 & D7137 Compression After Impact (1500 in.lb/in) [45/0/-45/90]3S	Strength		1x1x6	

(1) Open-hole configuration: 0.25” hole diameter, 1.5 inch width.
(2) Filled-hole test configuration: 0.25” diameter, see section 2 for fastener callout, 1.5” width.

(3) Single shear bearing test configuration: 0.25: hole diameter, 1.5" width, see section 2 for fastener callout, e/D=3
(4) Back-to-back strain gages were used on the first two specimens of each environment. If no buckling was observed, the remaining modulus specimens required strain gage. on one side of the specimens only. Appropriate extensometer may have been used in place of the strain gage.
(5) Loading direction is generally along the 0-degree direction.
(6) Use modified ASTM D5961 per Figure 1-3.

(Note that the layup numbers 1, 2 and 3 correspond to those designated as "quasi isotropic," "soft" and "hard" respectively. In addition, the 0°/90° cross-plied laminates used for the unidirectional materials only are designated "Layup 0").

Table 1-2: Laminate Level Test Matrix

1.5.4 Physical Testing

The properties in Table 1-3 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 oven cure conducted where that batch is present. The tests were performed by the National Institute for Aviation Research (NIAR) Composites Laboratory under the supervision of NCAMP.

Property	**Condition/Method** (Note 1)	**Min Replicates per panel**
Cured Ply Thickness	ASTM D3171-06	All data from mechanical test specimens
Laminate Density	ASTM D792-00	3
Fiber Volume, % by Volume	ASTM D3171-06 (Note 2)	3
Resin Content, % by Weight	ASTM D3171-06(Note 2)	3
Ultrasonic Through Transmission, C-Scan	MIL-HDBK-787A (Note 3)	1
Glass Transition Temperature, Tg by DMA or RDA	Dry and Wet – SACMA SRM 18R-94	1 Dry, 1 Wet (Note 4)

Notes 1: Where the applicable standard allows variations in specimen form or test method, the specific parameters used were specified in the PMC Data Collection Template..
2: Method II, except for laminates of materials where actual fiber weight is not known accurately prior to impregnation, as in the case for unidirectional materials. For these materials, in order to verify Method II is accurate, a minimum of 12 samples per batch were tested by Method I, Procedure B.
3: Five MHz was used for solid laminates. Panels with anomaly were segregated. Microscopy images may have been taken from questionable areas. NCAMP was involved in the review of all the C-scans.
4: Minimum total of 24 dry and 24 wet for each material system.

Table 1-3: Physical Testing Matrix

1.5.5 Environmental Conditioning

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

Test environments are defined as:
CTD = -65±5°F, dry
RTD = 70±10°F, room temperature dry
ETD = 180±5°F, dry
ETW = 180±5°F, wet (equilibrium moisture content)

Within each test method and test environment, the failure mode was evaluated immediately after each test by an FAA DER. All tested specimens were digitally photographed after each test in order to pictorially document failure modes. Representative photos are included in the CD accompanying this report.

For dry testing, specimens were dried at 160°F±5°F for 120 to 130 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 specimens were tested within 14 days from the date they were cured). 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 160°F±5°F for 120 to 130 hours before being conditioned to equilibrium at 160°F±5°F and 85% ± 5%. Effective moisture equilibrium was achieved when the average moisture content of the traveler specimen changed by less than 0.05% for three consecutive readings which are 7 ±0.5 days apart and may be expressed by:

$$\frac{W_i - W_{i-1}}{W_b} < 0.0005$$

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 5 grams were used to establish weight gain measurements. If the specimens or traveler coupons pass the criteria for three consecutive readings which are 7 ±0.5 days apart, the specimens were kept in the environmental chamber for up to an additional 60 days. Alternatively, the specimens may have been removed from the environmental chamber and placed in a sealed

plastic bag along with a moist cotton towel for a maximum of 14 days until mechanical testing. Strain-gaged specimens were removed from the controlled environment for a maximum of 2 hours for application of gages in ambient laboratory conditions.

1.5.6 Non-ambient Testing

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

For elevated temperature testing, the temperature chamber, test fixture, and grips were preheated to the specified temperature. Each specimen was heated to the required test temperature as verified by a thermocouple in direct contact with and taped to the specimen gage section. The heat-up time of the specimen did not exceed 5 minutes, unless otherwise specified in individual test summary sheets. The test was started 2^{+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.

1.5.7 Fluid Sensitivity Screening

Table 1-4 lists the requirements for fluid sensitivity screening, which requires ASTM D2344 Short Beam Strength testing on $[0°]_{34}$ lamina level specimens dried at 160°F±5°F for 120 to 130 hours before being subjected to the conditions indicated, five replicates per fluid and one cure cycle. Specimens were cleaned with a dry towel prior to the tests. In addition to short beam strength, load versus displacement curves were plotted to aid in the identification of matrix/resin softening. Since load versus displacement curves are influenced by test machine and fixture compliance, all the tests were performed with the identical machine and fixture, through a single setup. Experience suggests 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. For example, the exposure condition for jet fuel may not fully represent the condition of integral fuel tanks.

Extended Contact:	Exposure	Test Condition	Code
100 Low Lead Aviation Fuel	90 days min. @ 70°F±10°F	70°F	FS11RT
	90 days min. @ 70°F±10°F	180°F	FS11ET
SAE AMS 2629 Jet Reference Fluid	90 days min. @ 70°F±10°F	70°F	FS12RT
	90 days min. @ 70°F±10°F	180°F	FS12ET
MIL-PRF-5606 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	FS13RT
	90 days min. @ 70°F±10°F	180°F	FS13ET
MIL-PRF-83282 Hydraulic Oil	90 days min. @ 70°F±10°F	70°F	FS14RT
	90 days min. @ 70°F±10°F	180°F	FS14ET
MIL-PRF-7808 Engine Oil	90 days min. @ 70°F±10°F	70°F	FS15RT
	90 days min. @ 70°F±10°F	180°F	FS15ET
MIL-PRF-23699, Class STD Engine Oil	90 days min. @ 70°F±10°F	70°F	FS16RT
	90 days min. @ 70°F±10°F	180°F	FS16ET
Salt Water	90 days min. @ 70°F±10°F	70°F	FS17RT
	90 days min. @ 70°F±10°F	180°F	FS17ET
Skydrol LD-4 (SAE AS1241, Type IV, Class 1)	90 days min. @ 70°F±10°F	70°F	FS18RT
	90 days min. @ 70°F±10°F	180°F	FS18ET
50% Water with 50% Skydrol LD-4 (SAE AS1241, Type IV, Class 1)	90 days min. @ 70°F±10°F	70°F	FS19RT
	90 days min. @ 70°F±10°F	180°F	FS19ET
Short Duration Contact:			
MEK washing fluid. ASTM D740	90 minutes min. @ 70°F±10°F	70°F	FS21RT
	90 minutes min. @ 70°F±10°F	180°F	FS21ET
Polypropylene Glycol Deicer (Type I) Mil-A-824 3	90 minutes min. @ 70°F±10°F	70°F	FS22RT
	90 minutes min. @ 70°F±10°F	180°F	FS22ET
Isopropyl Alcohol Deicing Agent (TT-I-735)	48±4 hours @70°F±10°F	70°F	FS23RT
	48±4 hours @70°F±10°F	180°F	FS23ET
Control Tests:			
Distilled Water	90 days min. at 70°F±10°F	70°F	FS31RT
	90 days min. at 70°F±10°F	180°F	FS31ET
Dry	Dry per section 6.1	70°F	FS32RT
	Dry per section 6.1	180°F	FS32ET
85% Relative Humidity	Per section 6.1	70°F	FS33RT
	Per section 6.1	180°F	FS33ET

Table 1-4: Fluid Sensitivity Matrix

1.5.8 Normalization Procedures

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

The average cured ply thickness of 0.0085 inch 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.

1.5.9 Conformity

The 3-batch qualification panels have been fabricated according to the requirements of the test plan and conformed by the FAA. The test specimens and test setups have also been conformed by the FAA.

Testing was witnessed by the FAA. Witnessing was delegated to a DER. Mechanical testing was carried out at the National Institute for Aviation Research, Wichita State University. The test setup and procedures were reviewed by NCAMP IAB and NCAMP staff during a facility audit. FAA conformity inspection records and approvals are included in the CD accompanying this report.

1.5.10 Material Pedigree Information

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

2 Test Results

2.1 Lamina Level Test Summary

Prepreg Material:	TCAC12k HTS SFP OSI/TC250 42% fabric prepreg NMS 688/2 Material Specification				**Tencate 12K Fabric Lamina Properties Summary**
Fiber:	HTS40 F13 12k 800 tex		**Resin:**	TC250	
Tg(dry):	259.26°F	**Tg(wet):**	198.49°F	**Tg METHOD:**	DMA (SRM 18R-94)
PROCESSING:	NPS 81688 "C" Cure Cycle				

Date of fiber manufacture	Lot # 1 April 2007, Lot # 2 August 2007, Lot # 3 June 2008	**Date of testing**	9/30/2009 to 9/22/2010
Date of resin manufacture	Lot # 1 8/4/08, Lot # 2 8/13/08, Lot # 3 1/6/09	**Date of data submittal**	August 2010
Date of prepreg manufacture	Lot # 18/12/08, Lot # 2 8/13/08, Lot # 3 1/7/09		
Date of composite manufacture	November 2008 - June 2009		

LAMINA MECHANICAL PROPERTY SUMMARY
Data reported as: Normalized & Measured
(Normalized by CPT= .0085 inch)

	CTD Mean		RTD Mean		ETD Mean		ETW Mean	
	Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_1^{tu} (ksi)	129.00	127.21	130.41	126.33	---	---	135.15	132.02
E_1^t (Msi)	8.76	8.62	8.94	8.66	---	---	8.85	8.64
ν_{12}^t	---	0.039		0.040		---	---	0.042
F_2^{tu} (ksi)	121.60	117.07	125.98	121.76	---	---	128.42	128.63
E_2^t (Msi)	8.71	8.39	8.88	8.58	---	---	8.75	8.76
F_1^{cu} (ksi)	102.29	102.36	101.26	100.14	84.41	82.77	64.80	66.25
E_1^c (Msi)	7.51	7.52	8.12	8.02	7.90	7.72	7.88	8.06
ν_{12}^c	---	0.045	---	0.051	---	0.045	---	0.054
F_2^{cu} (ksi)	100.90	101.38	91.91	89.96	75.25	71.96	61.22	61.82
E_2^c (Msi)	7.73	7.79	8.23	8.04	7.75	7.39	7.96	8.01
ν_{21}^c	---	0.059		0.049		0.041		0.042
$F_{12}^{s5\%strain}$ (ksi)	---	13.72	---	9.87	---	---	---	5.08
$F_{12}^{s0.2\%}$ (ksi)	---	7.69	---	5.72	---	---	---	3.10
G_{12}^s (Msi)	---	0.60	---	0.52	---	---	---	0.32
SBS (ksi)	---	10.44	---	9.36	---	6.77	---	4.36

Table 2-1: Lamina Summary Data

2.2 Laminate Level Test Summary

Prepreg Material:	TCAC12k HTS SFP OSI/TC250 42% fabric prepreg NMS 688/2 Material Specification			**Tencate 12K Fabric Laminate Properties Summary**	
Fiber	HTS40 F13 12k 800 tex		**Resin** TC250		
Tg(dry)	259.26°F	**Tg(wet)**	198.49°F	**Tg METHOD**	DMA (SRM 18R-94)
PROCESSING:	NPS 81688 "C" Cure Cycle				
Date of fiber manufacture	Lot # 1 April 2007, Lot # 2 August 2007, Lot # 3 June 2008			**Date of testing**	9/30/2009 to 9/22/2010
Date of resin manufacture	Lot # 1 8/4/08, Lot # 2 8/13/08, Lot # 3 1/6/09			**Date of data submittal**	August 2010
Date of prepreg manufacture	Lot # 18/12/08, Lot # 2 8/13/08, Lot # 3 1/7/09				
Date of composite manufacture	November 2008 - June 2009				

LAMINATE MECHANICAL PROPERTY SUMMARY
Data reported as: Normalized & Measured
(Normalized by CPT= .0085 inch)

	Layup:	25/50/25		10/80/10		40/20/40	
	Test Condition	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHT Strength (ksi)	**CTD**	48.65	47.09	43.36	41.86	55.09	54.05
	RTD	49.32	46.76	40.16	38.55	57.11	55.05
	ETW	52.08	50.02	31.92	30.66	67.11	65.50
OHC Strength (ksi)	**RTD**	43.48	41.98	35.05	33.97	46.73	45.12
	ETW	28.65	27.98	23.92	23.42	32.38	31.59
UNT Strength (ksi)	**CTD**	91.10	89.02	57.86	56.48	112.04	110.38
	RTD	89.54	86.02	55.87	54.00	116.03	113.07
	ETW	88.23	86.40	45.16	44.39	106.21	104.54
Modulus (msi)	**CTD**	6.15	6.01	4.03	3.93	7.77	7.65
	RTD	6.10	5.85	3.95	3.82	7.86	7.66
	ETW	5.82	5.70	3.43	3.37	7.70	7.58
UNC Strength (ksi)	**RTD**	83.05	81.97	51.56	51.10	86.42	85.18
	ETW	50.82	51.84	28.73	29.17	61.90	62.48
Modulus (msi)	**RTD**	5.81	5.74	3.82	3.78	7.35	7.25
	ETW	5.52	5.64	3.36	3.41	7.07	7.14
FHT Strength (ksi)	**CTD**	53.24	51.66	48.34	46.68	58.60	57.02
	RTD	53.25	51.03	44.14	42.03	59.99	57.56
	ETW	52.92	50.78	33.31	31.95	62.27	60.15
FHC Strength (ksi)	**RTD**	70.82	67.86	50.41	48.68	72.37	70.13
	ETW	45.81	44.37	31.83	30.75	47.83	46.08
LSBS Strength (ksi)	**RTD**	---	9.30	---	---	---	---
	ETW	---	4.51	---	---	---	---
Ultimate Strength	**RTD**	114.08	116.88	114.94	122.80	106.38	108.40
	ETW	92.35	91.91	95.22	94.62	83.04	82.80
2% offset Strength (ksi)	**RTD**	92.14	93.29	92.57	94.99	90.68	93.61
	ETW	76.32	75.68	74.02	73.52	70.65	70.38
ILT Strength (ksi)	**CTD**	---	4.01	---	---	---	---
	RTD	---	3.82	---	---	---	---
	ETW	---	1.91	---	---	---	---
CAI Strength (ksi)	**RTD**	23.83	23.06	---	---	---	---

Table 2-2: Laminate Summary Data

2.3 Individual Test Summaries

2.3.1 Warp Tension Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Tension, 1-axis
Gr/ Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[0]12

Resin content: 41.16 % wt **Comp. density:** 1.207 [g/cc]
Fiber volume: 49.29 % vol
Ply count: 12
Test method: ASTM D3039M-08 **Modulus calculation:** 1000 to 3000 microstrain
Normalized by: 0.0085 in. CPT

		CTD		RTD		ETW			
Test Temperature [°F]		-65		70		180			
Moisture Conditioning		dry		dry		equilibrium			
Equilibrium at T, RH						160 F,85%			
Source code		TGJX XXXB		TGJX XXXA		TGJX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_1^{tu} (ksi)	**Mean**	129.00	127.21	130.41	126.33	135.15	132.02		
	Minimum	110.30	105.39	111.70	106.47	125.54	119.41		
	Maximum	143.11	149.49	145.93	141.51	146.53	146.14		
	C.V.(%)	7.60	9.52	6.92	6.89	4.02	5.48		
	No. Specimens	21		19		23			
	No. Prepreg Lots	3		3		3			
E_1^t (Msi)	**Mean**	8.76	8.62	8.94	8.66	8.85	8.64		
	Minimum	8.52	8.15	8.71	8.34	8.63	8.17		
	Maximum	9.25	9.08	9.80	9.34	9.08	9.22		
	C.V.(%)	1.84	2.57	2.63	2.74	1.30	2.94		
	No. Specimens	21		19		24			
	No. Prepreg Lots	3		3		3			
ν_{12}	**Mean**	0.039		0.040		0.042			
	No. Specimens	11		16		17			
	No. Prepreg Lots	3		3		3			

2.3.2 Fill Tension Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Resin content: 41.27 % wt **Comp. density:** 1.207 [g/cc]
Fiber volume: 49.36 % vol
Ply count: 12

Test method: ASTM D3039M-08 **Modulus calculation:** 1000 to 3000 microstrain

Normalized by: 0.0085 in. CPT

Tension, 2-axis
Gr/ Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[90]12

		CTD		RTD		ETW			
Test Temperature [°F]		-65		70		180			
Moisture Conditioning		dry		dry		equilibrium			
Equilibrium at T, RH						160 F,85%			
Source code		TGUX XXXB		TGUX XXXA		TGUX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_2^{tu} (ksi)	**Mean**	121.60	117.07	125.98	121.76	128.42	128.63		
	Minimum	95.39	91.02	113.22	109.24	117.41	117.22		
	Maximum	137.55	133.35	139.61	134.47	138.88	143.98		
	C.V.(%)	9.29	9.02	5.98	5.45	4.43	7.00		
	No. Specimens	19		18		20			
	No. Prepreg Lots	3		3		3			
E_2^t (Msi)	**Mean**	8.71	8.39	8.88	8.58	8.75	8.76		
	Minimum	7.98	7.75	8.38	8.09	8.38	8.19		
	Maximum	9.16	8.88	9.60	9.19	8.99	9.47		
	C.V.(%)	3.05	3.09	3.14	3.11	1.64	4.39		
	No. Specimens	19		19		20			
	No. Prepreg Lots	3		3		3			

2.3.3 Warp Compression Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Resin content: 38.72 % wt
Fiber volume: 51.67 % vol
Ply count: 12

Comp. density: 1.207 [g/cc]

Compression, 1-axis
Gr/ Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[0]12

Test method: ASTM D6641M-09

Modulus calculation: 1000 to 3000 microstrain

Normalized by: 0.0085 in. CPT

		CTD		RTD		ETD		ETW			
Test Temperature [°F]		-65		75		180		180			
Moisture Conditioning		dry		dry		dry		equilibrium			
Equilibrium at T, RH								160 F,85%			
Source code		TGLX XXXB		TGLX XXXA		TGLX XXXG		TGLX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_1^{cu} (ksi)	**Mean**	102.29	102.36	101.26	100.14	84.41	82.77	64.80	66.25		
	Minimum	85.03	87.25	93.49	93.56	78.75	77.06	52.21	55.08		
	Maximum	120.29	121.06	109.31	110.23	91.95	88.86	81.72	81.52		
	C.V.(%)	9.94	9.66	4.46	4.96	4.27	4.06	10.94	10.30		
	No. Specimens	20		19		20		23			
	No. Prepreg Lots	3		3		3		3			
E_1^c (Msi)	**Mean**	7.51	7.52	8.12	8.02	7.90	7.72	7.88	8.06		
	Minimum	5.33	5.35	6.89	6.98	6.69	6.49	7.14	7.56		
	Maximum	8.70	9.03	8.79	8.63	8.87	8.73	8.45	8.53		
	C.V.(%)	14.17	14.18	5.69	5.46	7.65	8.10	4.37	3.97		
	No. Specimens	20		25		21		25			
	No. Prepreg Lots	3		3		3		3			
ν_{12}	**Mean**	0.045		0.051		0.045		0.054			
	No. Specimens	15		23		20		17			
	No. Prepreg Lots	3		3		3		3			

2.3.4 Fill Compression Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Fill Compression, 2-axis
Gr/Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[90]12

Resin content: 41.73 % wt **Comp. density:** 1.207 [g/cc]
Fiber volume: 48.05 % vol
Ply count: 12

Test method: ASTM D6641M-09 **Modulus calculation:** 1000 to 3000 microstrain

Normalized by: 0.0085 in. CPT

		CTD		RTD		ETD		ETW	
Test Temperature [°F]		-65		70		180		180	
Moisture Conditioning		dry		dry		dry		equilibrium	
Equilibrium at T, RH								160 F,85%	
Source code		TGZX XXXB		TGZX XXXA		TGZX XXXG		TGZX XXXF	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_2^{cu} (ksi)	**Mean**	100.90	101.38	91.91	89.96	75.25	71.96	61.22	61.82
	Minimum	84.86	81.31	68.22	66.58	54.92	51.41	46.42	44.71
	Maximum	119.01	119.51	107.37	103.85	88.97	85.92	76.37	76.91
	C.V.(%)	11.07	11.44	14.22	14.43	16.14	17.28	12.76	13.64
	No. Specimens	18		21		19		22	
	No. Prepreg Lots	3		3		3		3	
E_2^c (Msi)	**Mean**	7.73	7.79	8.23	8.04	7.75	7.39	7.96	8.01
	Minimum	6.70	6.74	7.66	7.52	7.10	6.67	7.21	7.46
	Maximum	8.52	8.71	8.60	8.49	8.25	7.97	8.84	9.65
	C.V.(%)	7.38	7.97	3.26	3.19	3.84	4.66	4.78	6.11
	No. Specimens	20		23		21		26	
	No. Prepreg Lots	3		3		3		3	
ν21	**Mean**	0.059		0.049		0.041		0.042	
	No. Specimens	17		21		18		25	
	No. Prepreg Lots	3		3		3		3	

2.3.5 In-Plane Shear Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Resin content: 40.28 % w t
Comp. density: 1.207 [g/cc]
Fiber volume: 50.16 % vol
Ply count: 8
Test method: ASTM D3518-94
Modulus calculation: 2000 to 6000 microstrain
Normalized by: N/A

In-Plane Shear
Gr/ Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[45,-45]2S

		CTD		RTD		ETW			
Test Temperature [°F]		-65		70		180			
Moisture Conditioning		dry		dry		equilibrium			
Equilibrium at T, RH						160 F,85%			
Source code		TGNX XXXB		TGNX XXXA		TGNX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
$F_{12}^{s5\% \text{ strain}}$ (ksi)	**Mean**		13.72		9.87		5.08		
	Minimum		12.96		9.69		4.70		
	Maximum		14.78		10.19		5.40		
	C.V.(%)		4.71		1.58		4.36		
	No. Specimens	10		12		19			
	No. Prepreg Lots	2		2		3			
$F_{12}^{s0.2\%}$ (ksi)	**Mean**		7.69		5.72		3.10		
	Minimum		7.42		5.52		2.94		
	Maximum		8.26		6.08		3.29		
	C.V.(%)		2.81		2.57		3.28		
	No. Specimens	23		19		20			
	No. Prepreg Lots	3		3		3			
G_{12}^{s} (Msi)	**Mean**		0.60		0.52		0.32		
	Minimum		0.57		0.50		0.31		
	Maximum		0.64		0.56		0.34		
	C.V.(%)		3.23		2.71		3.11		
	No. Specimens	23		19		20			
	No. Prepreg Lots	3		3		3			

2.3.6 Unnotched Tension 1 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Unnotched Tension 1 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [45,0,-45,90]2S**	
Resin content:	42.00 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.56 % vol						
Ply count:	16						
Test method:	ASTM D3039M-08	**Modulus calculation:** 1000 to 3000 microstrain					
Normalized by:	0.0085	in. CPT					
		CTD		**RTD**		**ETW**	
Test Temperature [°F]		-65		70		180	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		TGAX XXXB		TGAX XXXA		TGAX XXXF	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	91.10	89.02	89.54	86.02	88.23	86.40
	Minimum	82.53	77.35	80.05	72.39	81.53	75.91
	Maximum	100.08	103.25	100.39	98.49	94.78	94.48
UNT1 Strength (ksi)	**C.V.(%)**	5.29	6.83	5.87	7.86	4.36	5.81
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
	Mean	6.15	6.01	6.10	5.85	5.82	5.70
	Minimum	5.99	5.62	5.93	5.41	5.27	5.19
	Maximum	6.43	6.37	6.25	6.13	6.00	6.07
UNT1 Modulus (Msi)	**C.V.(%)**	1.87	3.16	1.56	3.32	3.50	4.07
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.3.7 Unnotched Tension 2 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Unnotched Tension 2** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,-45,0,45,-45,45,-45,90,45,-45]S**	
Resin content:	41.41 % w t	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	49.29 % vol						
Ply count:	20						
Test method:	ASTM D3039M-08	**Modulus calculation:** 1000 to 3000 microstrain					
Normalized by:	0.0085	in. CPT					
		CTD		**RTD**		**ETW**	
Test Temperature [°F]		-65		70		180	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		TGBX XXXB		TGBX XXXA		TGBX XXXF	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	57.86	56.48	55.87	54.00	45.16	44.39
	Minimum	53.99	53.19	51.78	49.88	42.97	42.18
	Maximum	59.75	60.75	58.58	56.51	48.18	46.72
UNT2 Strength (ksi)	**C.V.(%)**	2.76	3.34	3.08	3.11	2.92	3.15
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	
	Mean	4.03	3.93	3.95	3.82	3.43	3.37
	Minimum	3.84	3.64	3.76	3.63	3.00	2.89
	Maximum	4.19	4.19	4.06	3.93	3.67	3.71
UNT2 Modulus (Msi)	**C.V.(%)**	2.17	3.38	2.08	2.28	5.17	5.91
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.3.8 Unnotched Tension 3 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Unnotched Tension 3 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [0,90,0,45,90,0,90,-45,90,0,90,45,0,90,0]**	
Resin content:	41.59 % w t		**Comp. density:** 1.207 [g/cc]				
Fiber volume:	48.98 % vol						
Ply count:	15						
Test method:	ASTM D3039M-08		**Modulus calculation:** 1000 to 3000 microstrain				
Normalized by:	0.0085	in. CPT					
			CTD		**RTD**		**ETW**	
Test Temperature [°F]			-65		70		180	
Moisture Conditioning			dry		dry		equilibrium	
Equilibrium at T, RH							160 F,85%	
Source code			TGCX XXXB		TGCX XXXA		TGCX XXXF	
			Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		112.04	110.38	116.03	113.07	106.21	104.54
	Minimum		100.16	100.11	105.20	102.31	92.71	92.20
	Maximum		119.06	119.28	125.34	123.52	118.04	118.97
UNT3 Strength (ksi)	**C.V.(%)**		5.09	5.65	4.53	5.08	7.00	7.58
	No. Specimens		18		18		18	
	No. Prepreg Lots		3		3		3	
	Mean		7.77	7.65	7.86	7.66	7.70	7.58
	Minimum		7.58	7.21	7.57	7.39	7.43	7.24
	Maximum		8.12	8.00	8.17	7.98	7.86	8.07
UNT3 Modulus (Msi)	**C.V.(%)**		1.75	3.05	2.05	2.45	1.78	3.20
	No. Specimens		18		18		19	
	No. Prepreg Lots		3		3		3	

2.3.9 Unnotched Compression 1 Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Resin content: 41.94 % wt **Comp. density:** 1.207 [g/cc]
Fiber volume: 48.08 % vol
Ply count: 16

Unnotched Compression 1
Gr/ Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[45,0,-45,90]2S

Test method: ASTM D6641-09 **Modulus calculation:** 1000 to 3000 microstrain

Normalized by: 0.0085 in. CPT

		RTD		ETW			
Test Temperature [°F]		70		180			
Moisture Conditioning				equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TG0X XXXA		TG0X XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
UNC1 Strength (ksi)	**Mean**	83.05	81.97	50.82	51.84		
	Minimum	69.08	68.90	40.72	40.97		
	Maximum	91.94	89.62	62.14	63.74		
	C.V.(%)	7.52	6.66	11.14	11.53		
	No. Specimens	19		20			
	No. Prepreg Lots	3		3			
UNC1 Modulus (Msi)	**Mean**	5.81	5.74	5.52	5.64		
	Minimum	5.07	5.29	4.88	5.14		
	Maximum	6.40	6.21	6.18	6.25		
	C.V.(%)	5.79	4.09	6.32	4.91		
	No. Specimens	18		18			
	No. Prepreg Lots	3		3			

***The resin content, fiber volume and comp. density did not include UNC1-B-C1**

2.3.10 Unnotched Compression 2 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Unnotched Compression 2** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,-45,0,45,-45,45,-45,90,45,-45]S**	
Resin content:	42.16 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.23 % vol						
Ply count:	20						
Test method:	ASTM D6641-09	**Modulus calculation:** 1000 to 3000 microstrain					
Normalized by:	0.0085	in. CPT					
		RTD		**ETW**			
Test Temperature [°F]		70		180			
Moisture Conditioning				equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TGXX XXXA		TGXX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	51.56	51.10	28.73	29.17		
	Minimum	40.61	39.93	24.31	24.06		
	Maximum	56.88	56.50	32.57	33.33		
UNC2	**C.V.(%)**	8.07	8.46	6.76	7.84		
Strength (ksi)							
	No. Specimens	19		19			
	No. Prepreg Lots	3		3			
	Mean	3.82	3.78	3.36	3.41		
	Minimum	3.43	3.41	3.12	3.17		
	Maximum	4.07	4.11	3.70	3.76		
UNC2	**C.V.(%)**	4.28	4.97	4.86	5.42		
Modulus (Msi)							
	No. Specimens	19		18			
	No. Prepreg Lots	3		3			

2.3.11 Unnotched Compression 3 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Unnotched Compression 3 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [0,90,45,0,90,0,90,-45,0,90]S**	
Resin content:	42.44 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.04 % vol						
Ply count:	20						
Test method:	ASTM D6641-09	**Modulus calculation:** 1000 to 3000 microstrain					
Normalized by:	0.0085	in. CPT					
		RTD		**ETW**			
Test Temperature [°F]		70		180			
Moisture Conditioning				equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TGYX XXXA		TGYX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	86.42	85.18	61.90	62.48		
	Minimum	73.70	71.99	53.59	54.74		
	Maximum	92.63	94.20	68.68	70.71		
UNC3	**C.V.(%)**	5.30	6.13	8.12	8.11		
Strength (ksi)							
	No. Specimens	18		18			
	No. Prepreg Lots	3		3			
	Mean	7.35	7.25	7.07	7.14		
	Minimum	6.75	6.86	6.71	6.66		
	Maximum	8.11	8.01	7.66	7.89		
UNC3	**C.V.(%)**	4.39	3.86	3.28	4.40		
Modulus (Msi)							
	No. Specimens	19		18			
	No. Prepreg Lots	3		3			

2.3.12 Laminate Short Beam Strength Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Short Beam Strength 1 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [45,0,-45,90]2S**	
Resin content:	41.94 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.08 % vol						
Ply count:	16						
Test method:	ASTM D2344M-00^{E1}						
Normalized by:	N/A						
		RTD		**ETW**			
Test Temperature [°F]		70		180			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TGqX XXXA		TGqX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
SBS1 (ksi)	**Mean**		9.30		4.51		
	Minimum		8.29		3.96		
	Maximum		10.23		5.09		
	C.V.(%)		5.69		8.02		
	No. Specimens		16		16		
	No. Prepreg Lots		3		3		

NOTE: ALL SBS1 specimens are machined from UNC1's panel

2.3.13 Lamina Short Beam Strength Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Resin content: 41.54 % wt
Fiber volume: 49.06 % vol
Ply count: 32

Comp. density: 1.207 [g/cc]

Test method: ASTM D2344M-00^{E1}

Normalized by: N/A

Short Beam Strength
Gr/Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[0]32

		CTD		RTD		ETD		ETW			
Test Temperature [°F]		-65		70		180		180			
Moisture Conditioning		dry		dry		dry		equilibrium			
Equilibrium at T, RH								160 F,85%			
Source code		TGQX XXXB		TGQX XXXA		TGQX XXXG		TGQX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
SBS Strength (ksi)	**Mean**		10.44		9.36		6.77		4.36		
	Minimum		8.99		8.37		6.19		3.72		
	Maximum		12.10		10.02		7.37		4.94		
	C.V.(%)		8.03		4.82		5.05		7.73		
	No. Specimens	18		18		18		22			
	No. Prepreg Lots	3		3		3		3			

2.3.14 Open Hole Tension 1 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC						**Open Hole Tension 1** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,0,-45,90]2S**		
Resin content:	42.43 % w t	**Comp. density:** 1.207 [g/cc]							
Fiber volume:	48.23 % vol								
Ply count:	16								
Test method:	ASTM D5766M-07								
Normalized by:	0.0085	in. CPT							
		CTD		**RTD**		**ETW**			
Test Temperature [°F]		-65		70		180			
Moisture Conditioning		dry		dry		equilibrium			
Equilibrium at T, RH						160 F,85%			
Source code		TGDX XXXB		TGDX XXXA		TGDX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	48.65	47.09	49.32	46.76	52.08	50.02		
	Minimum	44.61	41.76	47.47	44.39	48.84	47.23		
	Maximum	52.50	51.76	51.60	49.42	55.87	53.69		
OHT1	**C.V.(%)**	3.75	4.67	2.56	3.02	3.63	3.68		
Strength (ksi)									
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			

2.3.15 Open Hole Tension 2 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC						**Open Hole Tension 2** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,-45,0,45,-45,45,-45,90,45,-45]S**		
Resin content:	41.64 % w t	**Comp. density:** 1.207 [g/cc]							
Fiber volume:	48.88 % vol								
Ply count:	20								
Test method:	ASTM D5766M-07								
Normalized by:	0.0085	in. CPT							
		CTD		**RTD**		**ETW**			
Test Temperature [°F]		-65		70		180			
Moisture Conditioning		dry		dry		equilibrium			
Equilibrium at T, RH						160 F,85%			
Source code		TGEX XXXB		TGEX XXXA		TGEX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	43.36	41.86	40.16	38.55	31.92	30.66		
	Minimum	41.29	38.99	37.52	36.09	30.52	29.27		
	Maximum	45.91	44.46	42.79	40.59	32.97	32.07		
OHT2	**C.V.(%)**	3.41	3.13	3.50	3.32	2.42	2.61		
Strength (ksi)									
	No. Specimens	18		18		18			
	No. Prepreg Lots	3		3		3			

2.3.16 Open Hole Tension 3 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC							**Open Hole Tension 3** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[0,90,0,45,90,0,90,-45,90,0,90,45,0,90,0]**	
Resin content:	41.11 % w t	**Comp. density:** 1.207 [g/cc]							
Fiber volume:	49.30 % vol								
Ply count:	15								
Test method:	ASTM D5766M-07								
Normalized by:	0.0085	in. CPT							
		CTD		**RTD**		**ETW**			
Test Temperature [°F]		-65		70		180			
Moisture Conditioning		dry		dry		equilibrium			
Equilibrium at T, RH						160 F,85%			
Source code		TGFX XXXB		TGFX XXXA		TGFX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	55.09	54.05	57.11	55.05	67.11	65.50		
	Minimum	48.85	47.58	50.78	50.45	58.94	60.52		
	Maximum	65.34	64.57	62.82	60.47	72.55	71.01		
OHT3	**C.V.(%)**	6.28	6.80	6.82	6.01	5.11	4.58		
Strength (ksi)									
	No. Specimens	19		18		18			
	No. Prepreg Lots	3		3		3			

2.3.17 Filled-Hole Tension 1 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Filled Hole Tension 1** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,0,-45,90]2S**	
Resin content:	41.97 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.67 % vol						
Ply count:	16						
Test method:	ASTM D6742M-07						
Normalized by:	0.0085	in. CPT					
		CTD		**RTD**		**ETW**	
Test Temperature [°F]		-65		70		180	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		TG4X XXXB		TG4X XXXA		TG4X XXXF	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	53.24	51.66	53.25	51.03	52.92	50.78
	Minimum	50.38	48.54	50.20	47.61	50.05	47.68
	Maximum	56.05	54.50	55.21	52.92	55.10	53.26
FHT1	**C.V.(%)**	2.66	2.93	2.65	2.89	2.63	2.82
Strength (ksi)							
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.3.18 Filled-Hole Tension 2 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Filled Hole Tension 2** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,-45,0,45,-45,45,-45,90,45,-45]S**	
Resin content:	42.63 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.08 % vol						
Ply count:	20						
Test method:	ASTM D6742M-07						
Normalized by:	0.0085	in. CPT					
		CTD		**RTD**		**ETW**	
Test Temperature [°F]		-65		70		180	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		TG5X XXXB		TG5X XXXA		TG5X XXXF	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	48.34	46.68	44.14	42.03	33.31	31.95
	Minimum	46.27	43.55	40.47	38.45	32.12	30.83
	Maximum	50.67	48.84	47.20	44.74	34.85	33.58
FHT2	**C.V.(%)**	2.33	3.05	3.34	3.20	2.51	2.61
Strength (ksi)							
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.3.19 Filled-Hole Tension 3 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Filled Hole Tension 3 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [0,90,0,45,90,0,90,-45,90,0,90,45,0,90,0]**	
Resin content:	42.33 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.25 % vol						
Ply count:	15						
Test method:	ASTM D6742M-07						
Normalized by:	0.0085	in. CPT					
		CTD		**RTD**		**ETW**	
Test Temperature [°F]		-65		70		180	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		TG6X XXXB		TG6X XXXA		TG6X XXXF	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	58.60	57.02	59.99	57.56	62.27	60.15
	Minimum	53.75	52.81	54.44	51.72	57.06	54.18
	Maximum	62.53	61.84	65.29	62.64	65.27	64.25
FHT3	**C.V.(%)**	4.07	4.40	5.04	5.76	3.76	4.58
Strength (ksi)							
	No. Specimens	18		18		18	
	No. Prepreg Lots	3		3		3	

2.3.20 Open Hole Compression 1 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Open Hole Compression 1** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,0,-45,90,45,0,-45,90,-45,90]S**	
Resin content:	41.72 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.91 % vol						
Ply count:	20						
Test method:	ASTM D6484M-04						
Normalized by:	0.0085	in. CPT					
		RTD		**ETW**			
Test Temperature [°F]		70		180			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TGGX XXXA		TGGX XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	43.48	41.98	28.65	27.98		
	Minimum	40.95	38.63	25.37	25.31		
	Maximum	46.03	43.96	31.69	30.97		
OHC1	**C.V.(%)**	3.39	3.38	5.19	5.40		
Strength (ksi)							
	No. Specimens	18		19			
	No. Prepreg Lots	3		3			

2.3.21 Open Hole Compression 2 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Open Hole Compression 2 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [45,-45,0,45,-45,45,-45,90,45,-45]S**	
Resin content:	41.22 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	49.40 % vol						
Ply count:	20						
Test method:	ASTM D6484M-04						
Normalized by:	0.0085	in. CPT					
			RTD		**ETW**		
Test Temperature [°F]			70		180		
Moisture Conditioning			dry		equilibrium		
Equilibrium at T, RH					160 F,85%		
Source code			TGHX XXXA		TGHX XXXF		
			Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		35.05	33.97	23.92	23.42		
	Minimum		33.01	32.21	22.61	22.02		
	Maximum		37.75	36.19	25.15	24.99		
OHC2 Strength (ksi)	**C.V.(%)**		3.50	3.14	3.23	3.21		
	No. Specimens		18		18			
	No. Prepreg Lots		3		3			

2.3.22 Open Hole Compression 3 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Open Hole Compression 3 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [0,90,45,90,0,0,90,-45,90,0]S**	
Resin content:	42.47 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.20 % vol						
Ply count:	20						
Test method:	ASTM D6484M-04						
Normalized by:	0.0085	in. CPT					
			RTD		**ETW**		
Test Temperature [°F]			70		180		
Moisture Conditioning			dry		equilibrium		
Equilibrium at T, RH					160 F,85%		
Source code			TGIX XXXA		TGIX XXXF		
			Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		46.73	45.12	32.38	31.59		
	Minimum		43.18	41.57	29.07	28.36		
	Maximum		50.12	47.62	36.87	36.76		
OHC3 Strength (ksi)	**C.V.(%)**		4.24	4.23	5.26	5.97		
	No. Specimens		18		18			
	No. Prepreg Lots		3		3			

2.3.23 Filled-Hole Compression 1 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Filled Hole Compression 1** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,0,-45,90,45,0,-45,90,-45,90]S**	
Resin content:	41.13 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	49.48 % vol						
Ply count:	20						
Test method:	ASTM D6742M-04						
Normalized by:	0.0085	in. CPT					
			RTD		**ETW**		
Test Temperature [°F]			70		180		
Moisture Conditioning			dry		equilibrium		
Equilibrium at T, RH					160 F,85%		
Source code			TG7X XXXA		TG7X XXXF		
			Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		70.82	67.86	45.81	44.37		
	Minimum		65.05	63.32	39.43	38.12		
	Maximum		76.76	75.64	50.71	48.87		
FHC1	**C.V.(%)**		4.98	4.86	6.34	6.23		
Strength (ksi)								
	No. Specimens		18		17			
	No. Prepreg Lots		3		3			

2.3.24 Filled-Hole Compression 2 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Filled Hole Compression 2** **Gr/ Ep** **TCAC 12k HTS40 / TC250 - 42% RC** **PLAIN WEAVE** **[45,-45,0,45,-45,45,-45,90,45,-45]S**	
Resin content:	41.94 % wt	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	48.57 % vol						
Ply count:	20						
Test method:	ASTM D6742M-07						
Normalized by:	0.0085	in. CPT					
		RTD		**ETW**			
Test Temperature [°F]		70		180			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TG8X XXXA		TG8X XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	50.41	48.68	31.83	30.75		
	Minimum	43.21	40.37	26.99	25.05		
	Maximum	54.77	52.78	35.92	34.45		
FHC2	**C.V.(%)**	5.89	6.45	8.78	9.03		
Strength (ksi)							
	No. Specimens	16		18			
	No. Prepreg Lots	3		3			

2.3.25 Filled-Hole Compression 3 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Filled Hole Compression 3 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [0,90,45,90,0,0,90,-45,90,0]S**	
Resin content:	41.43 % w t	**Comp. density:** 1.207 [g/cc]					
Fiber volume:	49.03 % vol						
Ply count:	20						
Test method:	ASTM D6742M-07						
Normalized by:	0.0085	in. CPT					
		RTD		**ETW**			
Test Temperature [°F]		70		180			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TG9X XXXA		TG9X XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	72.37	70.13	47.83	46.08		
	Minimum	67.50	66.57	42.29	41.12		
	Maximum	77.91	77.21	53.26	52.52		
FHC3	**C.V.(%)**	4.43	4.63	5.86	6.20		
Strength (ksi)							
	No. Specimens	18		18			
	No. Prepreg Lots	3		3			

2.3.26 Single Shear Bearing 1 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Single Shear Bearing 1 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [45,0,-45,90]S**	
Resin content:	39.45 % w t	**Comp. density:**	1.207 [g/cc]				
Fiber volume:	51.03 % vol						
Ply count:	8						
Test method:	ASTM D5961-08						
Normalized by:	0.0085	in. CPT					
			RTD		**ETW**		
Test Temperature [°F]			70		180		
Moisture Conditioning			dry		equilibrium		
Equilibrium at T, RH					160 F,85%		
Source code			TG1X XXXA		TG1X XXXF		
			Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		114.08	116.88	92.35	91.91		
	Minimum		106.53	105.69	74.48	83.51		
	Maximum		123.11	127.10	99.82	100.58		
SSB1	**C.V.(%)**		5.46	6.31	6.40	5.75		
Ultimate Strength								
(ksi)	**No. Specimens**		6		18			
	No. Prepreg Lots		1		3			
	Mean		92.14	93.29	76.32	75.68		
	Minimum		81.88	86.01	64.10	66.23		
	Maximum		107.17	106.36	89.29	88.81		
SSB1	**C.V.(%)**		7.90	6.28	9.29	8.73		
2% offset Strength								
(ksi)	**No. Specimens**		18		19			
	No. Prepreg Lots		3		3			

2.3.27 Single Shear Bearing 2 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Single Shear Bearing 2 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [45,-45,90,45,-45]S**	
Resin content:	39.54 % wt	**Comp. density:**	1.207 [g/cc]				
Fiber volume:	51.10 % vol						
Ply count:	10						
Test method:	ASTM D5961-08						
Normalized by:	0.0085	in. CPT					
		RTD		**ETW**			
Test Temperature [°F]		70		180			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		TG2X XXXA		TG2X XXXF			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	114.94	122.80	95.22	94.62		
	Minimum	109.56	116.54	86.14	85.12		
	Maximum	118.52	129.09	103.76	106.74		
SSB2	**C.V.(%)**	2.88	3.09	4.90	5.68		
Ultimate Strength							
(ksi)	**No. Specimens**	7		18			
	No. Prepreg Lots	1		3			
	Mean	92.57	94.99	74.02	73.52		
	Minimum	76.88	72.92	62.54	64.34		
	Maximum	106.86	113.72	84.63	85.98		
SSB2	**C.V.(%)**	10.16	9.30	8.98	8.97		
2% offset Strength							
(ksi)	**No. Specimens**	20		18			
	No. Prepreg Lots	3		3			

2.3.28 Single Shear Bearing 3 Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Single Shear Bearing 3 Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [0,90,45,0,90]S**	
Resin content:	40.37 % w t		**Comp. density:** 1.207 [g/cc]				
Fiber volume:	49.93 % vol						
Ply count:	10						
Test method:	ASTM D5961-08						
Normalized by:	0.0085	in. CPT					
			RTD		**ETW**		
Test Temperature [°F]			70		180		
Moisture Conditioning			dry		equilibrium		
Equilibrium at T, RH					160 F,85%		
Source code			TG3X XXXA		TG3X XXXF		
			Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		106.38	108.40	83.04	82.80		
	Minimum		100.31	104.00	75.18	73.64		
	Maximum		116.65	112.41	93.63	92.12		
SSB3 Ultimate Strength	**C.V.(%)**		6.27	3.69	6.04	6.20		
(ksi)	**No. Specimens**		6		18			
	No. Prepreg Lots		1		3			
	Mean		90.68	93.61	70.65	70.38		
	Minimum		78.45	80.21	54.14	56.58		
	Maximum		101.57	105.59	80.00	84.05		
SSB3 2% offset Strength	**C.V.(%)**		6.42	7.04	9.90	9.33		
(ksi)	**No. Specimens**		19		18			
	No. Prepreg Lots		3		3			

2.3.29 Compression after Impact Properties

Material:	TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC					**Compression After Impact Gr/ Ep TCAC 12k HTS40 / TC250 - 42% RC PLAIN WEAVE [45,0,-45,90]3S**	
Resin content:	41.60 % wt		**Comp. density:**	1.207 [g/cc]			
Fiber volume:	48.58 % vol						
Ply count:	24						
Test method:	ASTM D 7136/ 7137M - 05^{E1}						
Normalized by:	0.0085	in. CPT					
			RTD				
Test Temperature [°F]			70				
Moisture Conditioning			dry				
Equilibrium at T, RH							
Source code			TGKX XXXA				
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	23.83	23.06				
	Minimum	22.80	22.08				
	Maximum	25.32	24.48				
CAI	**C.V.(%)**	4.41	4.13				
Strength (ksi)							
	No. Specimens		6				
	No. Prepreg Lots		1				

2.3.30 Interlaminar Tension Properties

Material: TenCate Advanced Composites - TCAC 12k HTS40 / TC250 - 42% RC

Resin content: 43.30 % wt **Comp. density:** 1.205 [g/cc]
Fiber volume: 47.30 % vol
Ply count: 21

Test method: ASTM D6415-06^{E1}

Normalized by: N/A

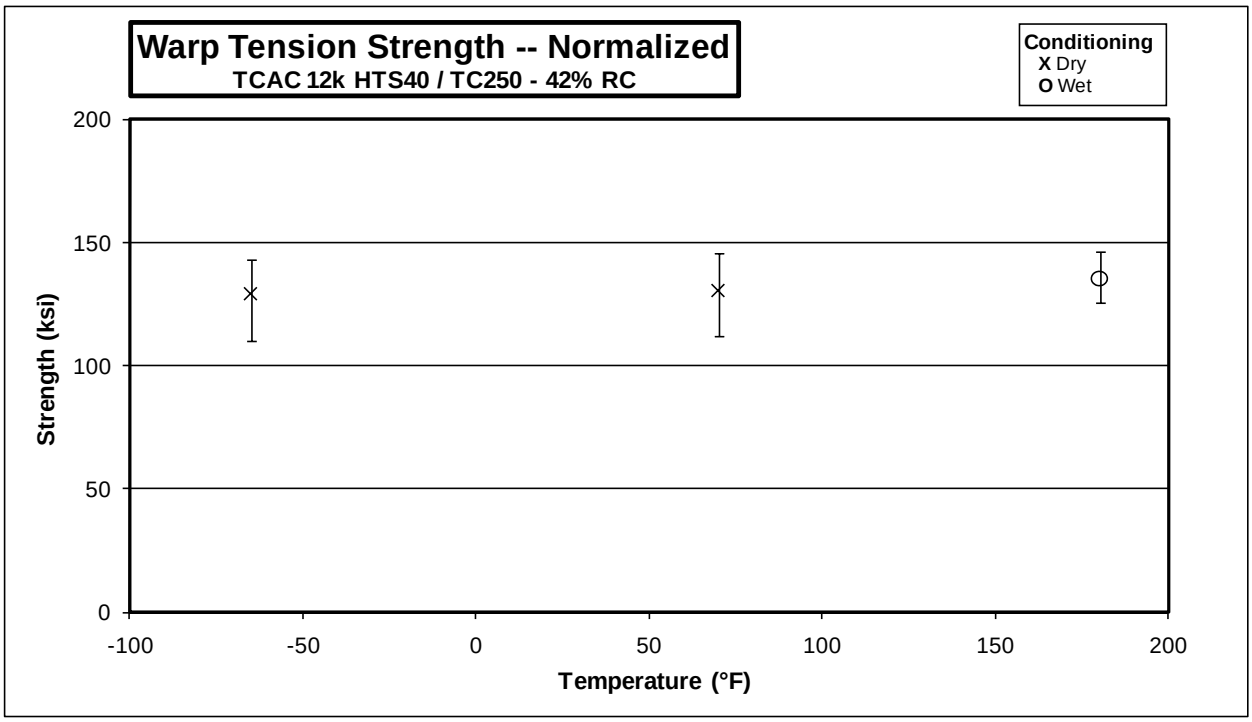
Interlaminar Tension
Gr/Ep
TCAC 12k HTS40 / TC250 - 42% RC
PLAIN WEAVE
[0]21

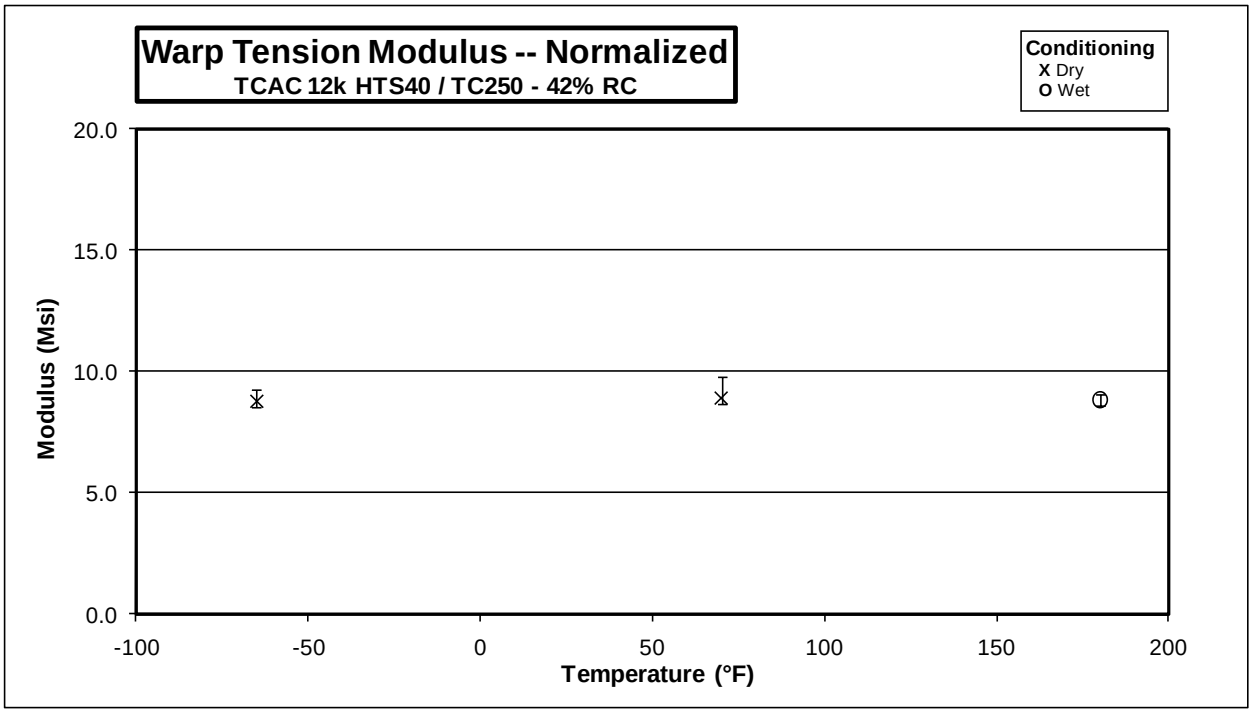
		RTD		CTD		ETW	
Test Temperature [°F]		70		-65		180	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		TGMX XXXA		TGMX XXXB		TGMX XXXF	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
ILT Strength (ksi)	**Mean**		3.82		4.01		1.91
	Minimum		3.03		3.44		1.44
	Maximum		4.53		4.73		2.29
	C.V.(%)		17.35		11.71		13.14
	No. Specimens	6		6		8	
	No. Prepreg Lots	1		1		1	

3 Individual Test Charts

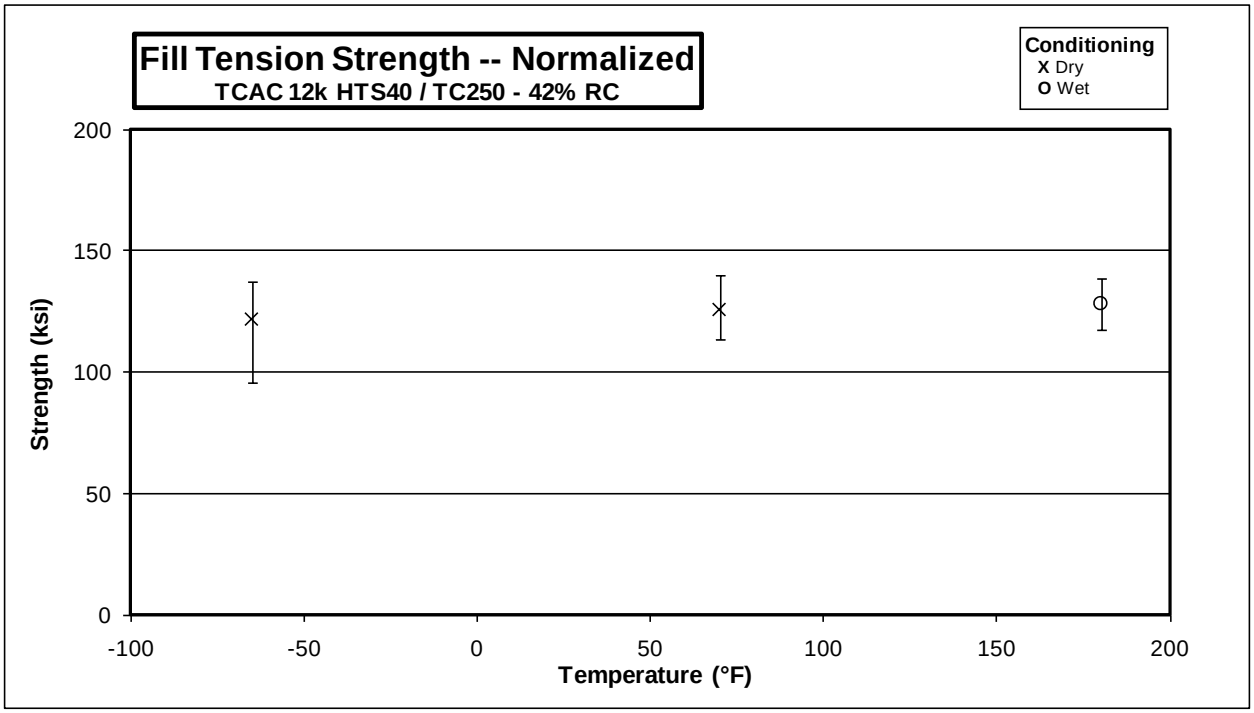
These charts combine all batches of data and plot the minimum and maximum modulus and strength range based on the test temperature.

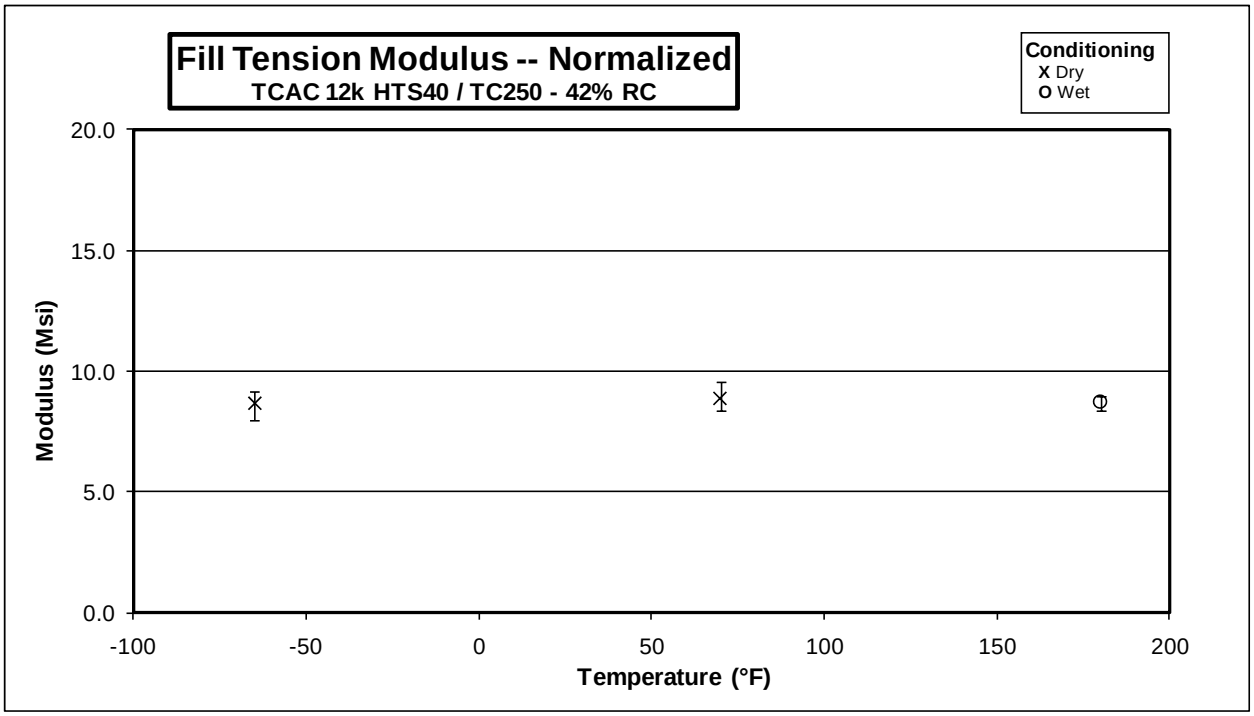
3.1 Warp Tension Properties



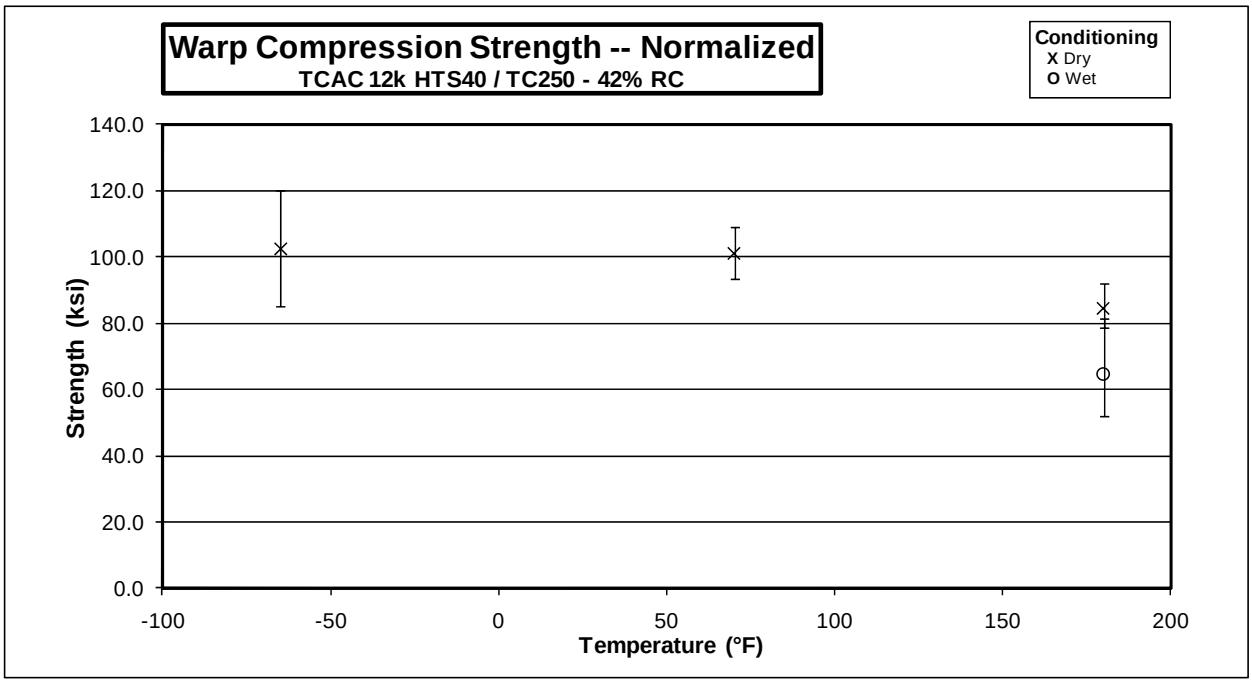


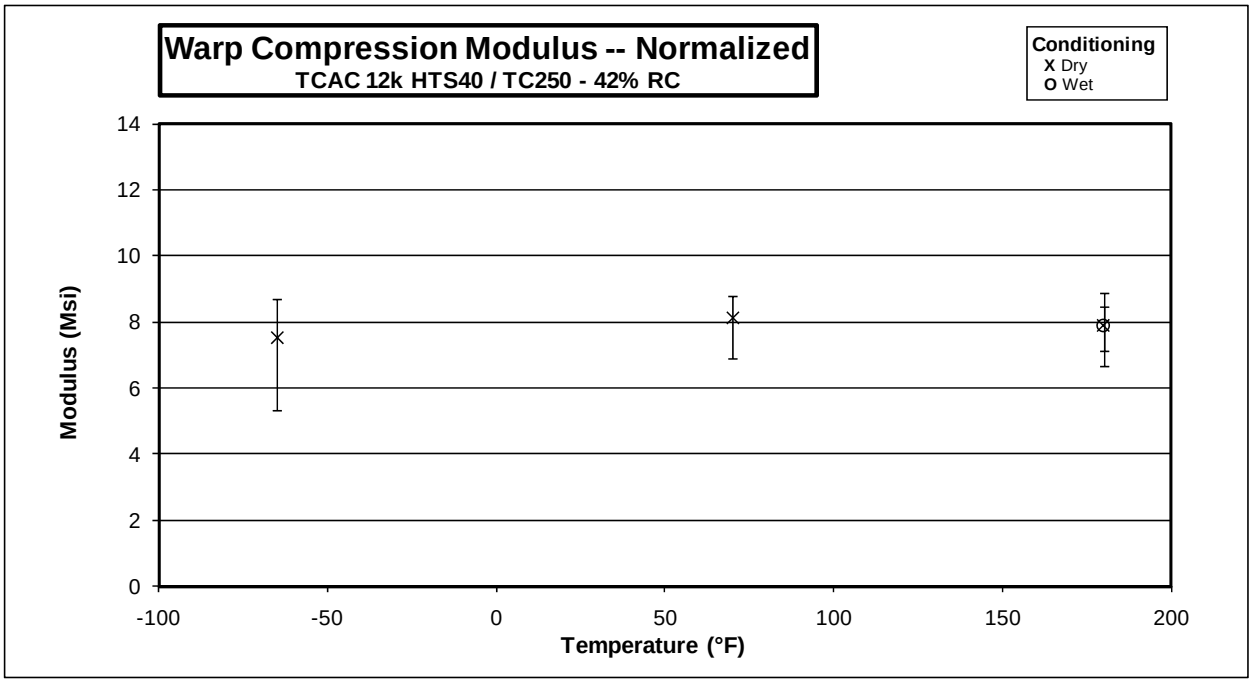
3.2 Fill Tension Properties



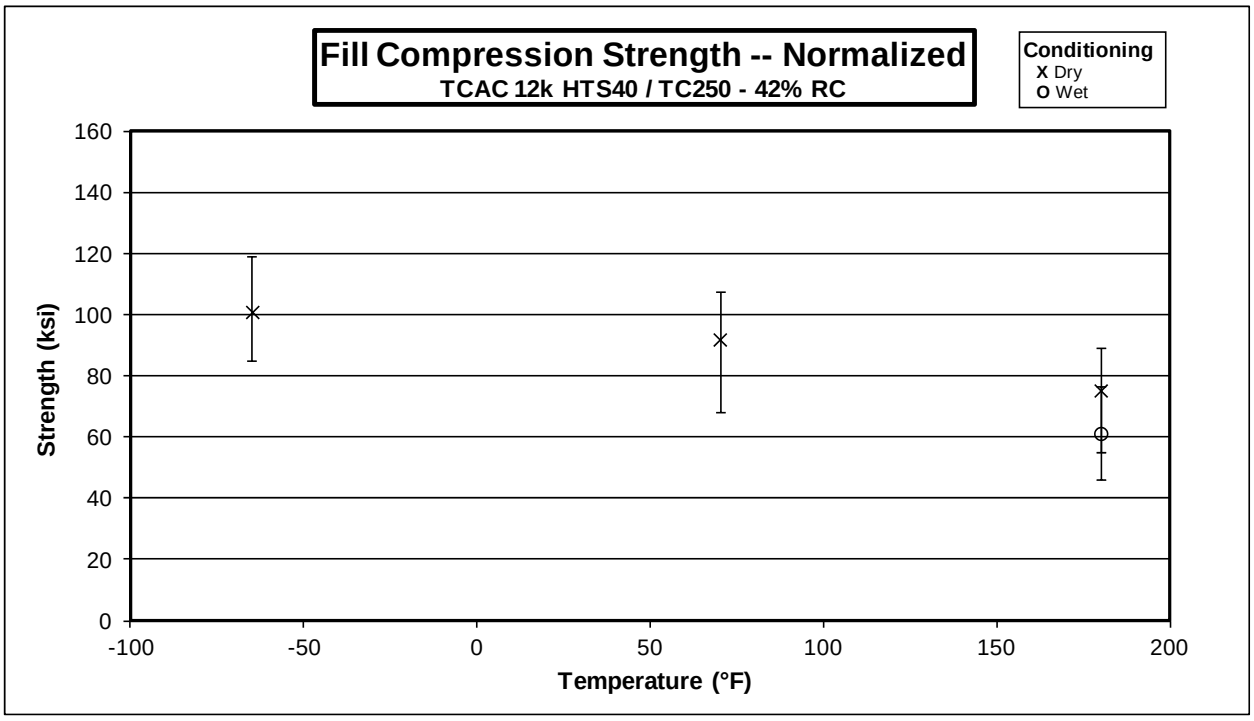


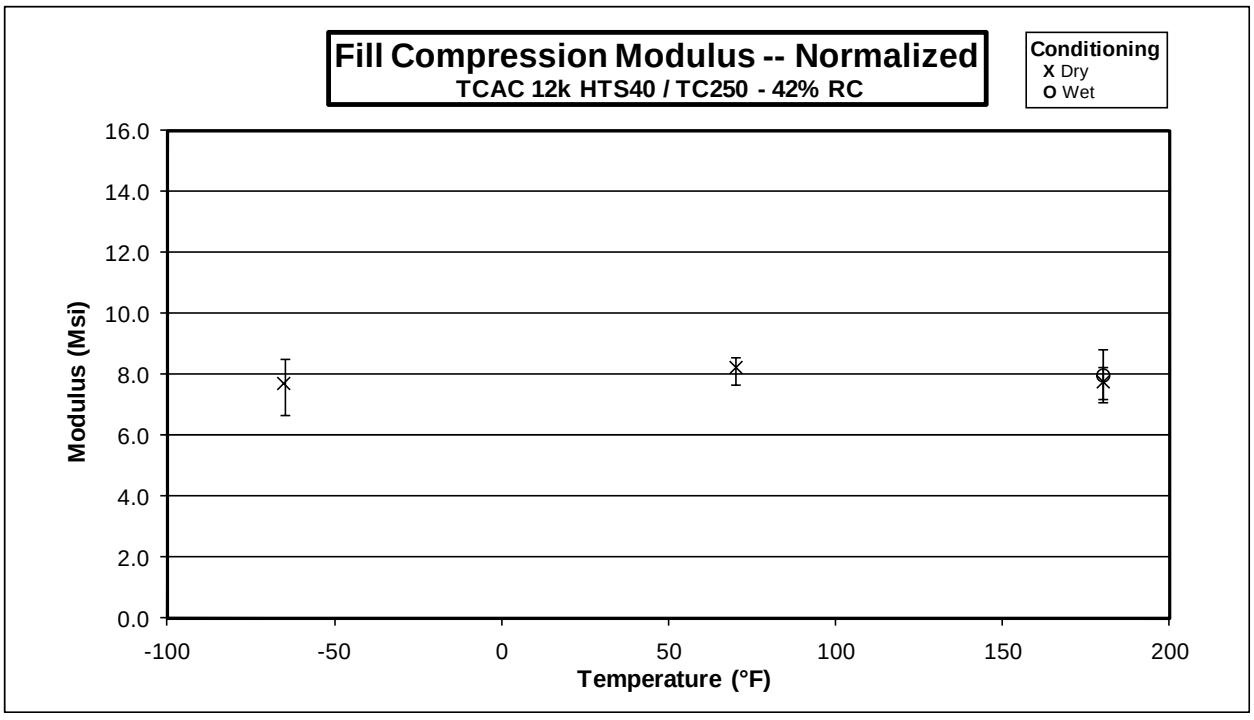
3.3 Warp Compression Properties



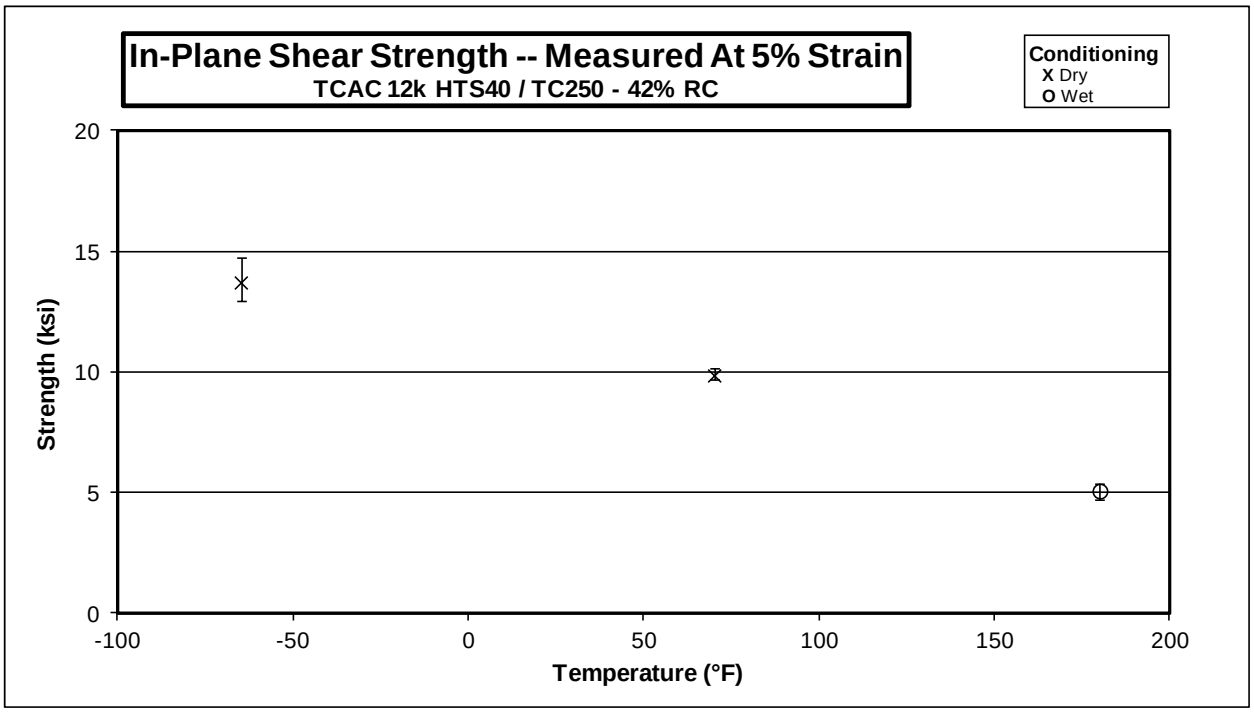


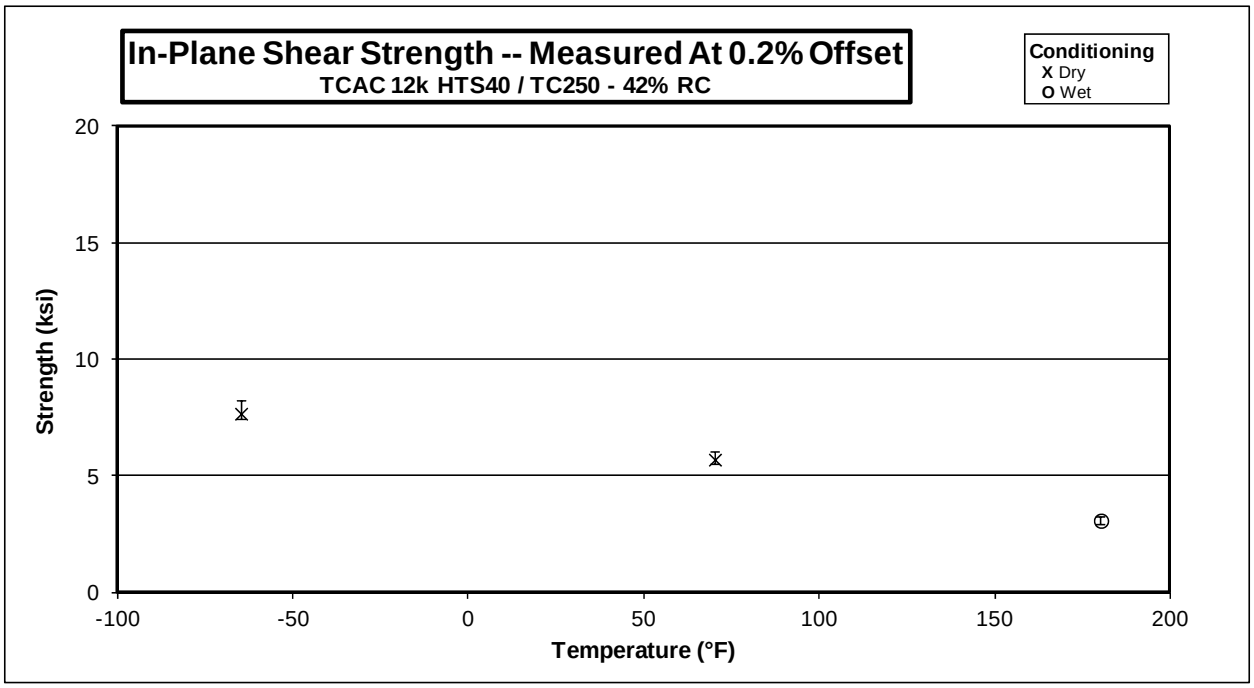
3.4 Fill Compression Properties

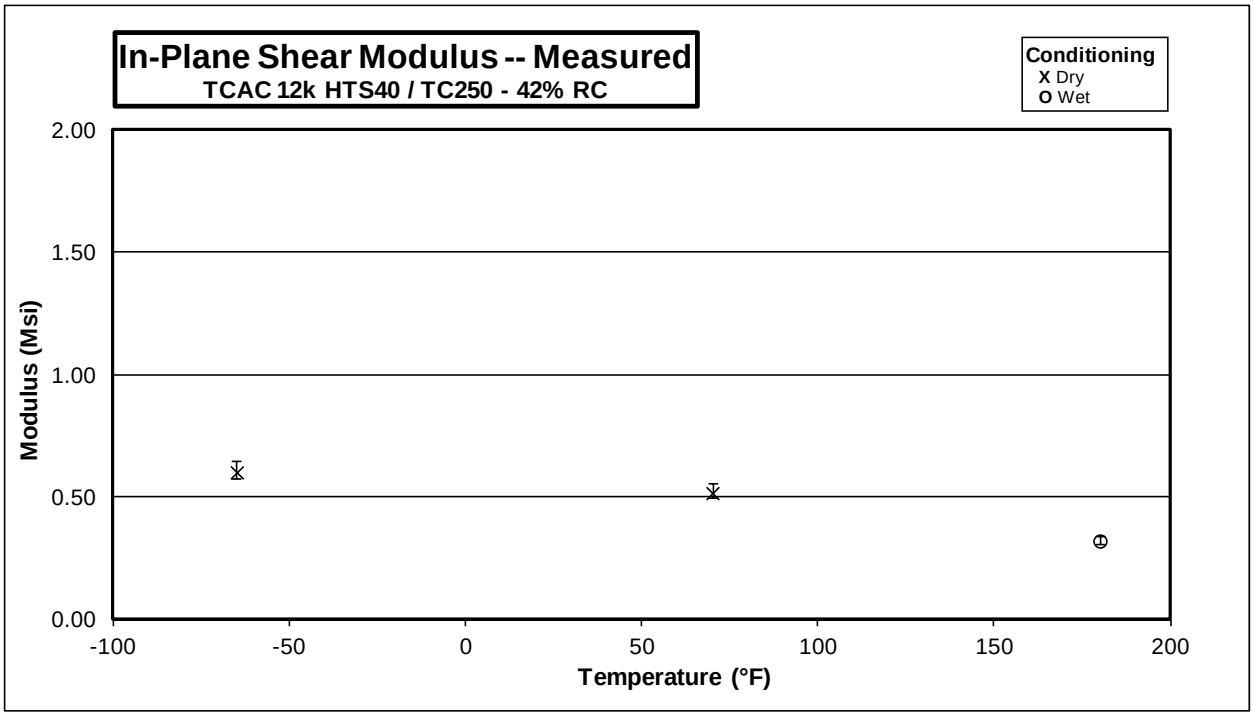




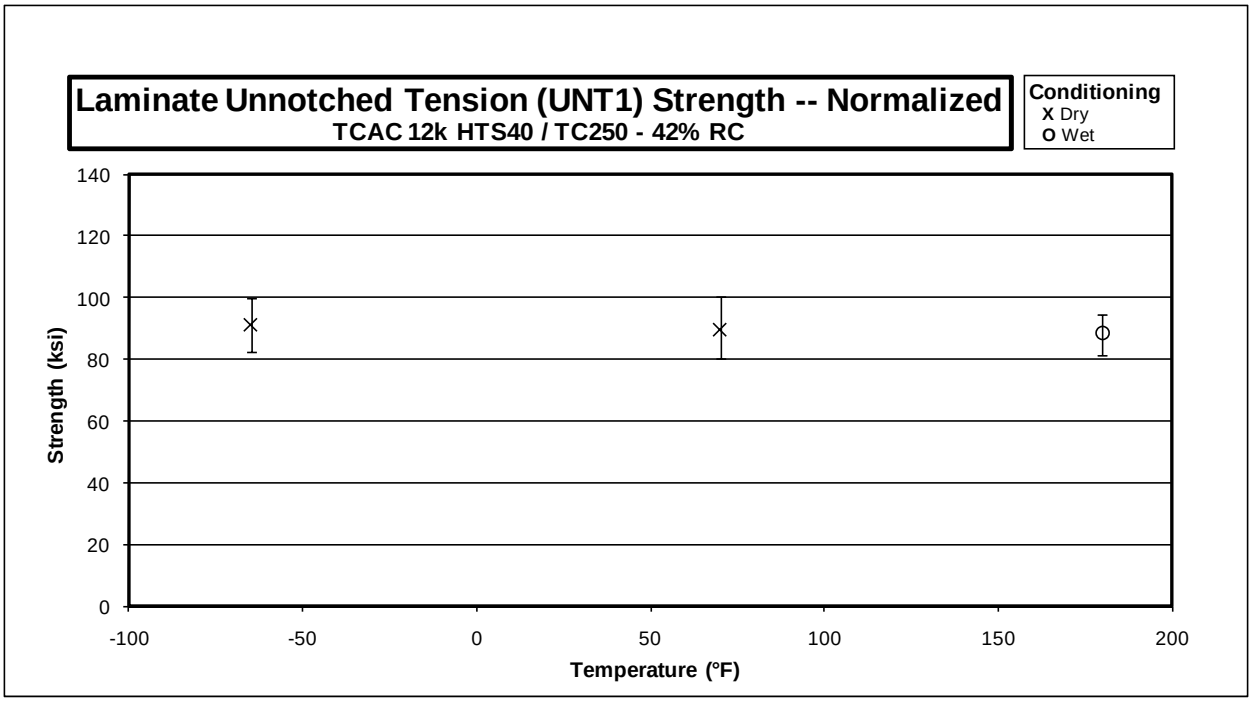
3.5 In-Plane Shear Properties

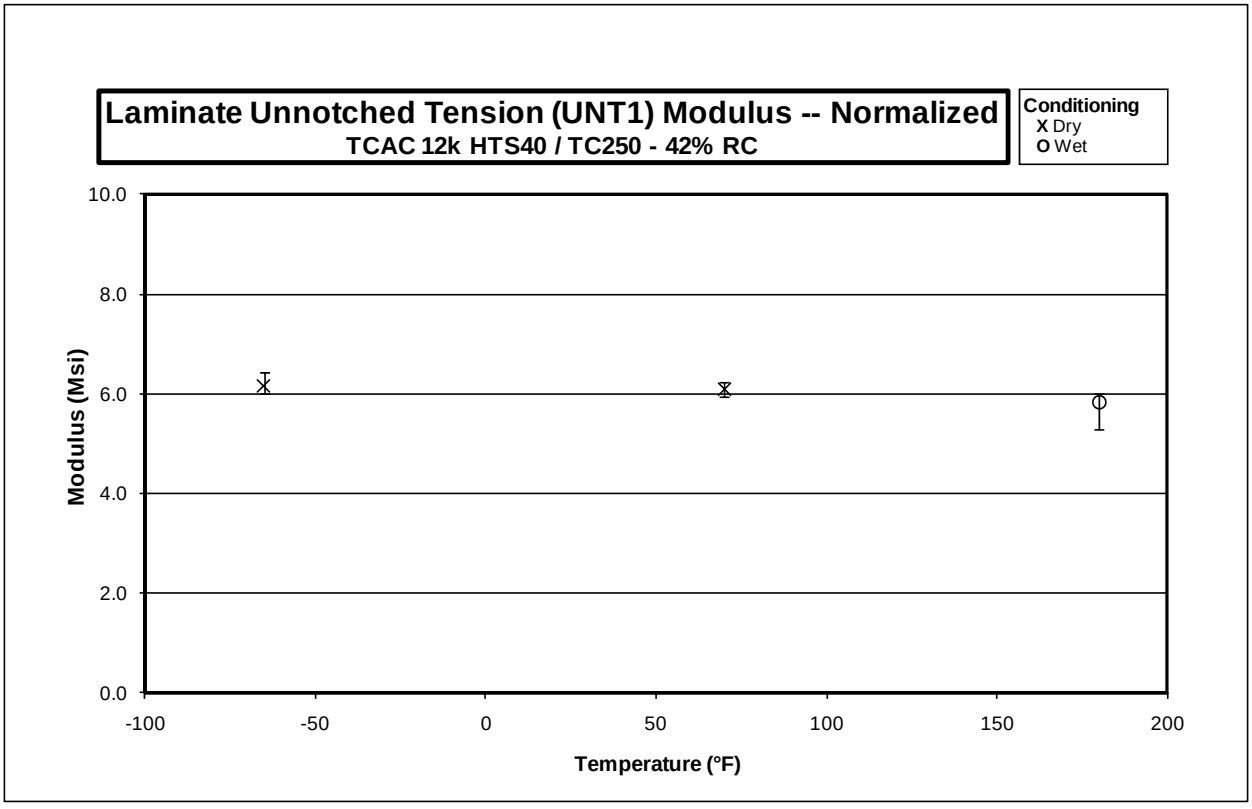




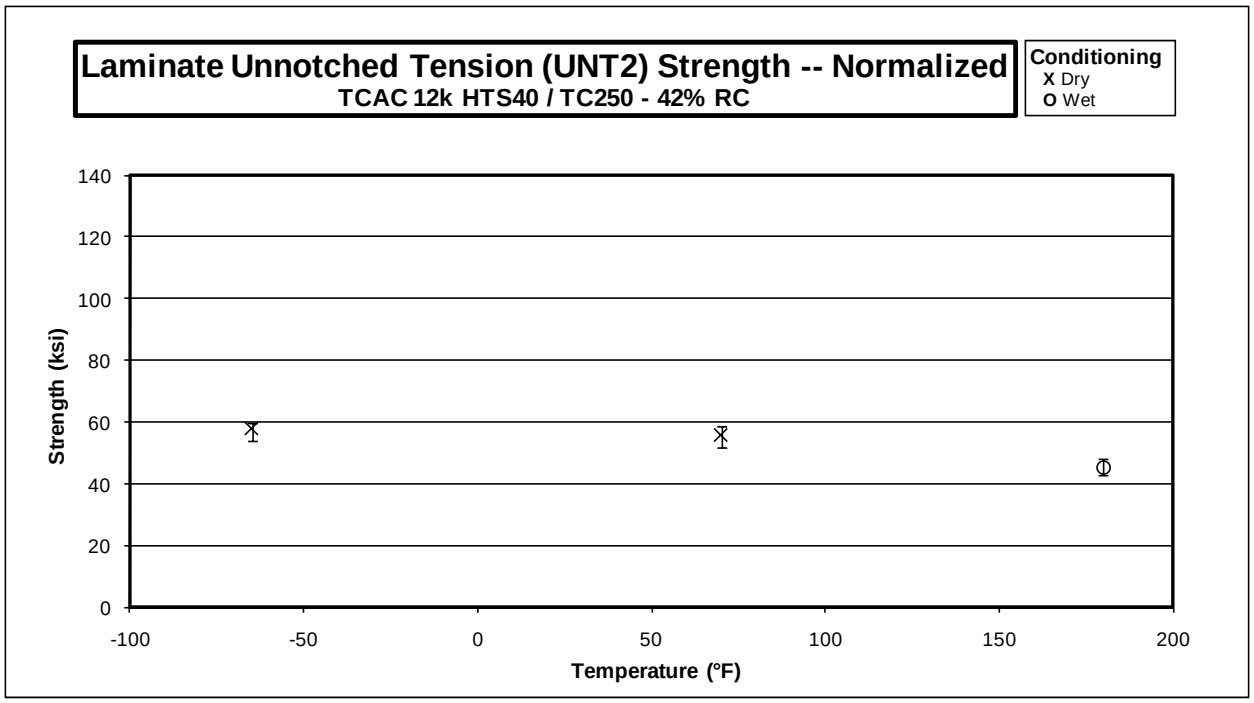

In-Plane Shear Modulus -- Measured
TCAC 12k HTS40 / TC250 - 42% RC
Conditioning
X Dry
O Wet
2.00
1.50
1.00
0.50
0.00
Modulus (Msi)
-100
-50
0
50
100
150
200
Temperature (°F)

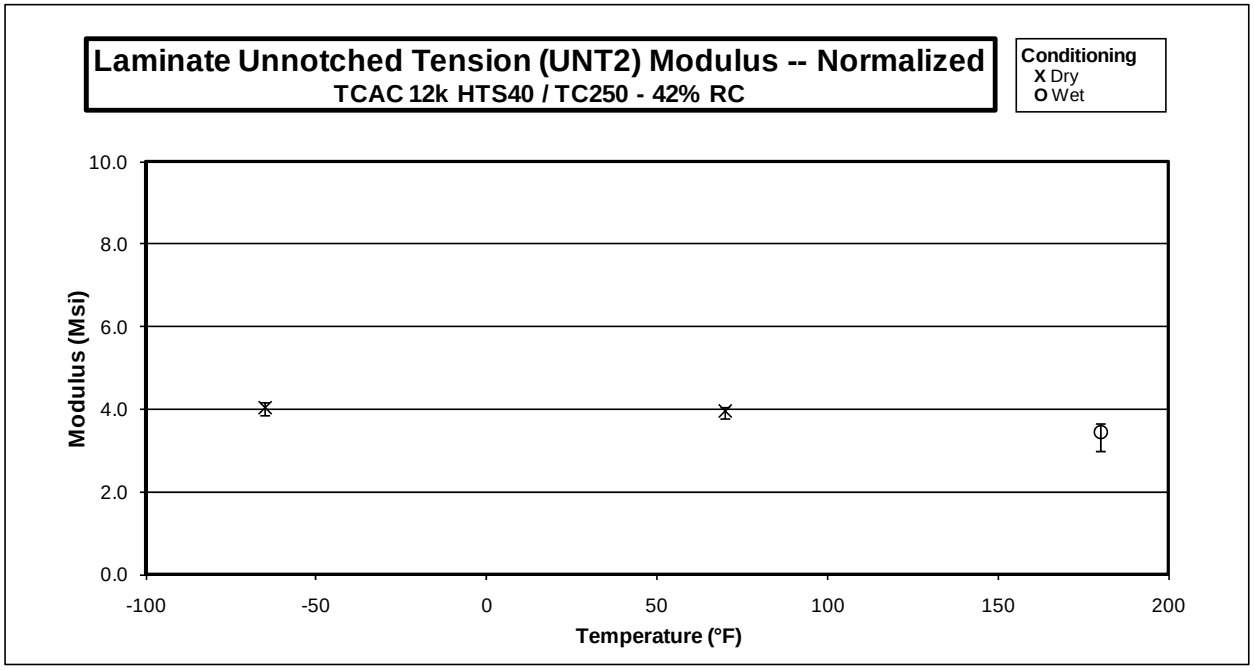
3.6 Unnotched Tension 1 Properties



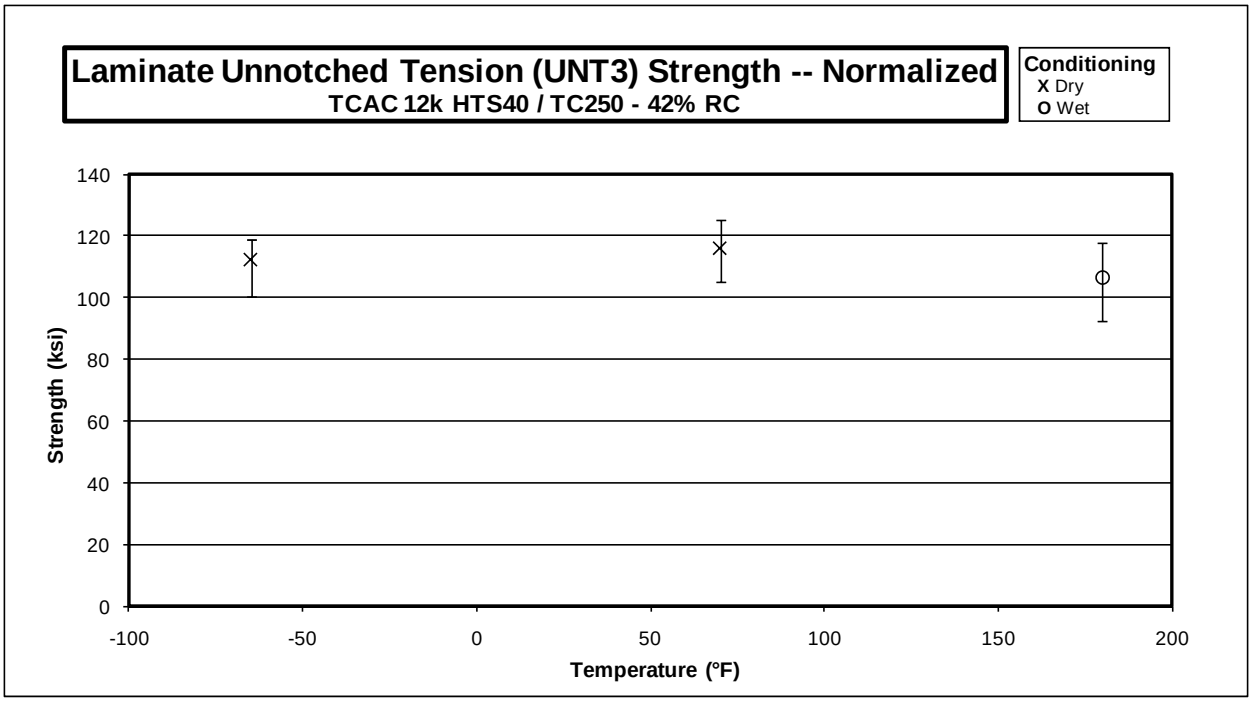


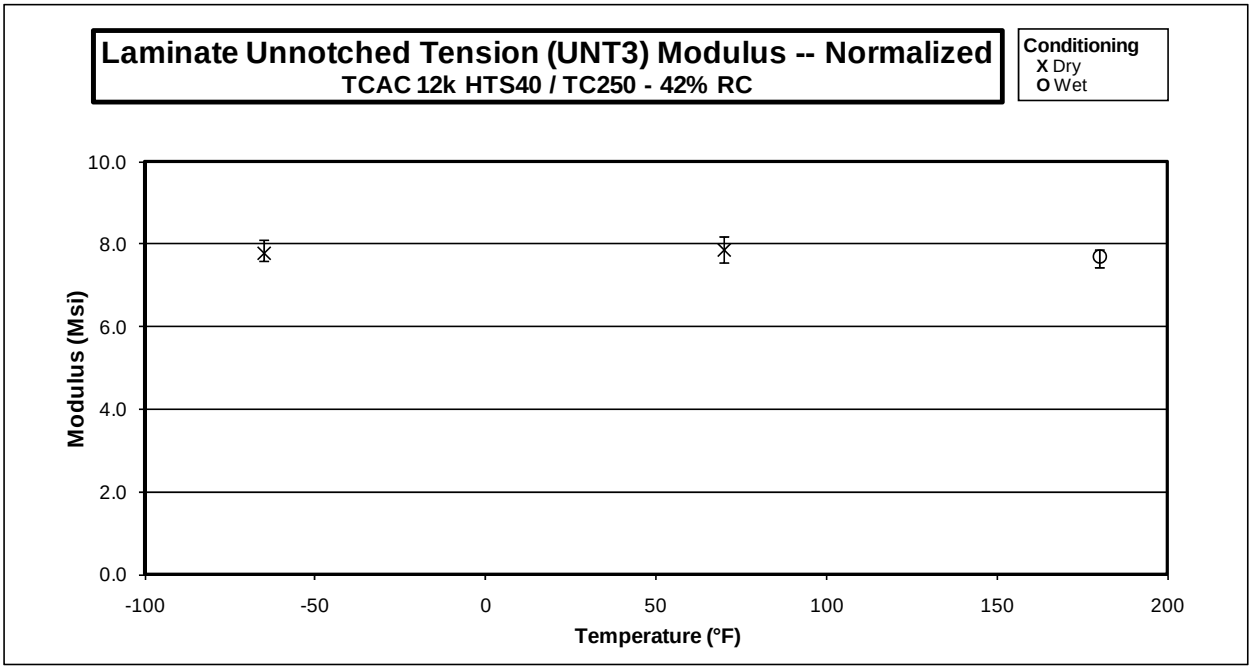
3.7 Unnotched Tension 2 Properties



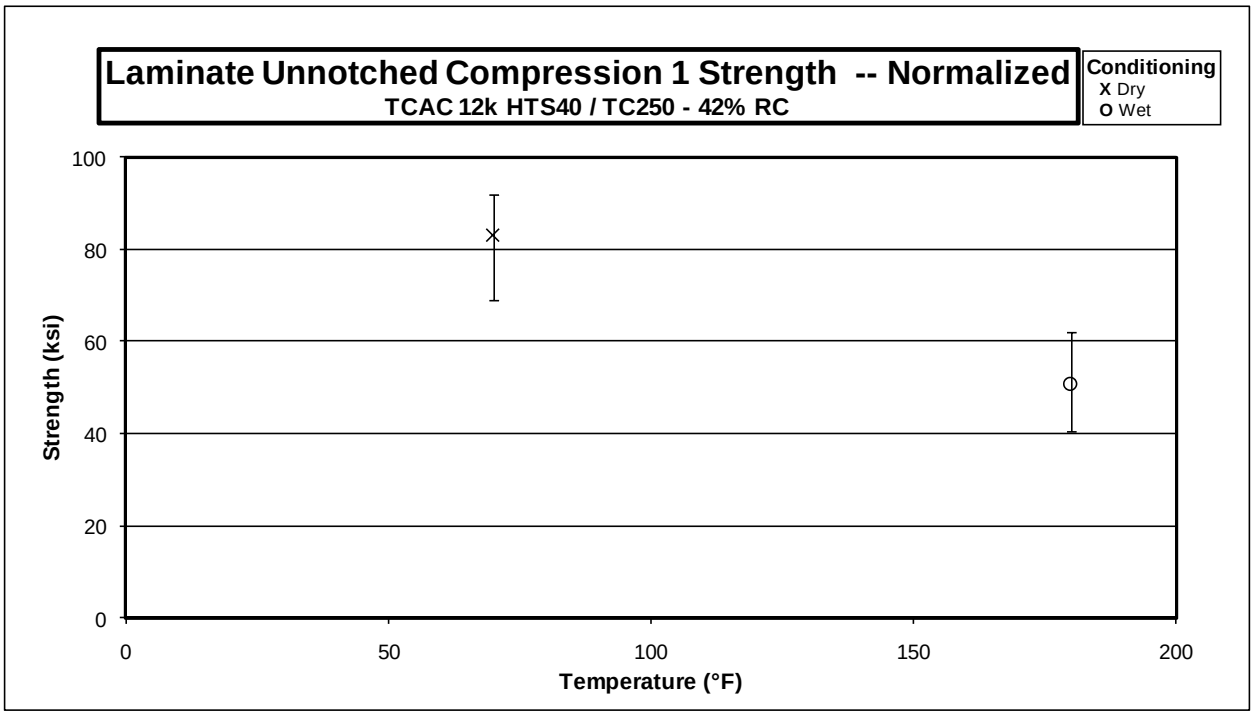


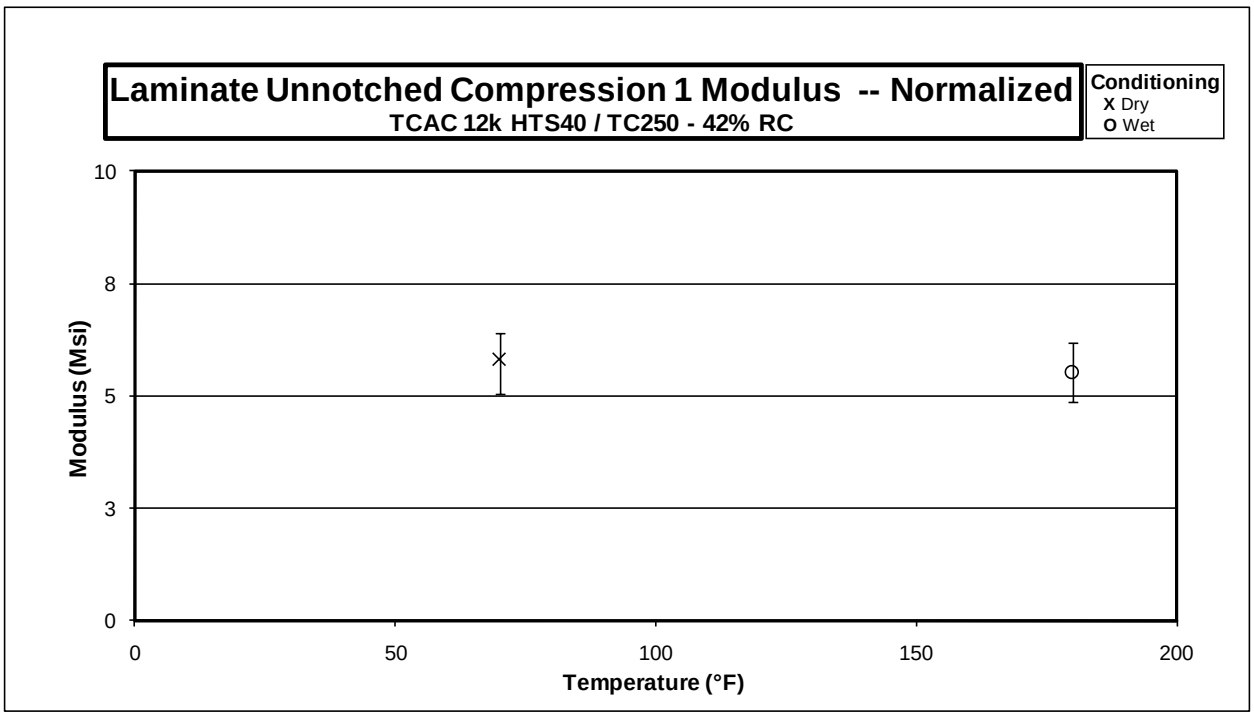
3.8 Unnotched Tension 3 Properties



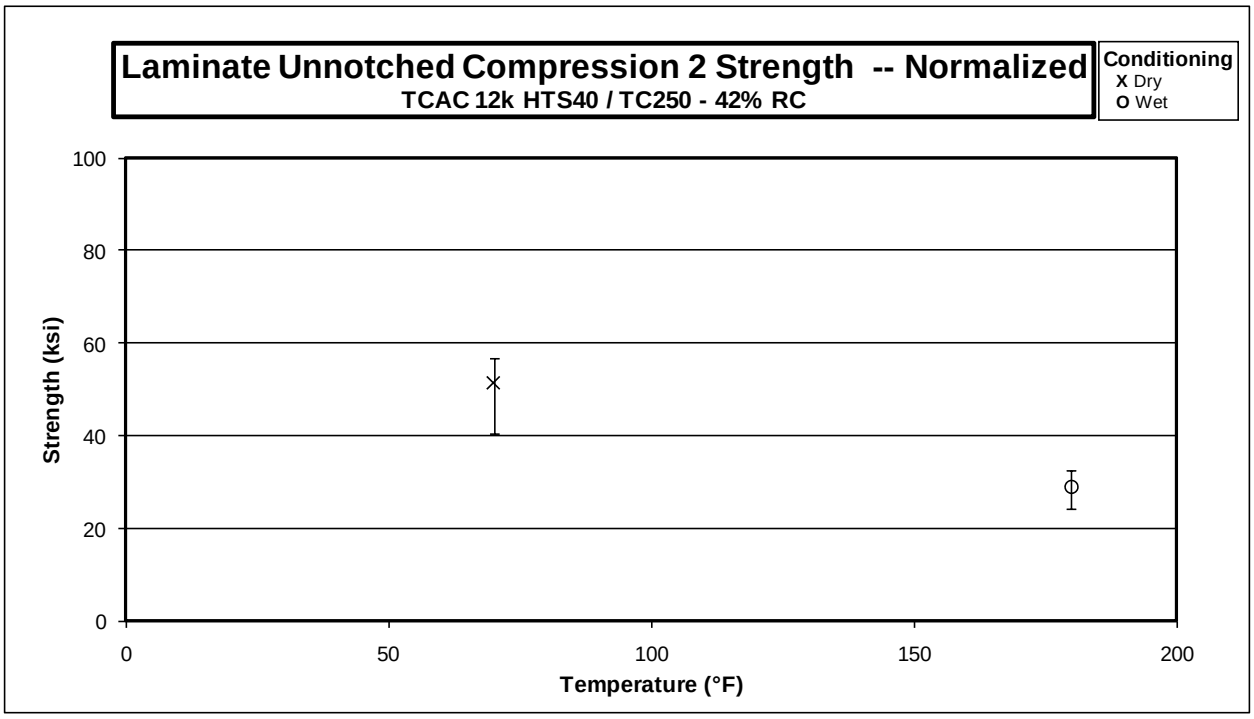


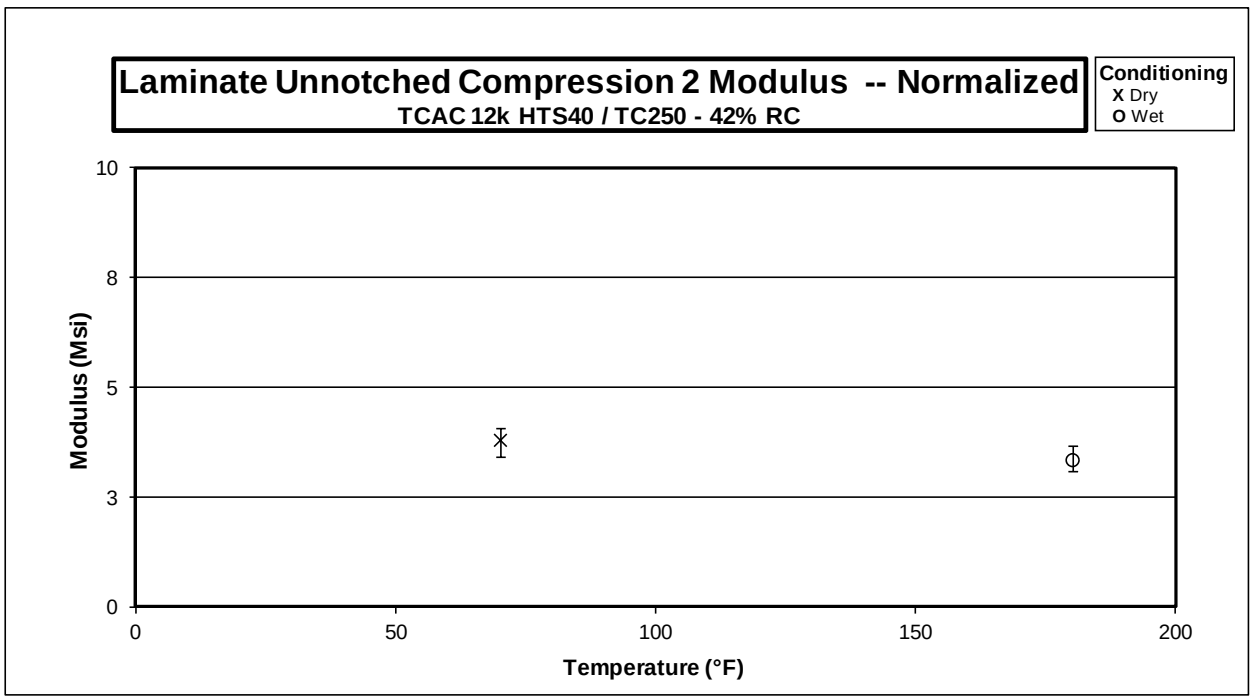
3.9 Unnotched Compression 1 Properties



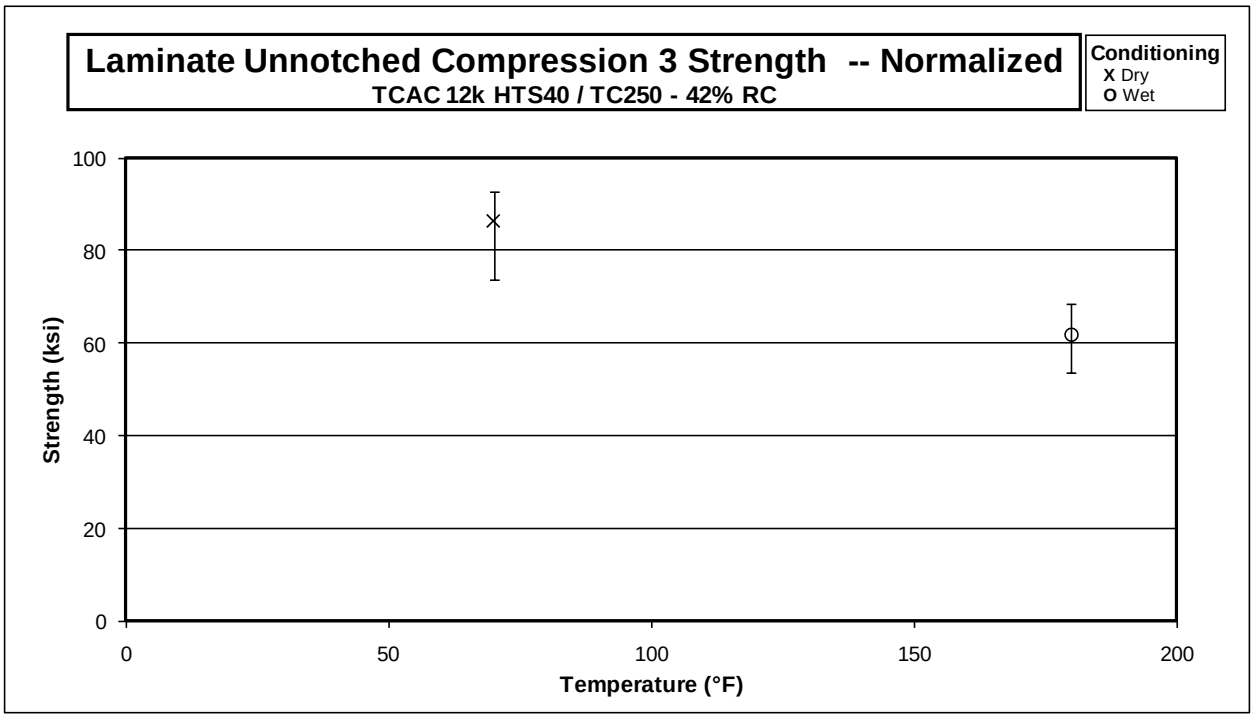


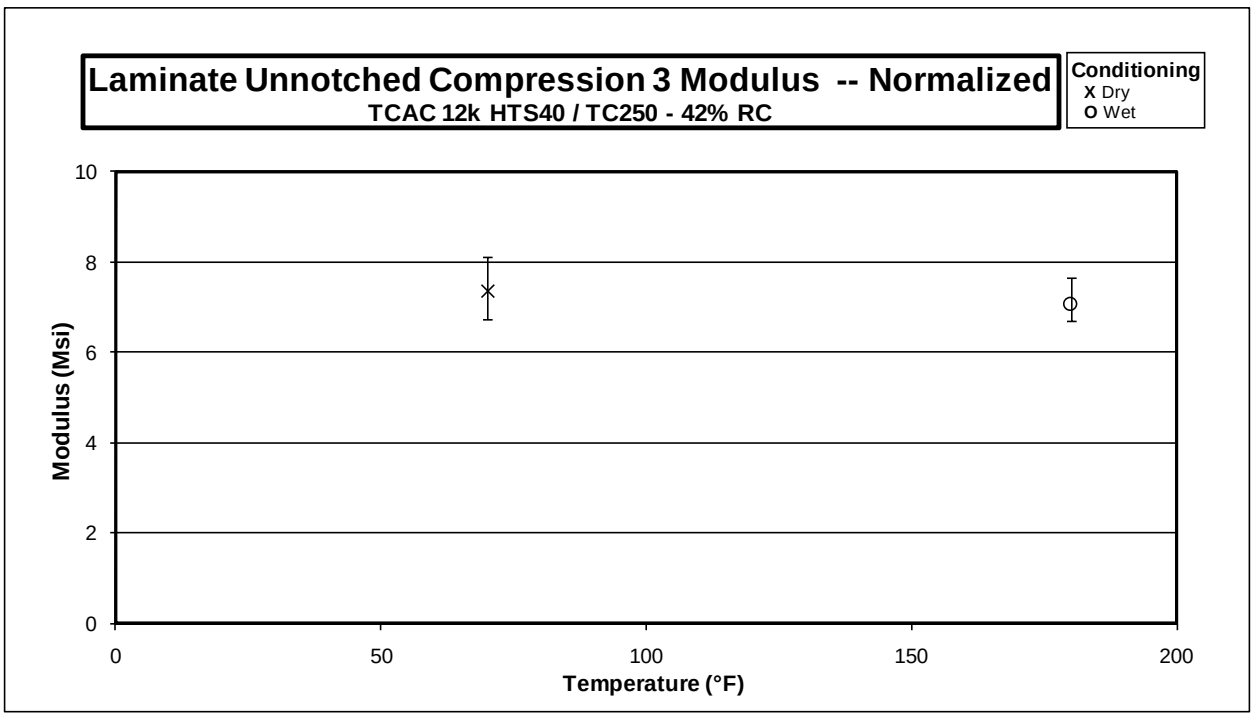
3.10 Unnotched Compression 2 Properties



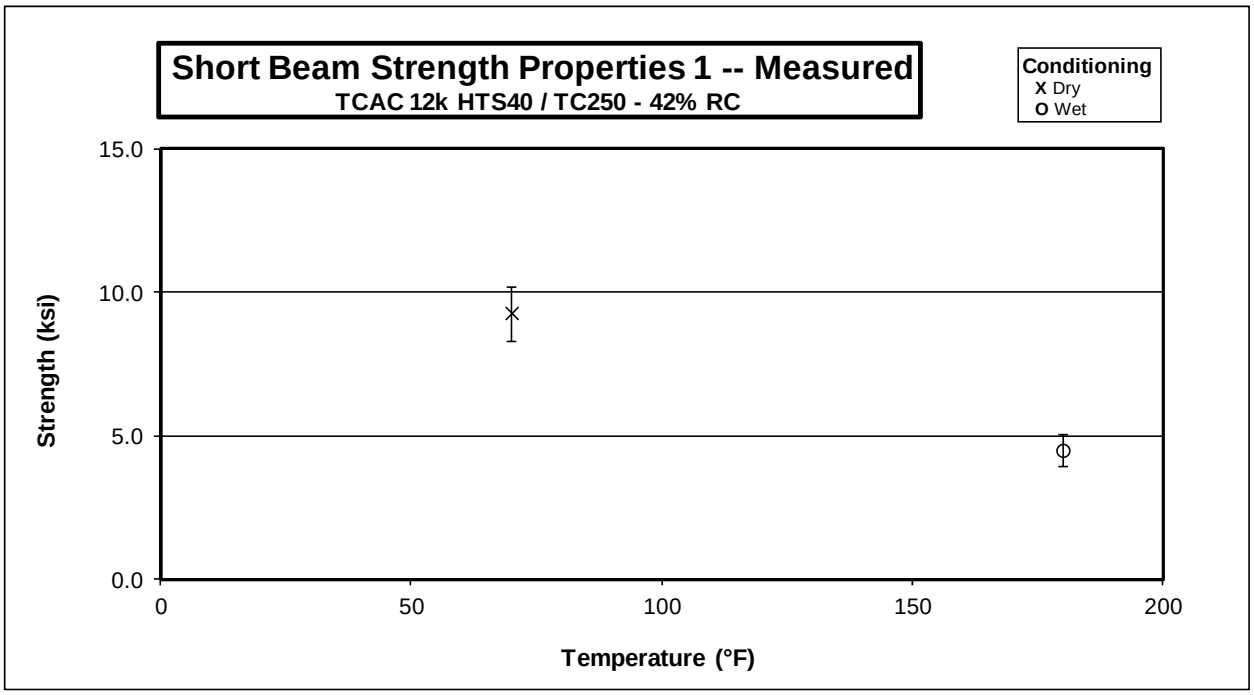


3.11 Unnotched Compression 3 Properties

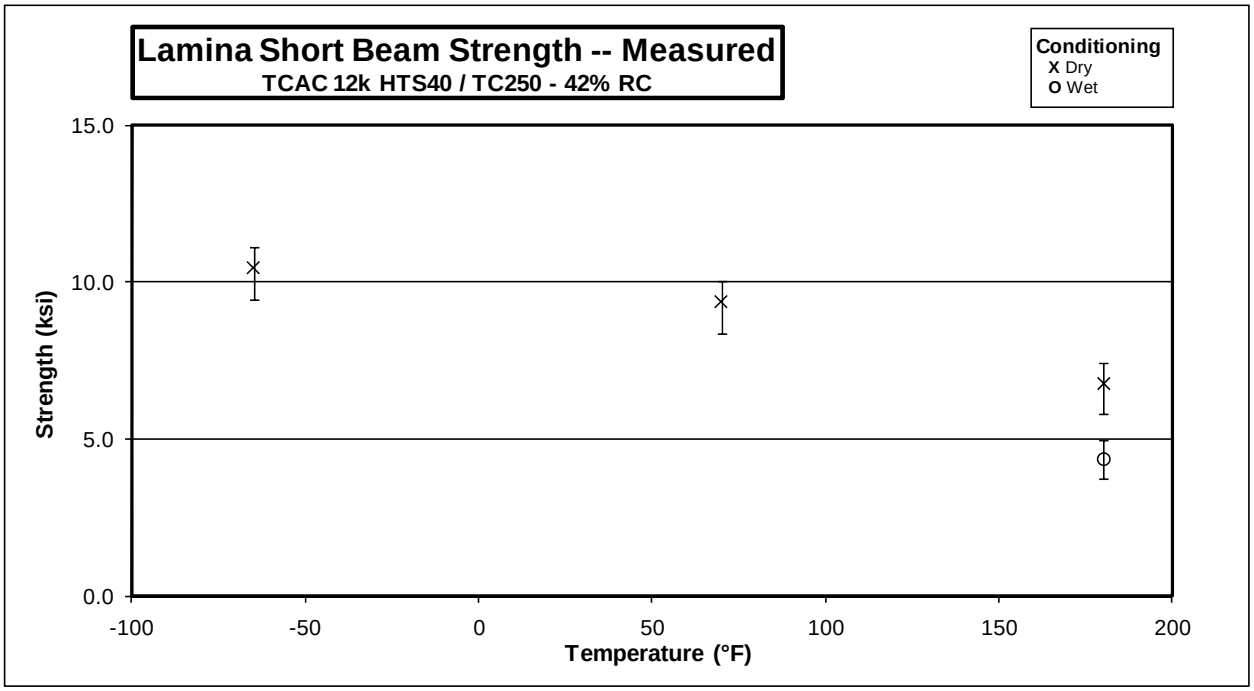




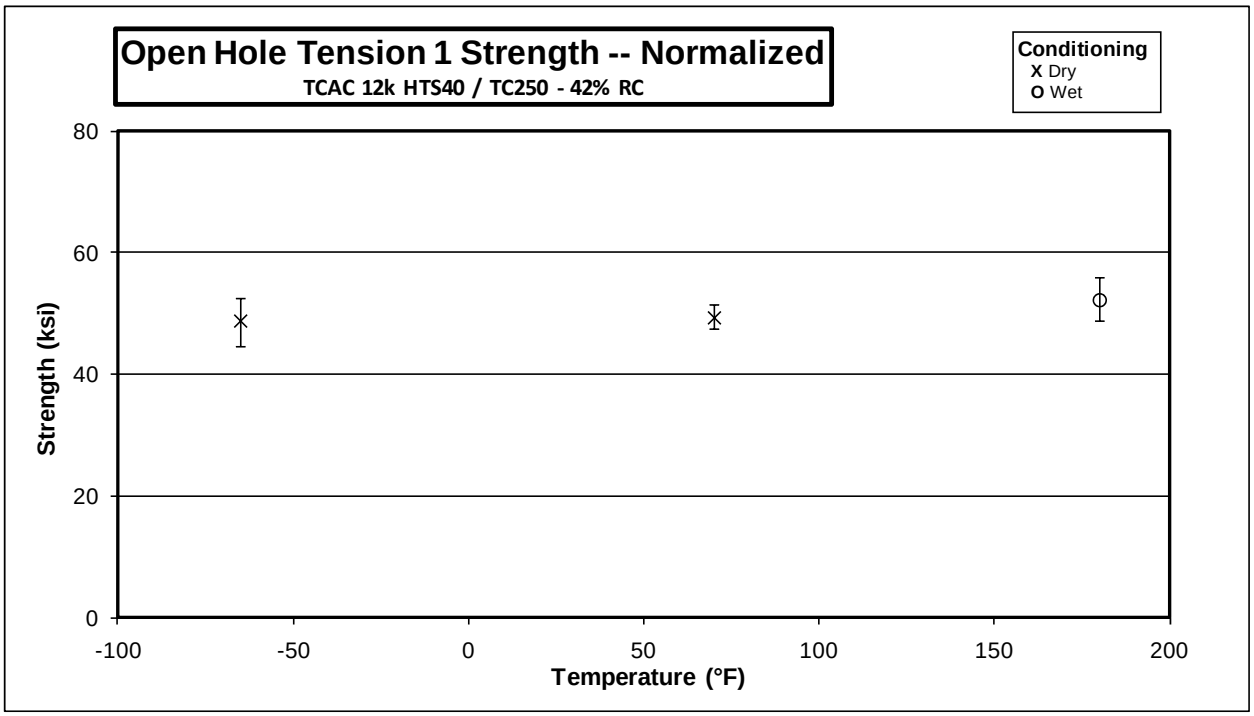
3.12 Laminate Short Beam Shear Properties



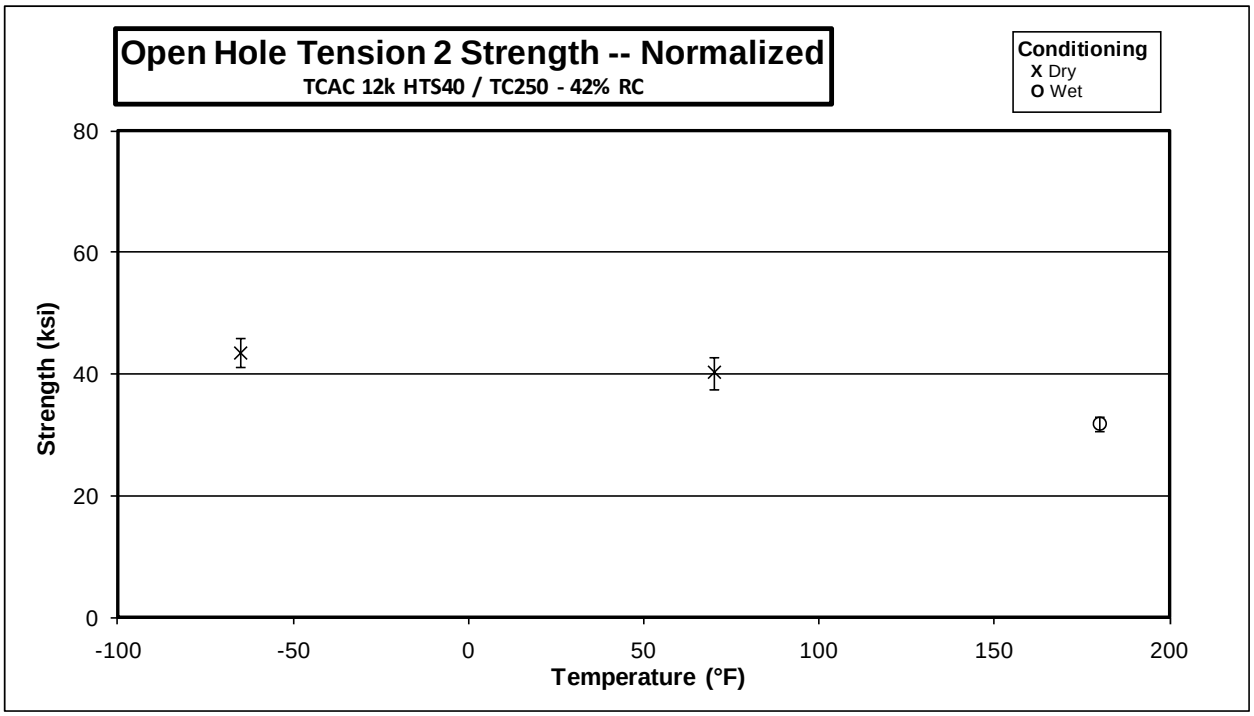
3.13 Lamina Short Beam Strength Properties



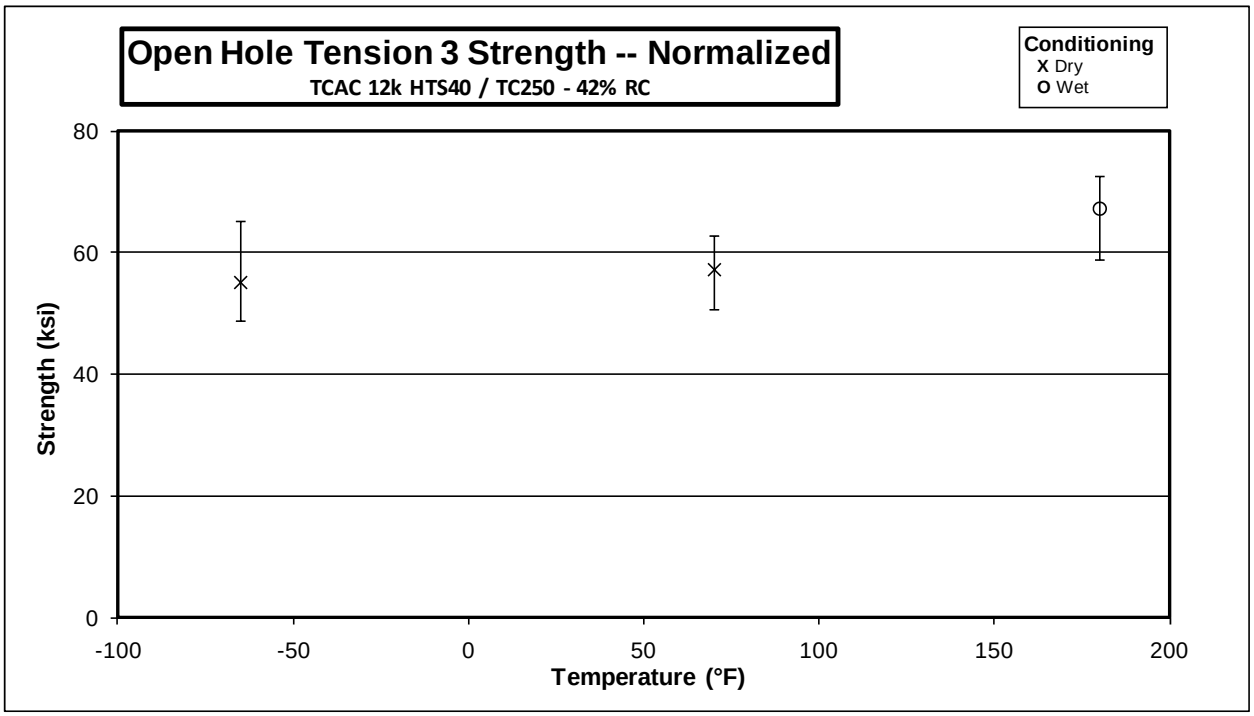
3.14 Open Hole Tension 1 Properties



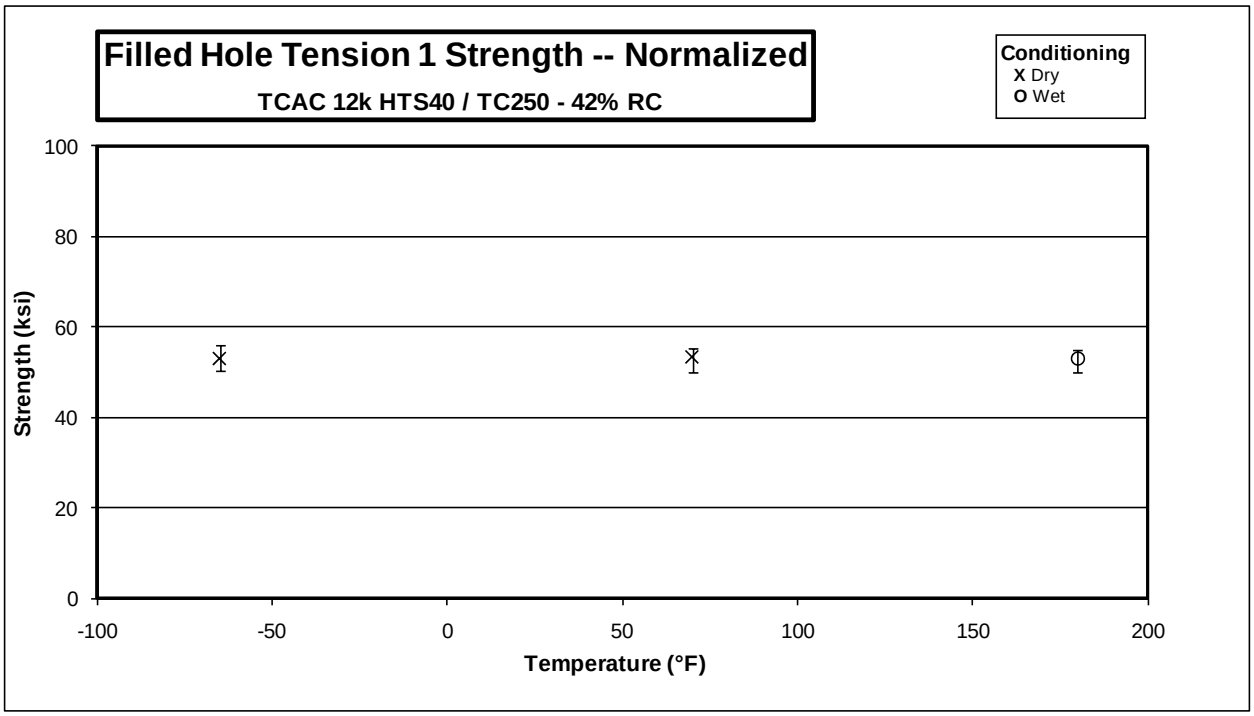
3.15 Open Hole Tension 2 Properties



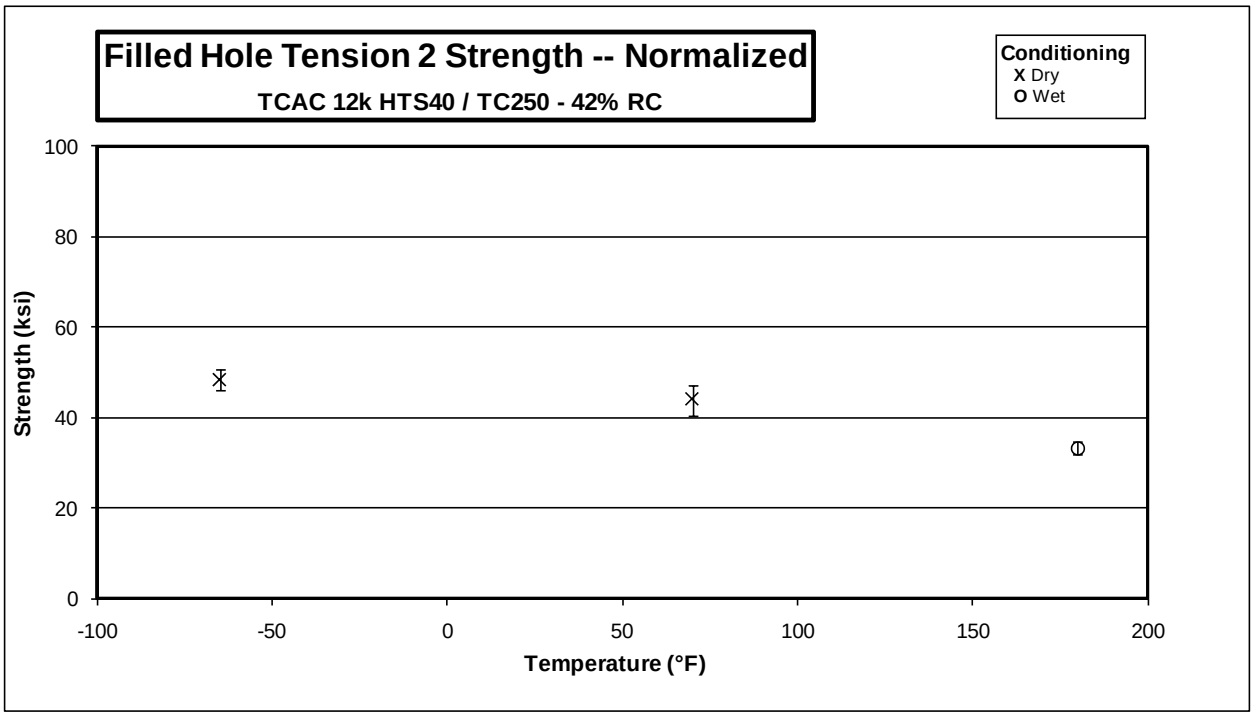
3.16 Open Hole Tension 3 Properties



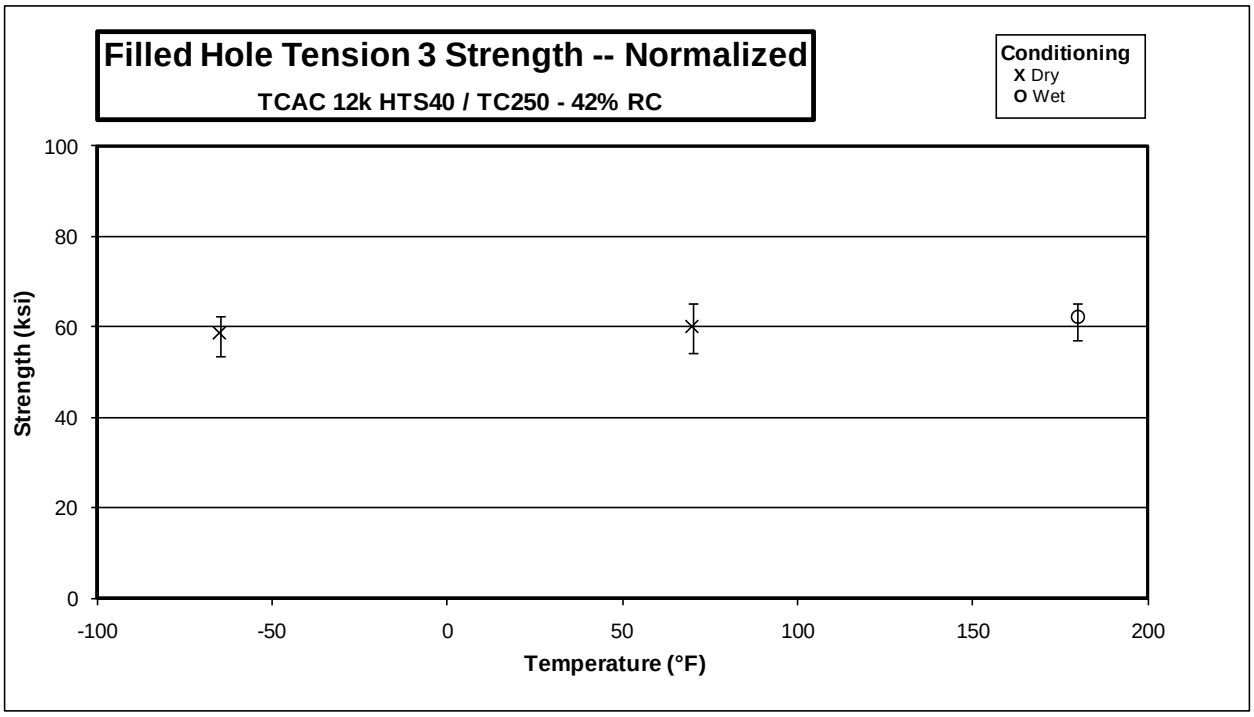
3.17 Filled-Hole Tension 1 Properties



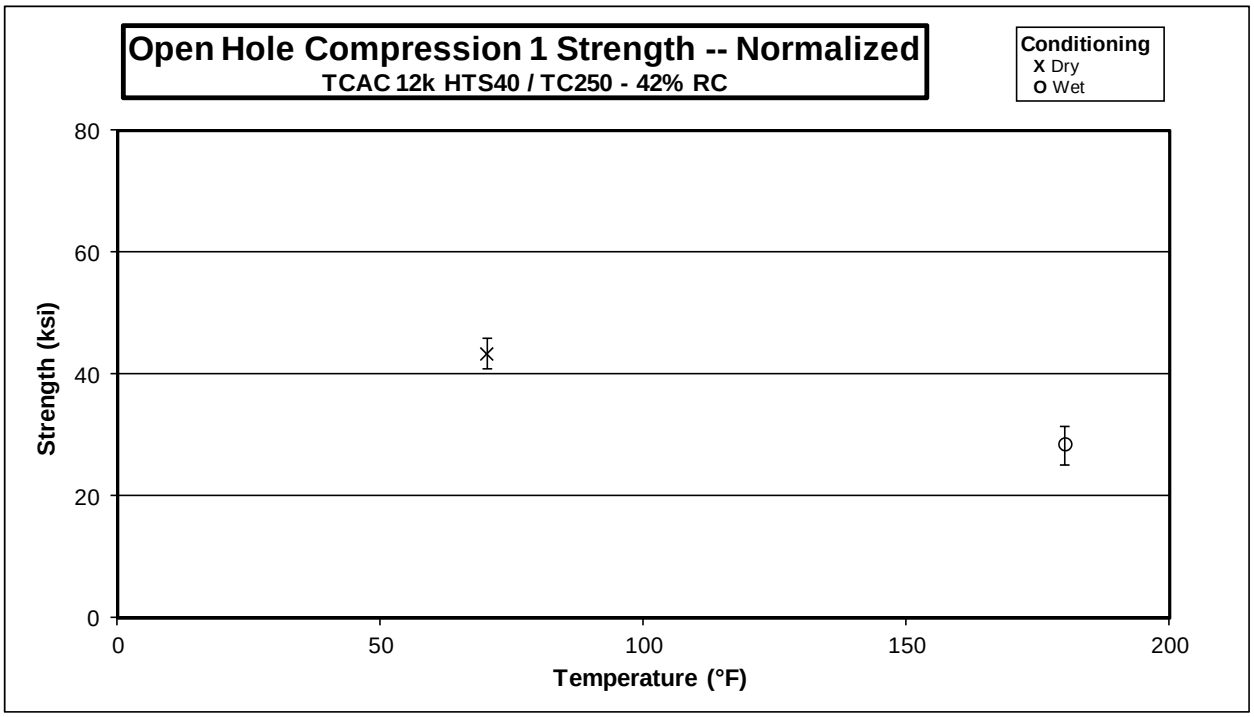
3.18 Filled-Hole Tension 2 Properties



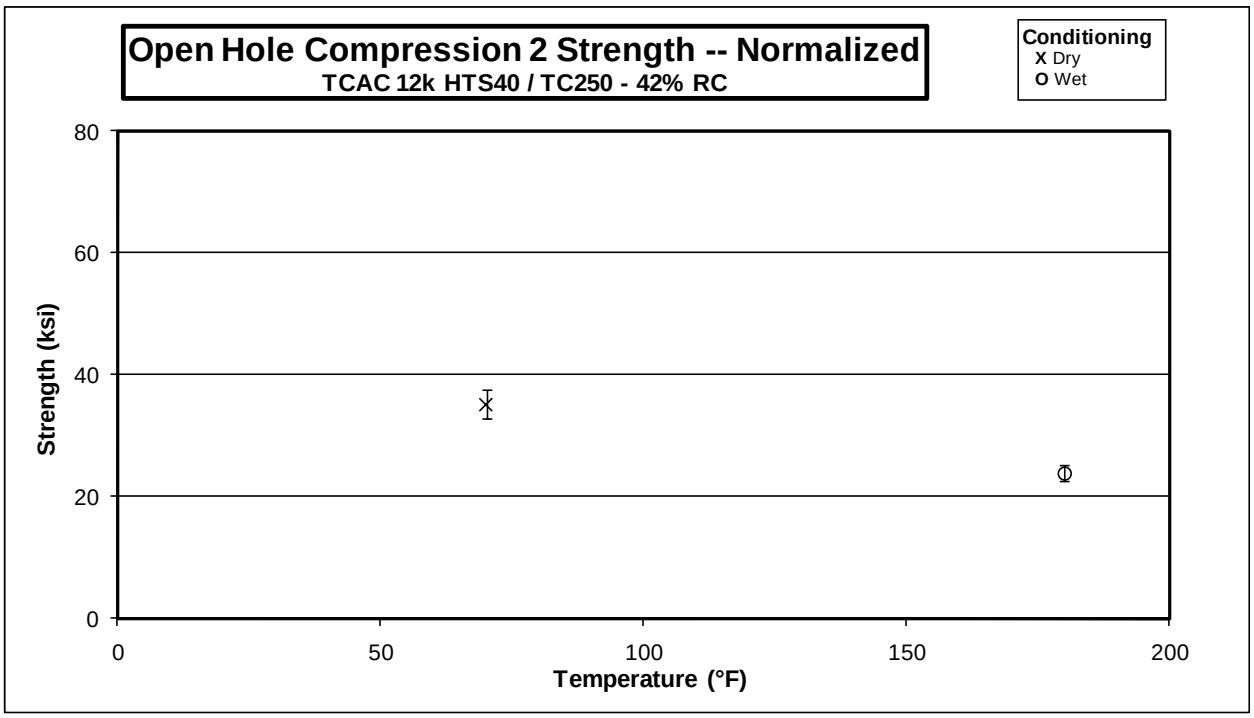
3.19 Filled-Hole Tension 3 Properties



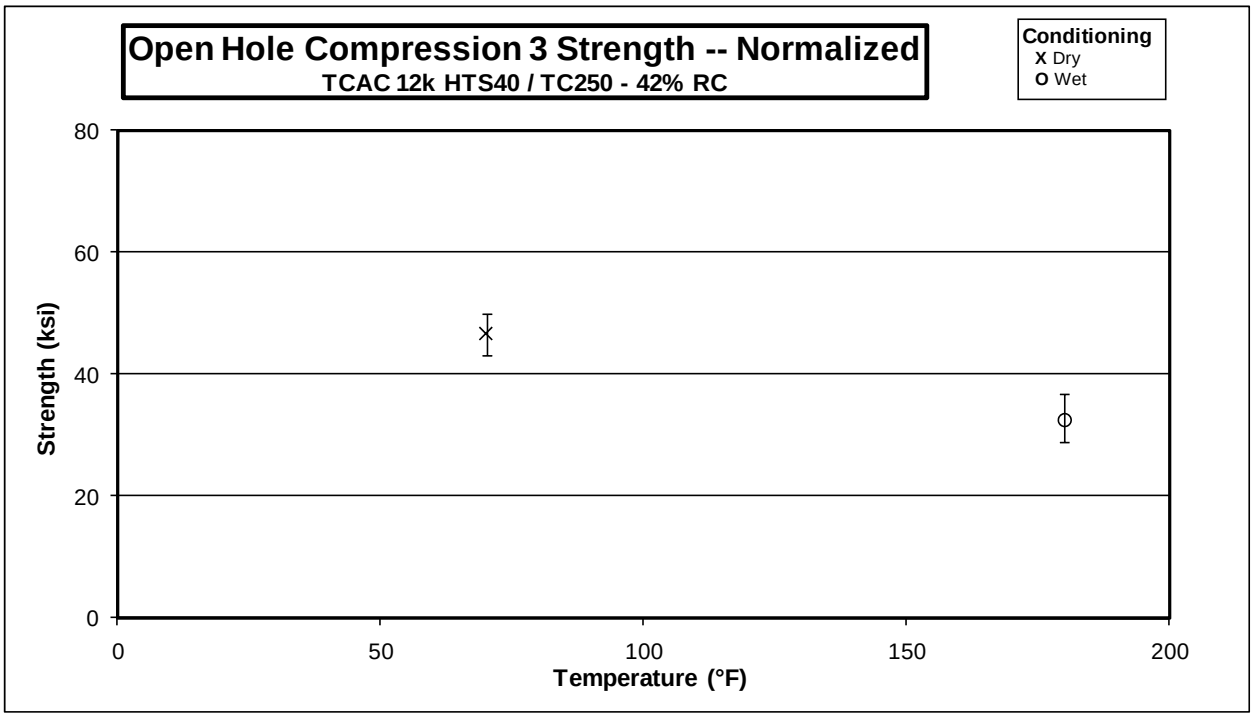
3.20 Open Hole Compression 1 Properties



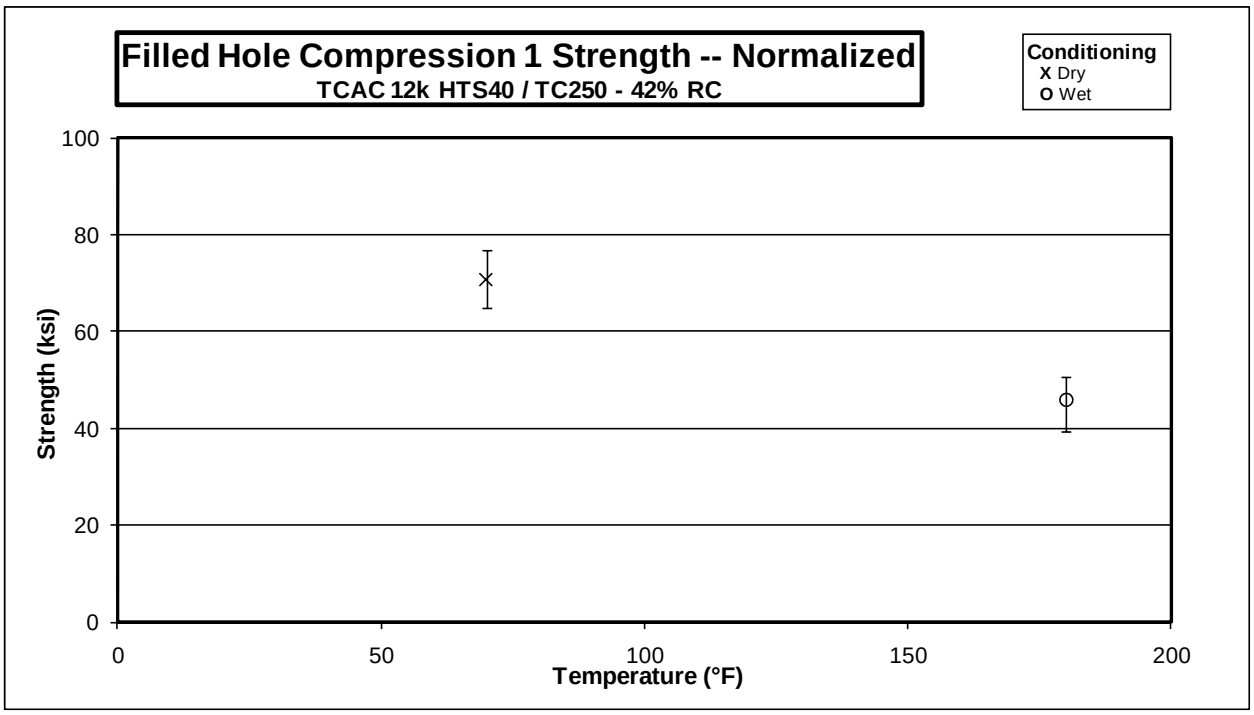
3.21 Open Hole Compression 2 Properties



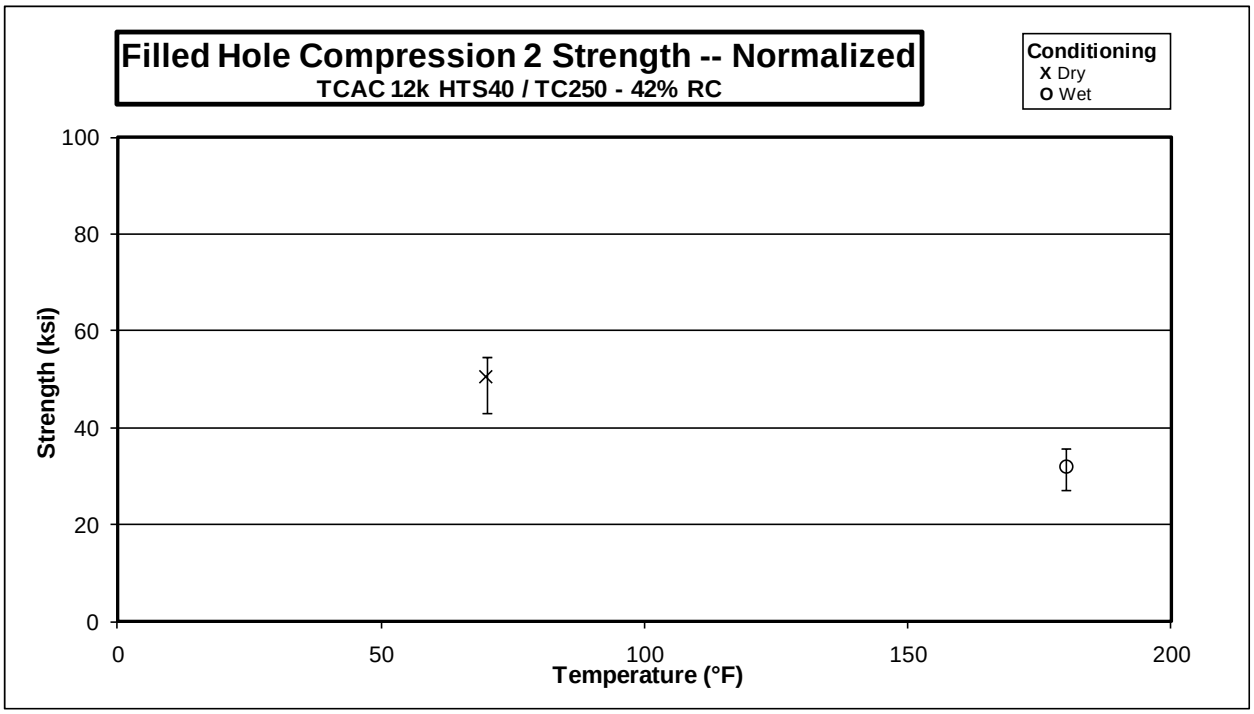
3.22 Open Hole Compression 3 Properties



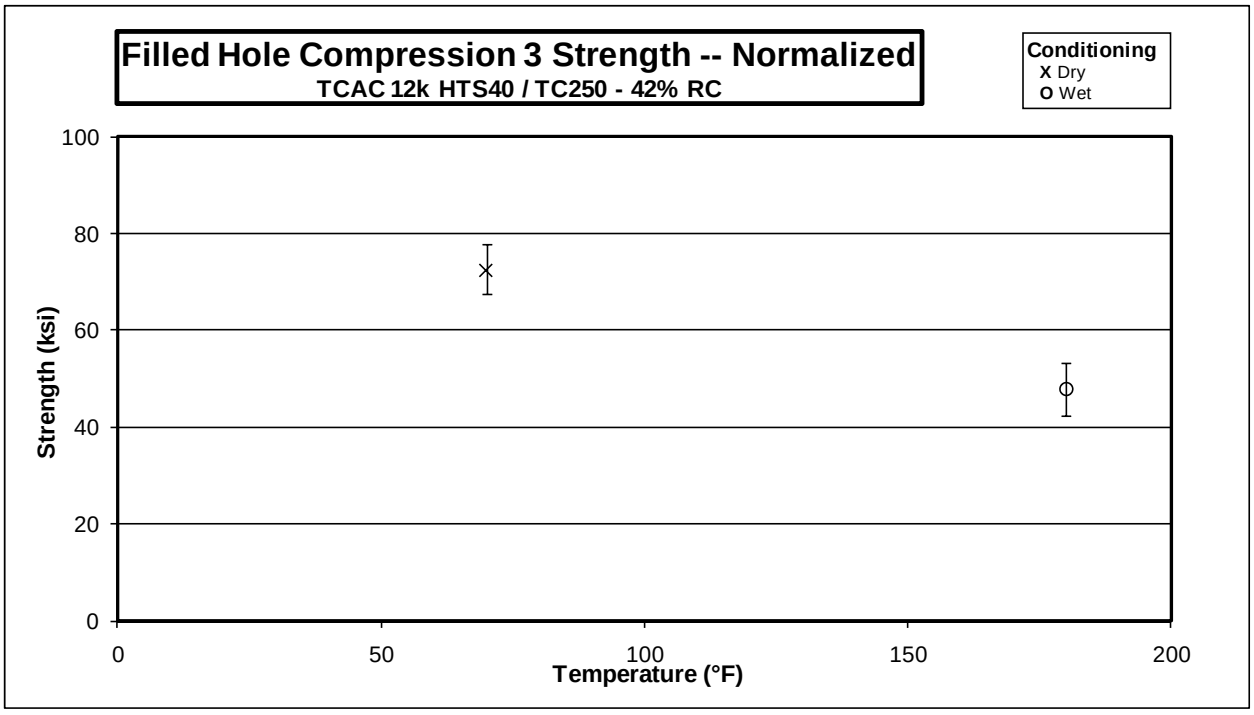
3.23 Filled-Hole Compression 1 Properties



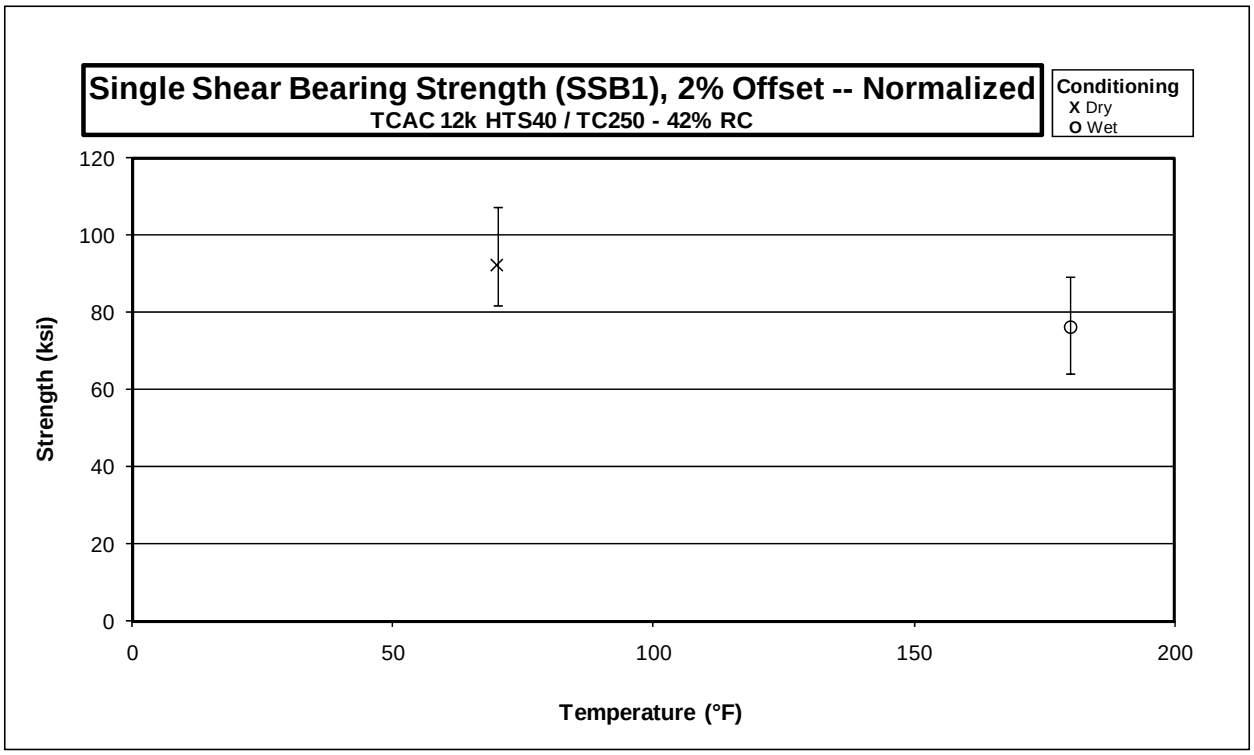
3.24 Filled-Hole Compression 2 Properties



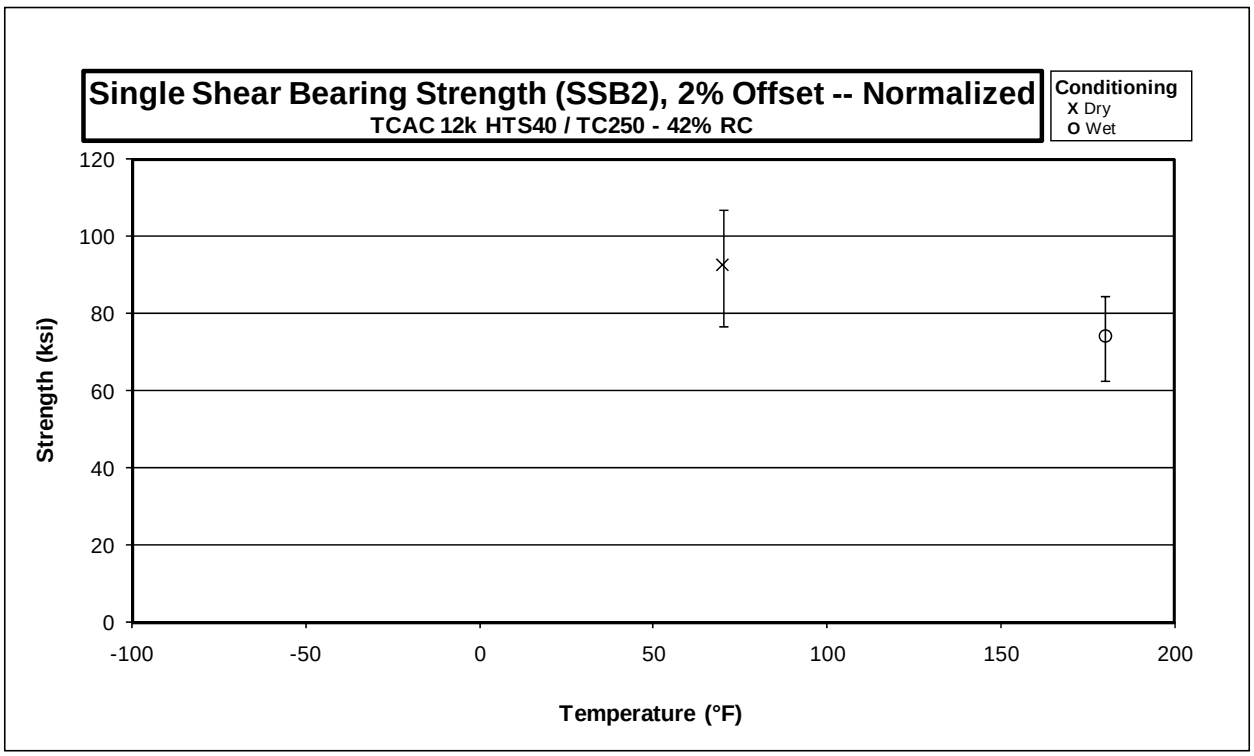
3.25 Filled-Hole Compression 3 Properties



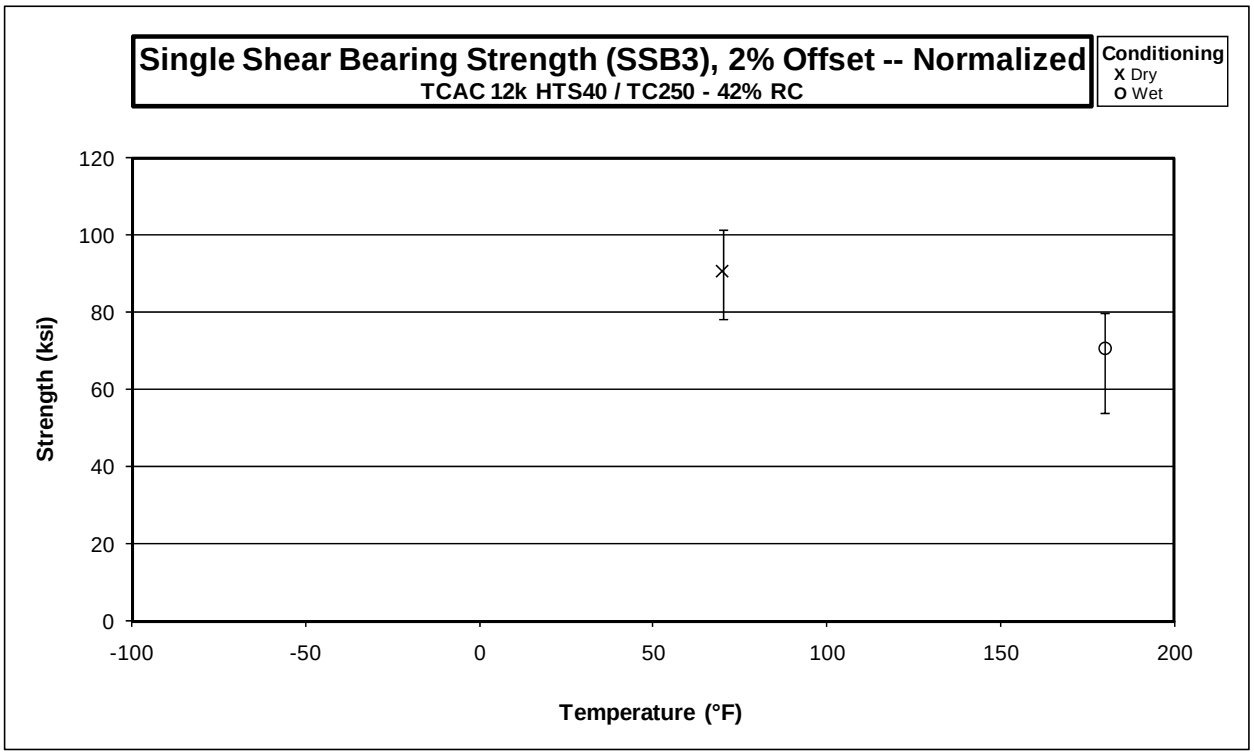
3.26 Single Shear Bearing Strength 1 Properties



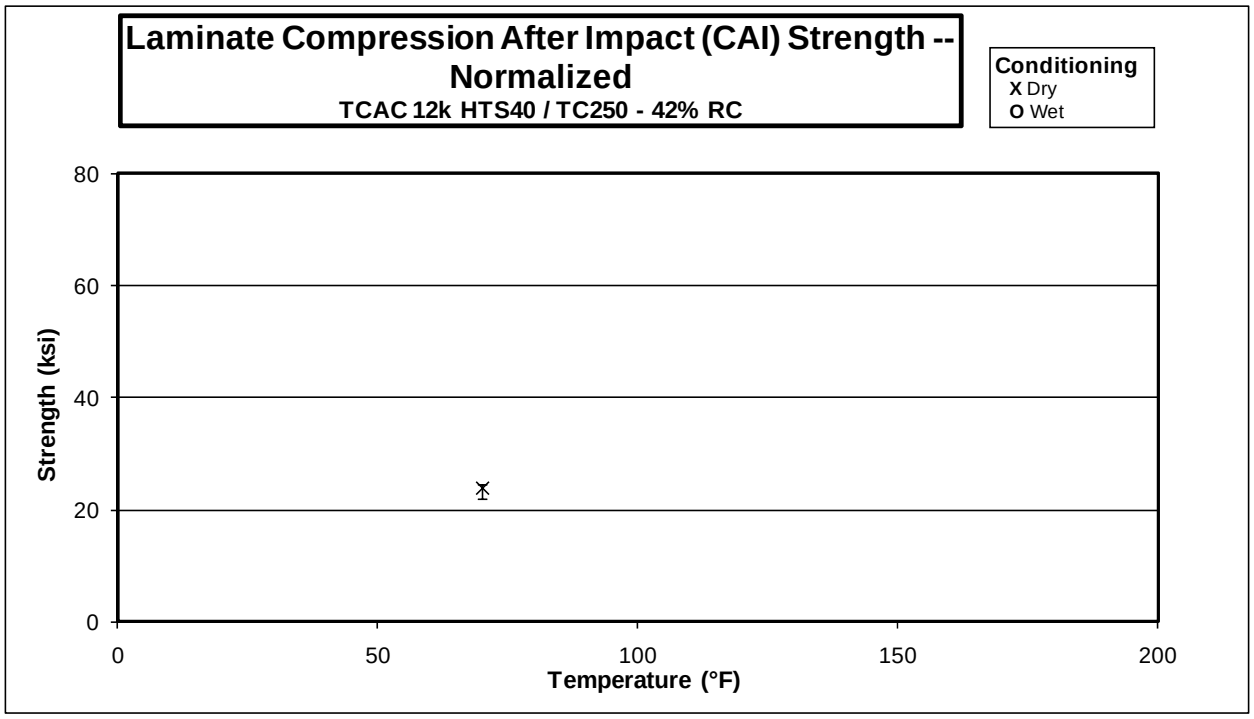
3.27 Single Shear Bearing Strength 2 Properties



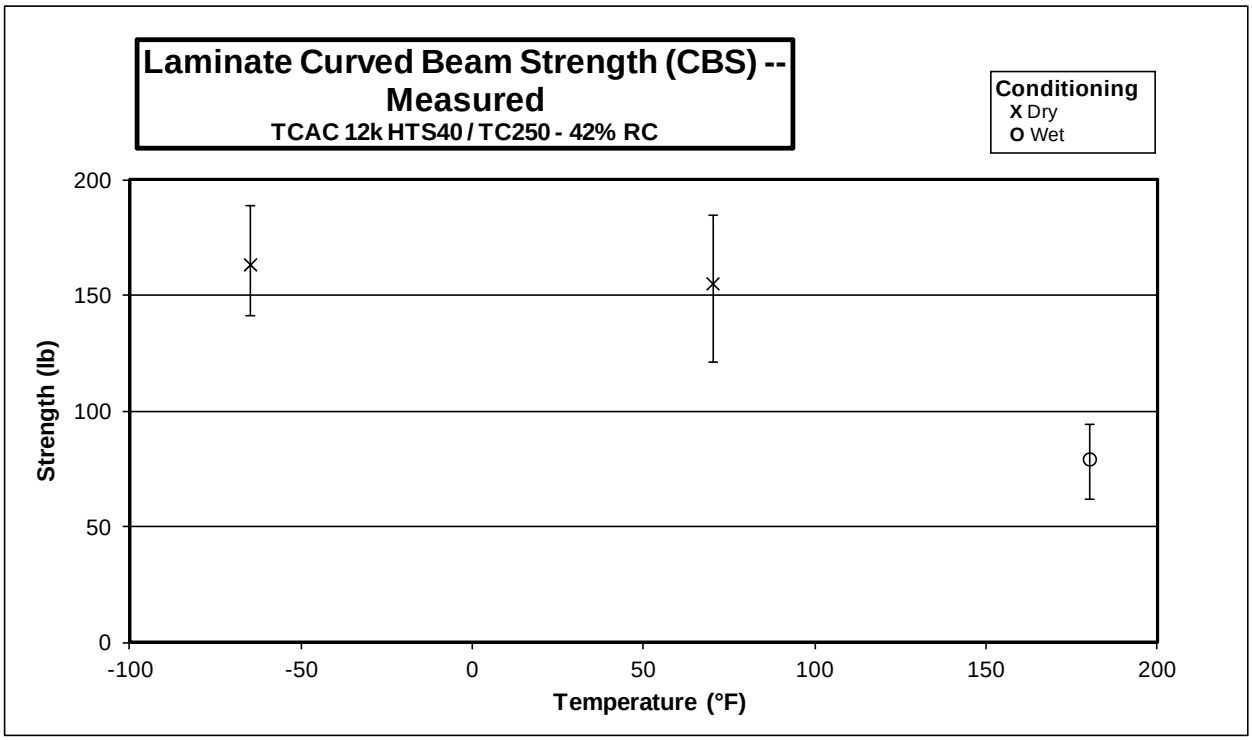
3.28 Single Shear Bearing Strength 3 Properties

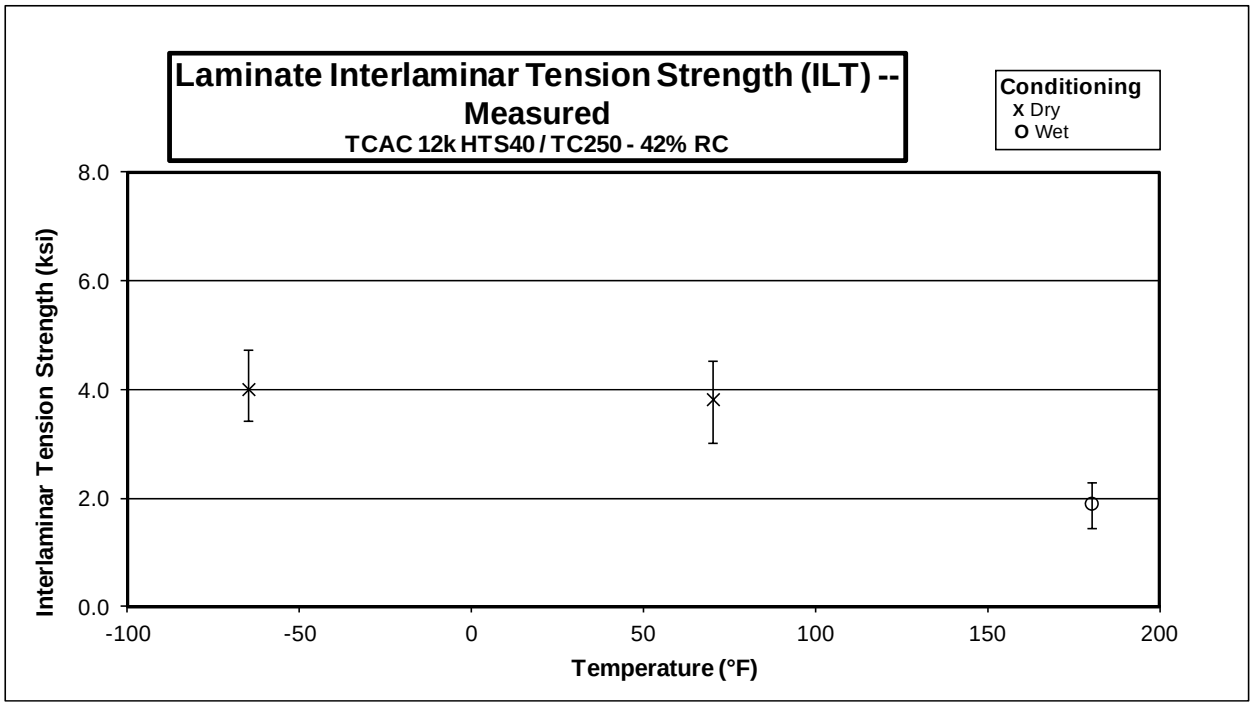


3.29 Compression Strength After Impact 1 Properties



3.30 Interlaminar Tension Properties





4 Raw Data

4.1 Warp Tension Properties

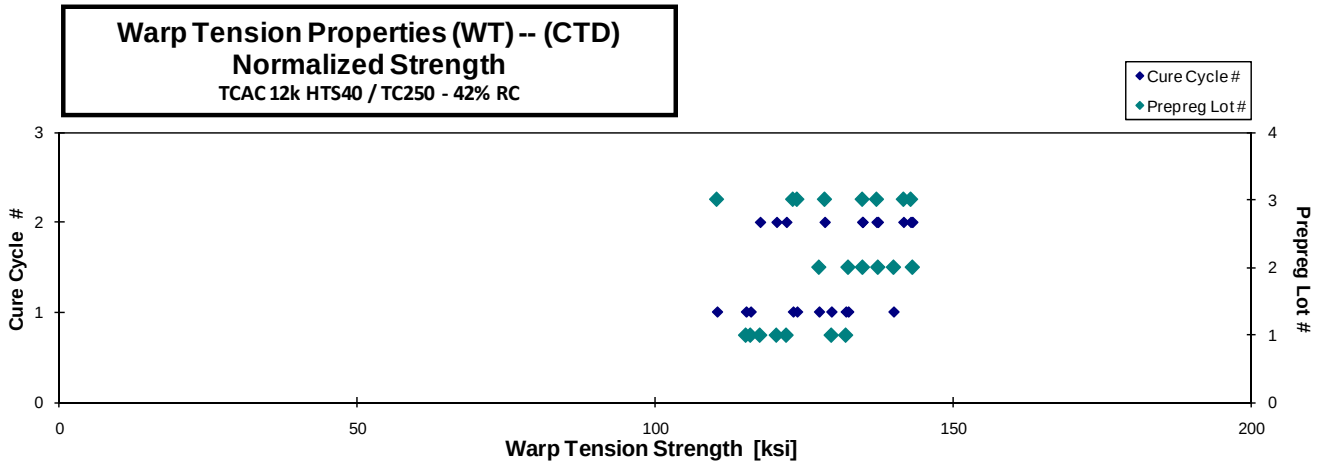
Warp Tension Properties (WT) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

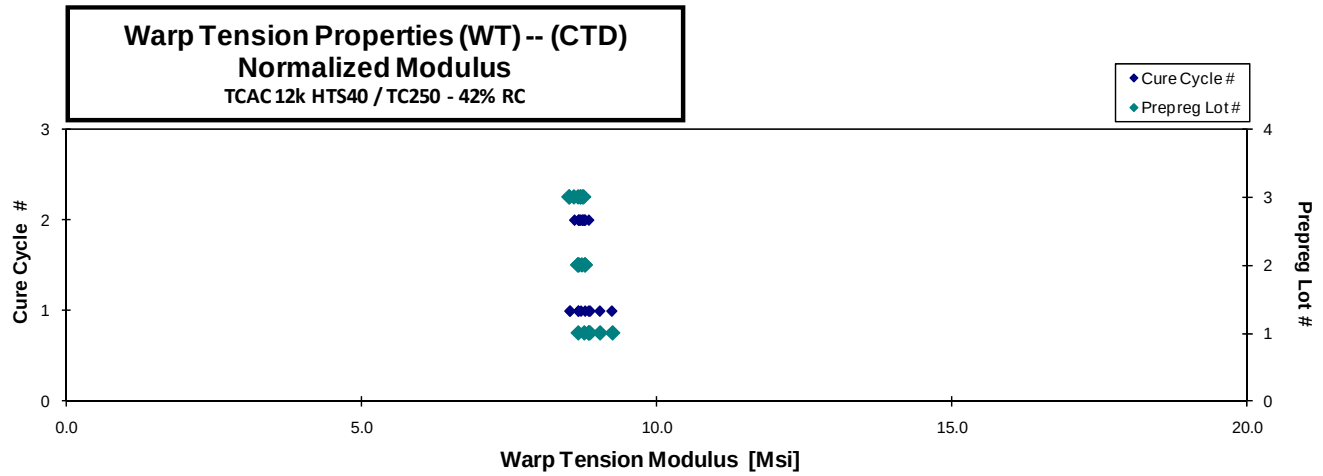
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGJA117B	A	C1	1	1	112.330	8.573	0.046	0.105	12	LAB	0.0088	115.946	8.849
TGJA118B	A	C1	1	1	127.266	8.716	0.061	0.104	12	LGM	0.0087	129.512	8.870
TGJA119B	A	C1	1	1	127.860	8.759	*	0.105	12	LAB	0.0088	131.934	9.038
TGJA11BB	A	C1	1	1	109.210	8.767	0.055	0.108	12	LAT	0.0090	115.170	9.245
TGJA215B	A	C2	1	2	116.695	8.584	0.055	0.105	12	LGM	0.0088	120.299	8.849
TGJA216B	A	C2	1	2	113.750	8.493	*	0.105	12	LGM	0.0088	117.523	8.775
TGJA217B	A	C2	1	2	118.744	8.447	0.033	0.105	12	LWT	0.0087	121.946	8.675
TGJB117B	B	C1	2	1	122.109	8.306	0.027	0.106	12	LAB	0.0089	127.436	8.668
TGJB118B	B	C1	2	1	131.410	8.610	*	0.103	12	LWT	0.0086	132.333	8.670
TGJB119B	B	C1	2	1	144.629	9.079	0.034	0.099	12	LAT	0.0082	139.950	8.786
TGJB217B	B	C2	2	2	139.978	8.596	0.030	0.104	12	LWB	0.0087	143.111	8.788
TGJB218B	B	C2	2	2	133.674	8.615	0.032	0.103	12	LGM	0.0086	134.744	8.684
TGJB219B	B	C2	2	2	137.913	8.771	*	0.102	12	LAT	0.0085	137.327	8.734
TGJC117B	C	C1	3	1	105.388	8.147	*	0.107	12	LAT	0.0089	110.296	8.526
TGJC118B	C	C1	3	1	119.981	8.450	*	0.105	12	LWB	0.0088	123.745	8.715
TGJC119B	C	C1	3	1	126.555	8.764	*	0.099	12	LGM	0.0083	123.060	8.522
TGJC217B	C	C2	3	2	129.927	8.436	0.033	0.106	12	LAB	0.0088	134.704	8.746
TGJC218B	C	C2	3	2	124.813	8.429	0.026	0.105	12	LWT	0.0087	128.382	8.670
TGJC219B	C	C2	3	2	149.491	9.003	*	0.097	12	LAT	0.0081	142.822	8.602
TGJC21AB	C	C2	3	2	139.445	8.857	*	0.100	12	LGM	0.0084	137.098	8.707
TGJC21BB	C	C2	3	2	140.192	8.675	*	0.103	12	LGM	0.0086	141.612	8.763

*** Poisson's ratio was not reported due to non-linearity.**

	Strength [ksi]	Modulus [Msi]	Poisson's Ratio		$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	127.208	8.623	0.039	$Average_{norm}$	128.998	8.756
Standard Dev.	12.109	0.222	0.013	$Standard\ Dev._{norm}$	9.808	0.161
Coeff. of Var. [%]	9.519	2.570	32.070	$Coeff.\ of\ Var.\ [\%]_{norm}$	7.603	1.844
Min.	105.388	8.147	0.026	Min.	110.296	8.522
Max.	149.491	9.079	0.061	Max.	143.111	9.245
Number of Spec.	21	21	11	Number of Spec.	21	21


Warp Tension Properties (WT) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Strength [ksi]
0
50
100
150
200
0
1
2
3
4


Warp Tension Properties (WT) -- (CTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Modulus [Msi]
0.0
5.0
10.0
15.0
20.0
0
1
2
3
4

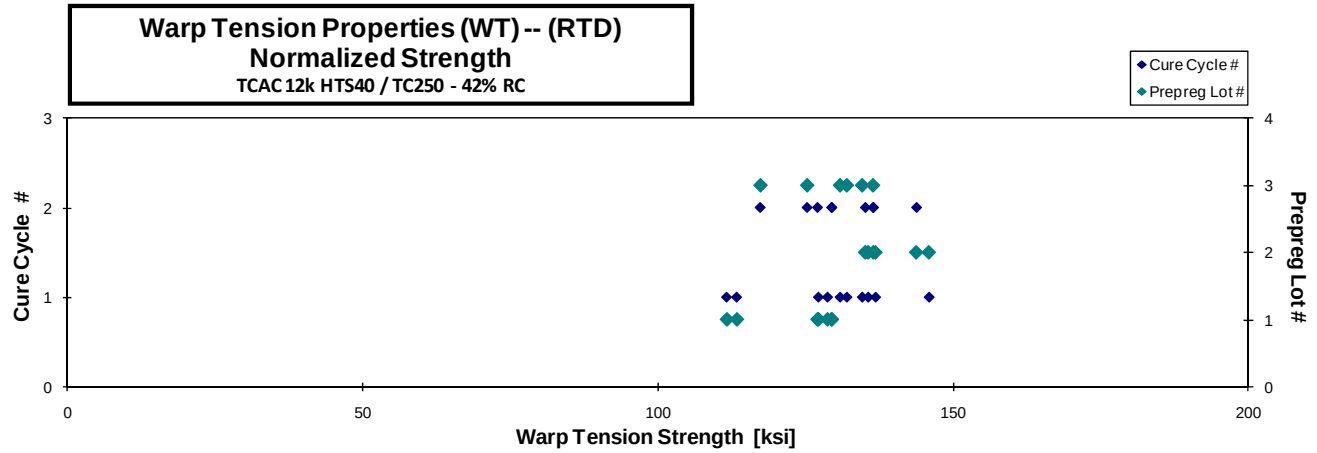
Warp Tension Properties (WT) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

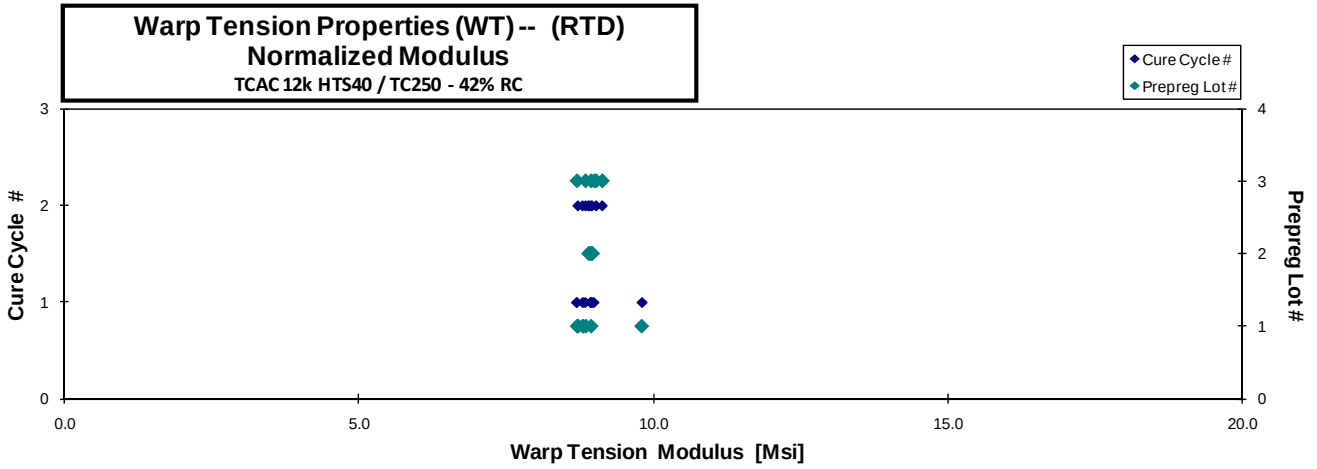
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGJA11CA	A	C1	1	1	121.966	8.343	0.035	0.108	12	LGM	0.0090	128.762	8.808
TGJA11DA	A	C1	1	1	106.466	9.341	0.037	0.107	12	LGM	0.0089	111.702	9.800
TGJA11EA	A	C1	1	1	109.466	8.405	0.043	0.106	12	LAT/LAT	0.0088	113.401	8.707
TGJA11FA	A	C1	1	1	125.140	8.797	0.028	0.104	12	LAT/LAB	0.0086	127.226	8.944
TGJA218A	A	C2	1	2	126.341	8.592	*	0.105	12	LWT	0.0087	129.479	8.805
TGJA219A	A	C2	1	2	127.718	8.734	*	0.103	12	LAT	0.0086	129.471	8.854
TGJA21AA	A	C2	1	2	125.889	8.647	*	0.103	12	LAT	0.0086	127.061	8.727
TGJB11CA	B	C1	2	1	141.513	8.693	0.044	0.105	12	LWT	0.0088	145.930	8.965
TGJB11DA	B	C1	2	1	127.845	8.431	0.054	0.108	12	LAB	0.0090	135.637	8.945
TGJB11EA	B	C1	2	1	127.897	8.352	0.048	0.109	12	LAB	0.0091	136.883	8.939
TGJB21CA	B	C2	2	2	131.795	8.685	0.035	0.105	12	LAB/LWT	0.0087	135.154	8.907
TGJB21DA	B	C2	2	2	131.124	8.609	0.041	0.106	12	LGM	0.0089	136.523	8.963
TGJB21FA	B	C2	2	2	138.702	8.591	0.044	0.106	12	LGM	0.0088	143.801	8.906
TGJC11DA	C	C1	3	1	131.919	8.812	0.036	0.104	12	LAT	0.0087	134.635	8.994
TGJC11EA	C	C1	3	1	126.246	8.397	0.039	0.106	12	LWB	0.0088	130.887	8.706
TGJC11FA	C	C1	3	1	129.012	8.648	0.038	0.104	12	LAT	0.0087	132.026	8.850
TGJC21DA	C	C2	3	2	114.576	8.814	0.046	0.105	12	LAT	0.0087	117.384	9.030
TGJC21EA	C	C2	3	2	132.490	8.867	0.035	0.105	12	LAT	0.0088	136.474	9.134
TGJC21FA	C	C2	3	2	124.093	8.857	0.039	0.103	12	LWB	0.0086	125.310	8.944

*** No transverse strain data available; uniaxial strain device was used.**

Average	**126.326**	**8.664**	**0.040**	**$Average_{norm}$**	**0.0088**	**130.408**	**8.944**
Standard Dev.	**8.700**	**0.237**	**0.006**	**$Standard\ Dev._{norm}$**		**9.029**	**0.235**
Coeff. of Var. [%]	**6.887**	**2.737**	**15.521**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**6.924**	**2.631**
Min.	**106.466**	**8.343**	**0.028**	**Min.**	**0.0086**	**111.702**	**8.706**
Max.	**141.513**	**9.341**	**0.054**	**Max.**	**0.0091**	**145.930**	**9.800**
Number of Spec.	**19**	**19**	**16**	**Number of Spec.**		**19**	**19**


Warp Tension Properties (WT) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Strength [ksi]
0
50
100
150
200
0
1
2
3
4


Warp Tension Properties (WT) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Modulus [Msi]
0.0
5.0
10.0
15.0
20.0
0
1
2
3
4

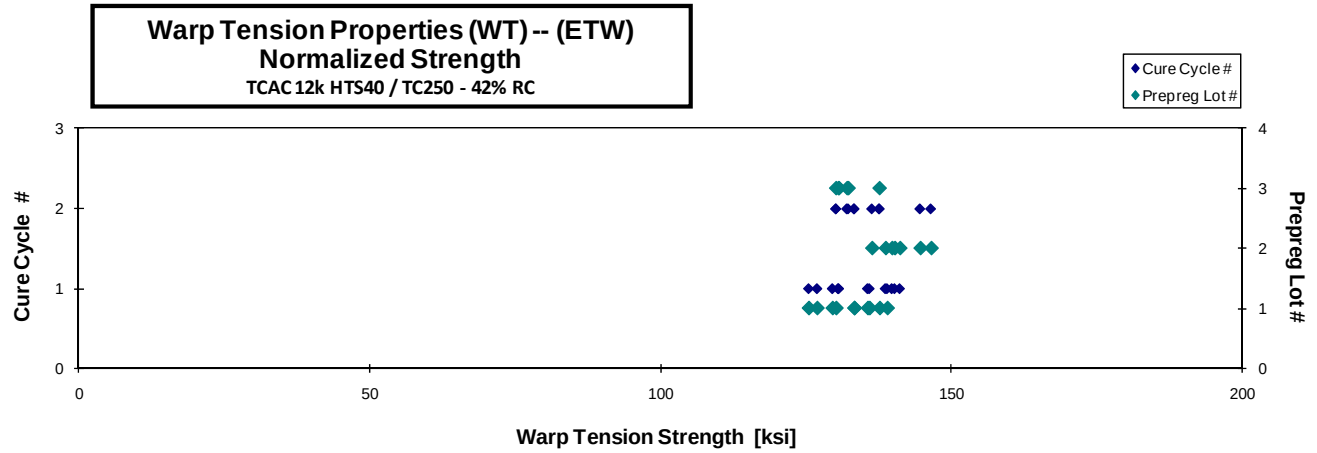
Warp Tension Properties (WT) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

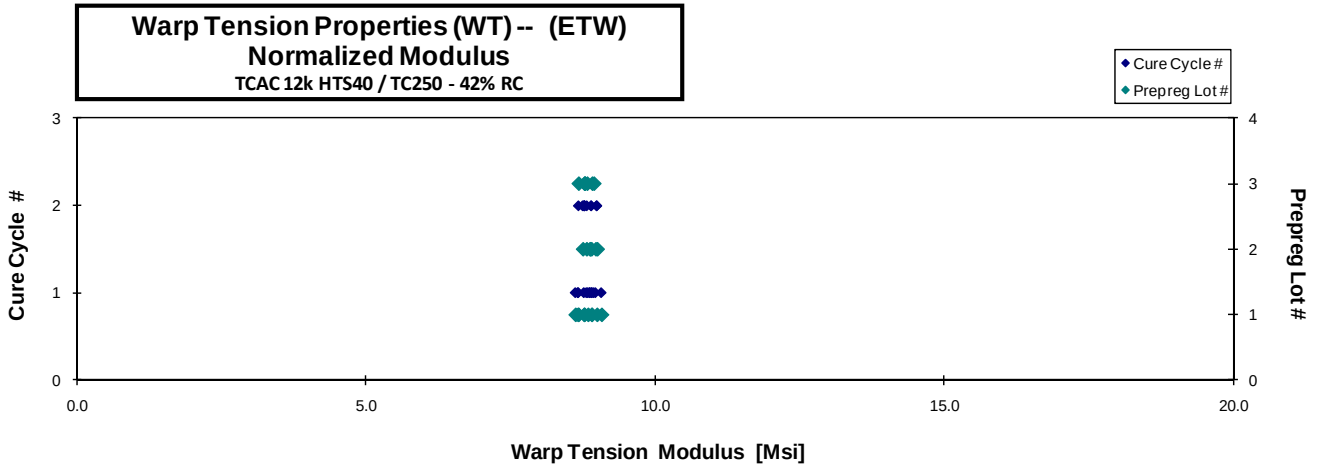
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGJA111F	A	C1	1	1	132.555	8.873	***	0.104	12	LWB/LAT	0.0087	135.652	9.080
TGJA112F	A	C1	1	1	121.987	8.501	***	0.106	12	LAT/LAB	0.0088	126.970	8.848
TGJA113F	A	C1	1	1	119.409	8.478	***	0.107	12	LWT/LAB	0.0089	125.535	8.913
TGJA114F	A	C1	1	1	122.054	8.268	0.046	0.108	12	LAT/LAB	0.0090	129.612	8.780
TGJA115F	A	C1	1	1	131.491	8.166	0.016	0.108	12	LGM	0.0090	139.011	8.633
TGJA116F	A	C1	1	1	129.544	8.267	0.045	0.107	12	LWT/LWB	0.0089	135.957	8.676
TGJA211F	A	C2	1	2	132.218	8.614	**	0.103	12	LAT/LWB	0.0086	133.341	8.687
TGJA212F	A	C2	1	2	131.528	8.665	0.033	0.103	12	LAT/LWB	0.0086	133.354	8.786
TGJA213F	A	C2	1	2	127.252	8.706	0.048	0.104	12	LAT/LWB	0.0087	130.226	8.909
TGJA214F	A	C2	1	2	133.879	8.752	0.034	0.105	12	LAB/LWT	0.0087	137.686	9.001
TGJB111F	B	C1	2	1	143.646	9.225	**	0.099	12	LWB/LAT	0.0083	139.820	8.979
TGJB112F	B	C1	2	1	140.934	8.923	0.045	0.102	12	LWT	0.0085	140.290	8.883
TGJB113F	B	C1	2	1	137.521	8.748	0.052	0.103	12	LAT/LWB	0.0086	138.712	8.824
TGJB114F	B	C1	2	1	139.218	8.757	0.057	0.103	12	LWT/LAB	0.0086	141.174	8.880
TGJB211F	B	C2	2	2	146.144	8.737	0.043	0.102	12	LGM	0.0085	146.526	8.760
TGJB212F	B	C2	2	2	143.049	8.905	0.051	0.103	12	LGM	0.0086	144.662	9.005
TGJB213F	B	C2	2	2	132.993	8.684	0.051	0.105	12	LAT	0.0087	136.383	8.906
TGJC114F	C	C1	3	1	*	8.692	0.039	0.105	12		0.0087		8.919
TGJC115F	C	C1	3	1	125.563	8.604	0.040	0.106	12	LAB / LGM	0.0088	130.589	8.948
TGJC116F	C	C1	3	1	124.213	8.254	**	0.107	12	LAT	0.0089	130.708	8.686
TGJC211F	C	C2	3	2	132.272	8.973	0.039	0.100	12	LWB	0.0084	130.197	8.833
TGJC212F	C	C2	3	2	129.415	8.593	0.040	0.104	12	LWT / LAB	0.0087	132.312	8.786
TGJC213F	C	C2	3	2	133.095	8.505	**	0.105	12	LAT / LGM	0.0088	137.640	8.795
TGJC214F	C	C2	3	2	126.567	8.425	0.039	0.106	12	LGM	0.0089	132.089	8.793

*** Strength removed due to bad failure mode observed.**
**** Poisson's ratio was not reported due to non-linearity.**
***** No transverse strain data available; uniaxial strain device was used.**

	Strength [ksi]	Modulus [Msi]	Poisson's Ratio		Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	132.024	8.638	0.042	$Average_{norm}$	0.0087	135.150	8.846
Standard Dev.	7.234	0.254	0.009	$Standard\ Dev._{norm}$		5.437	0.115
Coeff. of Var. [%]	5.480	2.936	22.327	$Coeff.\ of\ Var.\ [\%]_{norm}$		4.023	1.296
Min.	119.409	8.166	0.016	Min.	0.0083	125.535	8.633
Max.	146.144	9.225	0.057	Max.	0.0090	146.526	9.080
Number of Spec.	23	24	17	Number of Spec.		23	24


Warp Tension Properties (WT) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
50
100
150
200
Warp Tension Strength [ksi]


Warp Tension Properties (WT) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
5.0
10.0
15.0
20.0
Warp Tension Modulus [Msi]

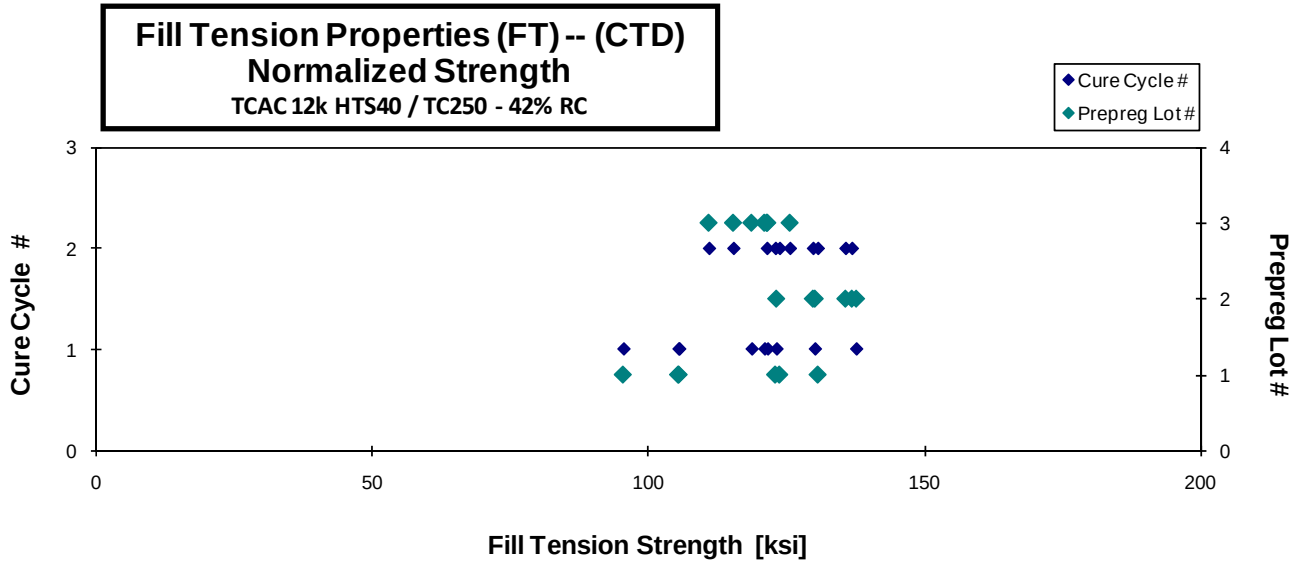
4.2 Fill Tension Properties

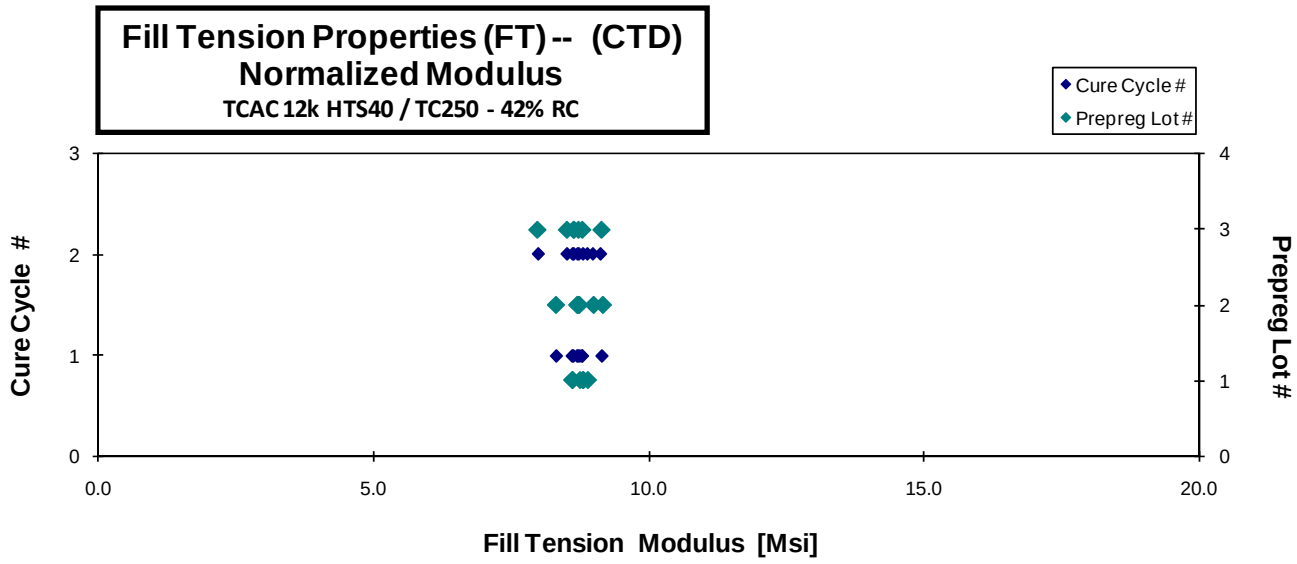
Fill Tension Properties (FT) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGUA117B	A	C1	1	1	102.212	8.534	0.105	12	LGM	0.0088	105.368	8.798
TGUA118B	A	C1	1	1	102.945	8.539	0.105	12	LGM	0.0087	105.485	8.750
TGUA119B	A	C1	1	1	91.020	8.214	0.107	12	LGM	0.0089	95.392	8.609
TGUA217B	A	C2	1	2	125.610	8.288	0.106	12	LAB	0.0088	130.597	8.617
TGUA218B	A	C2	1	2	118.479	8.493	0.106	12	LWB	0.0088	122.912	8.810
TGUA219B	A	C2	1	2	119.010	8.555	0.106	12	LWT	0.0088	123.657	8.889
TGUB117B	B	C1	2	1	119.359	8.063	0.105	12	LAT	0.0088	123.103	8.316
TGUB118B	B	C1	2	1	133.346	8.879	0.105	12	LWT	0.0088	137.551	9.159
TGUB119B	B	C1	2	1	127.144	8.503	0.104	12	LAB	0.0087	130.073	8.699
TGUB218B	B	C2	2	2	127.918	8.482	0.108	12	LWT	0.0090	135.610	8.992
TGUB219B	B	C2	2	2	128.647	8.216	0.108	12	LAB	0.0090	136.761	8.735
TGUB21AB	B	C2	2	2	123.936	8.321	0.107	12	LAT	0.0089	129.727	8.710
TGUC117B	C	C1	3	1	115.805	8.228	0.107	12	LAT	0.0089	121.500	8.633
TGUC118B	C	C1	3	1	115.632	8.337	0.107	12	LGM	0.0089	120.941	8.719
TGUC119B	C	C1	3	1	113.175	8.386	0.107	12	LWB	0.0089	118.612	8.789
TGUC21CB	C	C2	3	2	112.029	8.874	0.105	12	LAB	0.0087	115.306	9.133
TGUC21DB	C	C2	3	2	107.628	7.748	0.105	12	LAT	0.0088	110.881	7.982
TGUC21EB	C	C2	3	2	118.275	8.297	0.105	12	LAB	0.0087	121.367	8.514
TGUC21FB	C	C2	3	2	122.214	8.410	0.105	12	LAB	0.0087	125.529	8.638

Average	**117.073**	**8.388**	**$Average_{norm}$**	**0.0088**	**121.599**	**8.710**
Standard Dev.	**10.566**	**0.259**	**$Standard\ Dev._{norm}$**		**11.296**	**0.266**
Coeff. of Var. [%]	**9.025**	**3.090**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**9.290**	**3.053**
Min.	**91.020**	**7.748**	**Min.**	**0.0087**	**95.392**	**7.982**
Max.	**133.346**	**8.879**	**Max.**	**0.0090**	**137.551**	**9.159**
Number of Spec.	**19**	**19**	**Number of Spec.**		**19**	**19**


Fill Tension Properties (FT) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Strength [ksi]
0
50
100
150
200
0
1
2
3
4


Fill Tension Properties (FT) -- (CTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Modulus [Msi]
0.0
5.0
10.0
15.0
20.0
0
1
2
3
4

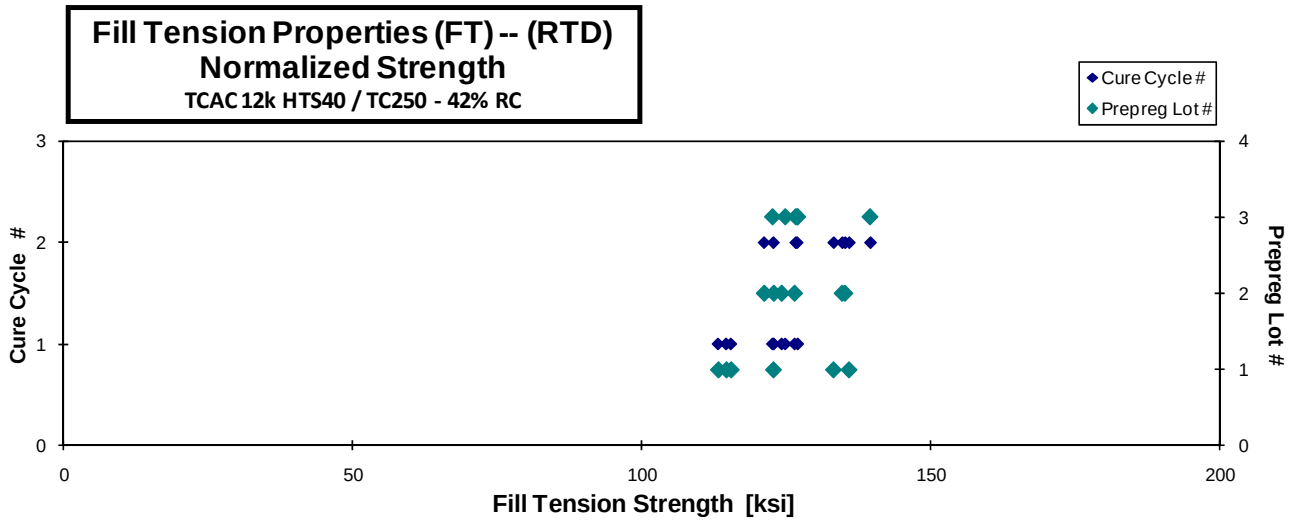
Fill Tension Properties (FT) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

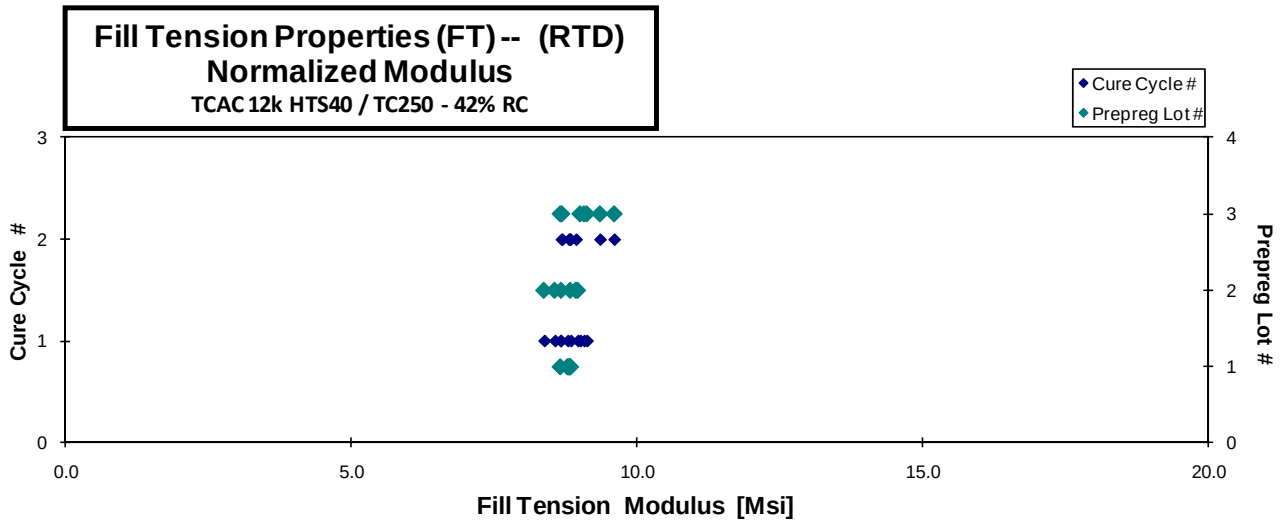
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGUA11DA	A	C1	1	1	109.238	8.535	0.106	12	LGM	0.0088	113.218	8.846
TGUA11EA	A	C1	1	1	114.179	8.574	0.103	12	LGM	0.0086	115.429	8.668
TGUA11FA	A	C1	1	1	114.480	8.782	0.102	12	LWT	0.0085	114.611	8.792
TGUA21DA	A	C2	1	2	120.113	8.617	0.104	12	LWT	0.0087	122.802	8.810
TGUA21EA	A	C2	1	2	132.756	8.625	0.104	12	LAT	0.0087	135.945	8.832
TGUA21FA	A	C2	1	2	129.402	8.567	0.105	12	LGM	0.0088	133.250	8.822
TGUB11DA	B	C1	2	1	122.004	8.086	0.106	12	LGM	0.0088	126.470	8.382
TGUB11EA	B	C1	2	1	119.540	8.337	0.105	12	LAT	0.0087	122.861	8.569
TGUB11FA	B	C1	2	1	119.766	8.646	0.106	12	LWT	0.0088	124.228	8.968
TGUB21DA	B	C2	2	2	116.528	8.348	0.106	12	LGM	0.0088	121.193	8.682
TGUB21EA	B	C2	2	2	128.535	8.401	0.107	12	LWT	0.0089	135.235	8.838
TGUB21FA	B	C2	2	2	127.197	8.437	0.108	12	LWB	0.0090	134.742	8.937
TGUC11DA	C	C1	3	1	121.761	8.310	0.106	12	LAB	0.0089	127.013	8.668
TGUC11EA*	C	C1	3	1		8.762	0.106	12	LIB	0.0088		9.077
TGUC11FA	C	C1	3	1	116.943	8.592	0.107	12	LAT	0.0089	122.638	9.011
TGUC11GA	C	C1	3	1	120.209	8.787	0.106	12	LAT	0.0088	124.845	9.126
TGUC217A	C	C2	3	2	121.478	9.191	0.107	12	LAT	0.0089	126.917	9.602
TGUC218A	C	C2	3	2	134.465	8.375	0.106	12	LAT	0.0088	139.607	8.695
TGUC219A	C	C2	3	2	123.056	9.088	0.105	12	LAT	0.0088	126.676	9.355

*** Strength is not reported as unaccepatable failure modes was observed**

Average	**121.758**	**8.582**	**$Average_{norm}$**	**0.0088**	**125.982**	**8.878**
Standard Dev.	**6.642**	**0.267**	**$Standard\ Dev._{norm}$**		**7.533**	**0.279**
Coeff. of Var. [%]	**5.455**	**3.110**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.979**	**3.145**
Min.	**109.238**	**8.086**	**Min.**	**0.0085**	**113.218**	**8.382**
Max.	**134.465**	**9.191**	**Max.**	**0.0090**	**139.607**	**9.602**
Number of Spec.	**18**	**19**	**Number of Spec.**		**18**	**19**


Fill Tension Properties (FT) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Strength [ksi]
0
50
100
150
200
0
1
2
3
4


Fill Tension Properties (FT) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Modulus [Msi]
0.0
5.0
10.0
15.0
20.0
0
1
2
3
4

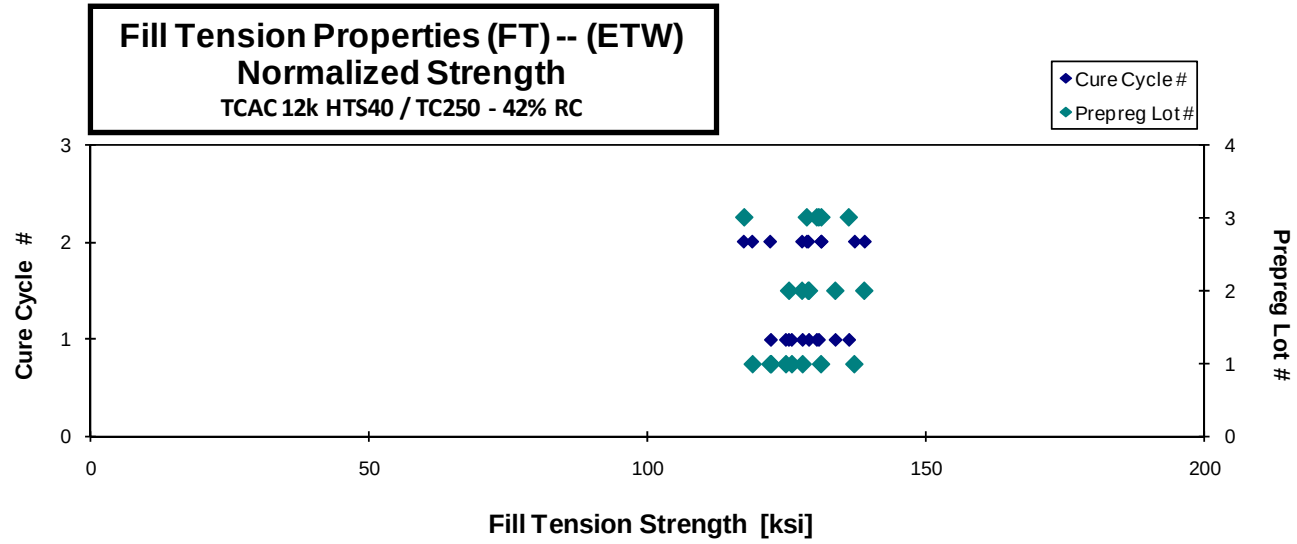
Fill Tension Properties (FT) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

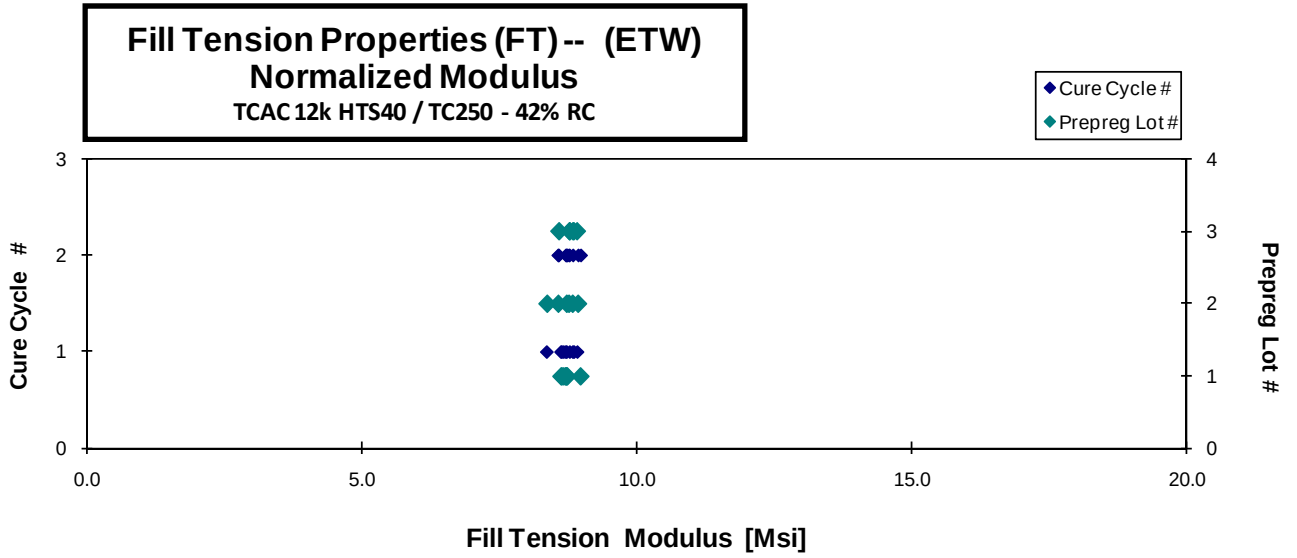
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGUA111F	A	C1	1	1	122.125	8.326	0.107	12	LGM / LAB	0.0089	127.872	8.718
TGUA112F	A	C1	1	1	117.224	8.279	0.106	12	LGM / LAB	0.0089	122.243	8.633
TGUA113F	A	C1	1	1	120.998	8.340	0.106	12	LGM / LAB / LWT	0.0088	125.941	8.680
TGUA114F	A	C1	1	1	119.293	8.262	0.107	12	LGM / LAB / LWT	0.0089	124.888	8.650
TGUA211F	A	C2	1	2	141.973	9.468	0.094	12	LGM	0.0079	131.162	8.747
TGUA212F	A	C2	1	2	143.985	9.159	0.097	12	LGM	0.0081	137.115	8.722
TGUA213F	A	C2	1	2	119.661	8.788	0.101	12	LAT / LAB	0.0084	118.918	8.733
TGUA214F	A	C2	1	2	119.052	8.768	0.105	12	LAT / LWB	0.0087	122.106	8.993
TGUB111F	B	C1	2	1	143.551	9.381	0.095	12	LGM	0.0079	133.699	8.737
TGUB112F	B	C1	2	1	133.562	8.672	0.099	12	LGM/LWT	0.0082	129.001	8.375
TGUB113F	B	C1	2	1	125.582	8.857	0.102	12	LAT/LWB	0.0085	125.438	8.846
TGUB213F	B	C2	2	2	121.872	8.186	0.107	12	LWB/LAT	0.0089	127.766	8.582
TGUB214F	B	C2	2	2	131.188	8.451	0.108	12	LWB/LAT	0.0090	138.884	8.947
TGUB215F	B	C2	2	2	123.141	8.389	0.107	12	LGM/LAT	0.0089	128.855	8.778
TGUC111F	C	C1	3	1	136.348	9.193	0.098	12	LAT/LAB	0.0081	130.400	8.792
TGUC112F	C	C1	3	1	137.973	8.990	0.101	12	LAT/LAB	0.0084	136.124	8.869
TGUC113F	C	C1	3	1	130.840	8.934	0.102	12	LAB	0.0085	130.754	8.928
TGUC211F	C	C2	3	2	132.471	8.853	0.099	12	LGM/LWB	0.0083	128.618	8.595
TGUC212F	C	C2	3	2	133.584	8.947	0.100	12	LWT/LAB	0.0084	131.227	8.789
TGUC213F	C	C2	3	2	118.246	8.915	0.101	12	LAT	0.0084	117.415	8.852

	Strength [ksi]	Modulus [Msi]
Average	128.633	8.758
Standard Dev.	9.007	0.384
Coeff. of Var. [%]	7.002	4.390
Min.	117.224	8.186
Max.	143.985	9.468
Number of Spec.	20	20

	t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	0.0085	128.421	8.748
$Standard\ Dev._{norm}$		5.691	0.143
$Coeff.\ of\ Var.\ [\%]_{norm}$		4.431	1.639
Min.	0.0079	117.415	8.375
Max.	0.0090	138.884	8.993
Number of Spec.		20	20


Fill Tension Properties (FT) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
50
100
150
200
Fill Tension Strength [ksi]


Fill Tension Properties (FT) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
5.0
10.0
15.0
20.0
Fill Tension Modulus [Msi]

4.3 Warp Compression Properties

Warp Compression Properties (WC) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

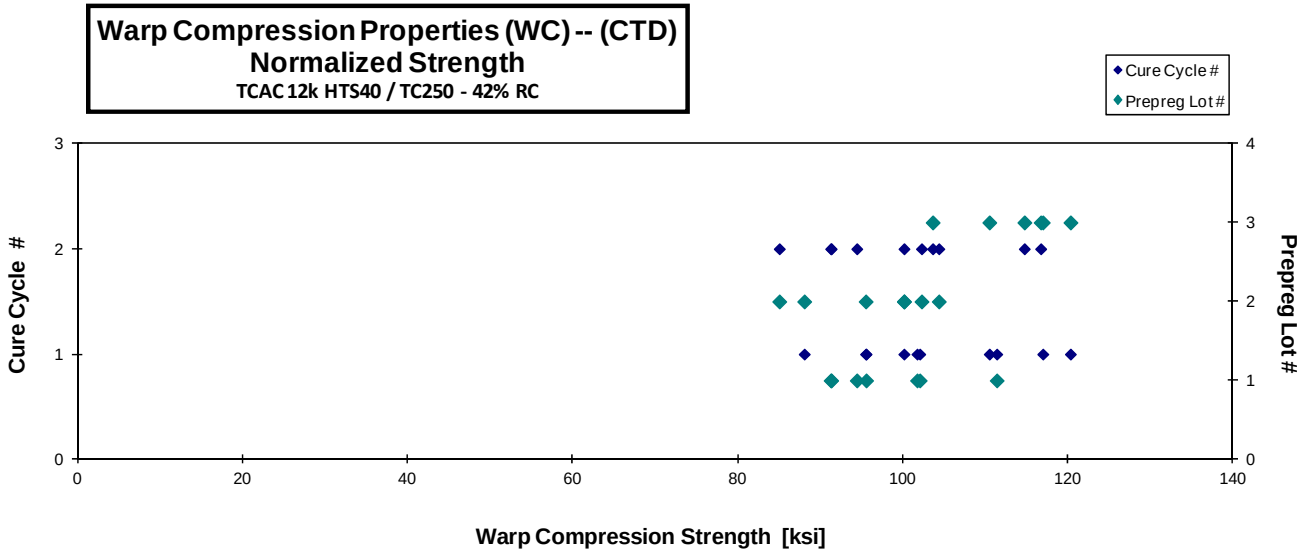
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGLA11FB***	A	C1	1	1	96.297	6.551	0.041	0.101	12	BGM	0.0084	95.542	6.499
TGLA11GB	A	C1	1	1	102.632	7.006	0.031	0.101	12	BGM	0.0084	101.709	6.943
TGLA11HB	A	C1	1	1	104.600	7.584	0.050	0.100	12	BGM	0.0083	102.036	7.398
TGLA11IB	A	C1	1	1	**	**	**	0.100	12	BGM	0.0083		
TGLA11JB	A	C1	1	1	112.709	8.050	0.058	0.101	12	BGM	0.0084	111.365	7.954
TGLA21FB	A	C2	1	2	93.950	8.086	0.073	0.103	12	BAB	0.0085	94.411	8.126
TGLA21GB	A	C2	1	2	91.234	6.499	0.058	0.102	12	BGM	0.0085	91.249	6.500
TGLA21HB	A	C2	1	2	91.644	8.289	*	0.102	12	BAT	0.0085	91.314	8.260
TGLB11FB	B	C1	2	1	87.251	5.912	0.031	0.103	12	BGM	0.0086	88.050	5.966
TGLB11GB	B	C1	2	1	95.286	5.717	0.045	0.102	12	BGM	0.0085	95.489	5.729
TGLB11HB	B	C1	2	1	100.467	5.348	*	0.102	12	BGM	0.0085	100.122	5.329
TGLB21FB	B	C2	2	2	107.242	8.436	*	0.099	12	BGM	0.0083	104.350	8.209
TGLB21GB	B	C2	2	2	87.279	6.692	0.024	0.099	12	BGM	0.0083	85.025	6.520
TGLB21HB	B	C2	2	2	99.691	7.784	*	0.102	12	BGM	0.0085	100.130	7.819
TGLB21IB	B	C2	2	2	100.544	8.004	0.039	0.104	12	BGM	0.0086	102.253	8.140
TGLC118B	C	C1	3	1	111.432	8.110	0.045	0.107	12	BGM	0.0089	116.949	8.512
TGLC119B	C	C1	3	1	105.706	8.044	0.041	0.107	12	BGM	0.0089	110.465	8.406
TGLC11KB	C	C1	3	1	115.156	7.894	0.039	0.107	12	BGM	0.0089	120.293	8.246
TGLC21FB	C	C2	3	2	121.063	9.030	0.047	0.098	12	BGM	0.0082	116.691	8.704
TGLC21GB	C	C2	3	2	117.880	8.697	0.054	0.099	12	BGM	0.0083	114.711	8.464
TGLC21HB	C	C2	3	2	105.165	8.677	*	0.100	12	BGM	0.0084	103.601	8.548

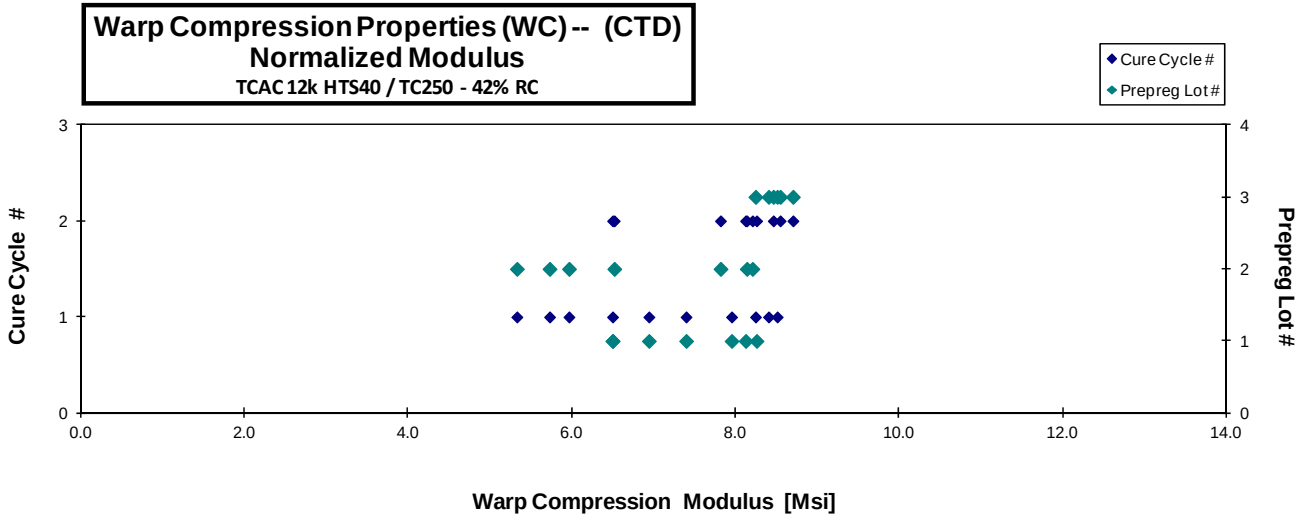
* Poisson's ratio was not reported due to non-linearity.
** datapoint ommited because bending of 21.88% was recorded at failure load.
*** Bending of -14.31% was recorded at ~2000με. Bending of -11.31% was recorded at failure load.

Average	**102.361**	**7.521**	**0.045**
Standard Dev.	**9.888**	**1.066**	**0.012**
Coeff. of Var. [%]	**9.660**	**14.176**	**27.602**
Min.	**87.251**	**5.348**	**0.024**
Max.	**121.063**	**9.030**	**0.073**
Number of Spec.	**20**	**20**	**15**

$Average_{norm}$	**0.0085**	**102.288**	**7.514**
$Standard\ Dev._{norm}$		**10.164**	**1.065**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**9.936**	**14.173**
Min.	**0.0082**	**85.025**	**5.329**
Max.	**0.0089**	**120.293**	**8.704**
Number of Spec.		**20**	**20**

Modulus - strain data has been reviewed by the DRWG. High variability may be due to the large unit cell size of the weave. **Data should be used with discretion.**


Warp Compression Properties (WC) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Strength [ksi]
0
20
40
60
80
100
120
140
0
1
2
3
4


Warp Compression Properties (WC) -- (CTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Modulus [Msi]
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
0
1
2
3
4

Warp Compression Properties (WC) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

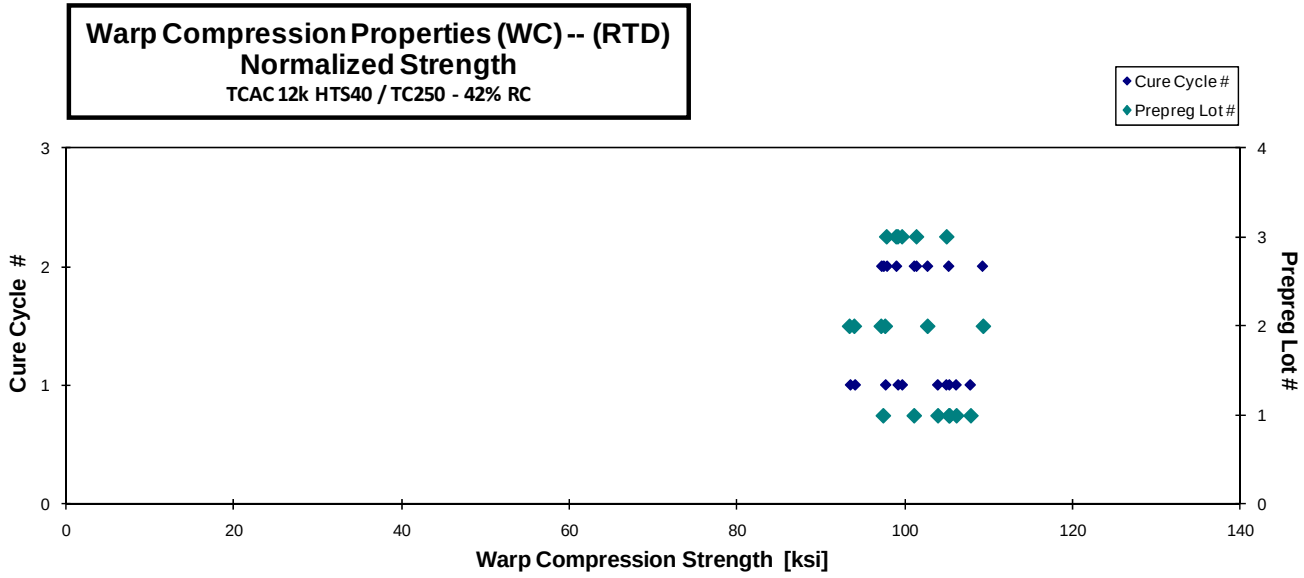
normalizing t_{ply} [in]: 0.0085

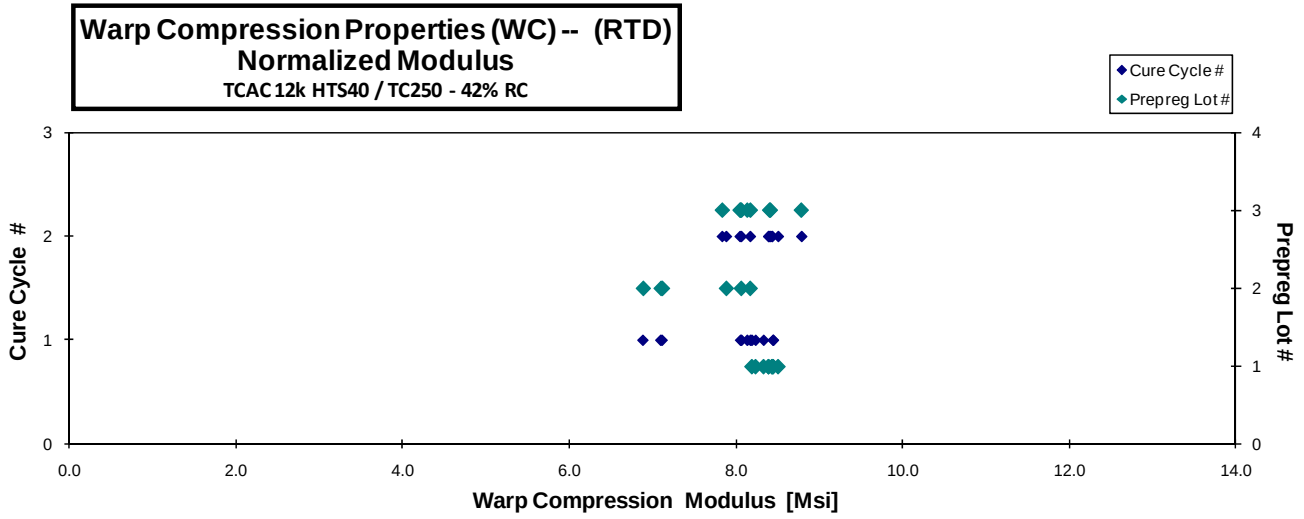
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGLA11KA	A	C1	1	1	108.550	8.506	0.049	0.101	12	BGM	0.0084	107.841	8.451
TGLA11LA	A	C1	1	1	*	8.224	0.038	0.102	12	HIT	0.0085		8.242
TGLA11MA	A	C1	1	1	105.681	8.301	0.037	0.102	12	BGM	0.0085	106.147	8.337
TGLA11NA	A	C1	1	1	102.873	8.112	0.041	0.103	12	BGM	0.0086	103.949	8.197
TGLA11OA	A	C1	1	1	104.687	8.401	0.031	0.103	12	BAT	0.0086	105.337	8.453
TGLA21KA	A	C2	1	2	*	8.340	0.035	0.103	12	HIB	0.0086		8.397
TGLA21LA	A	C2	1	2	99.686	8.318	0.055	0.103	12	BGM	0.0086	101.136	8.439
TGLA21MA	A	C2	1	2	95.609	8.349	0.055	0.104	12	BGM	0.0087	97.484	8.513
TGLA21NA	A	C2	1	2	*	8.343	0.094	0.103	12	HIT	0.0086		8.440
TGLA21OA	A	C2	1	2	103.599	8.265	0.076	0.104	12	HAB	0.0086	105.258	8.397
TGLB11KA	B	C1	2	1	96.324	7.335	0.032	0.099	12	BGM	0.0083	93.491	7.119
TGLB11LA	B	C1	2	1	95.362	6.985	0.046	0.101	12	BGM	0.0084	94.053	6.889
TGLB11MA	B	C1	2	1	97.122	7.061	0.042	0.103	12	BGM	0.0086	97.709	7.103
TGLB21KA	B	C2	2	2	105.518	7.894	0.051	0.106	12	BGM	0.0088	109.311	8.177
TGLB21LA	B	C2	2	2	98.927	7.771	0.051	0.106	12	BGM / HGM	0.0088	102.726	8.070
TGLB21MA	B	C2	2	2	93.556	7.591	0.043	0.106	12	BGM	0.0088	97.240	7.890
TGLC11DA	C	C1	3	1	110.229	8.463	0.034	0.097	12	BGM	0.0081	104.979	8.060
TGLC11IA	C	C1	3	1	97.224	7.976	0.038	0.105	12	BAT	0.0087	99.702	8.180
TGLC11JA	C	C1	3	1	*	7.757	0.042	0.106	12	HIT	0.0088		8.072
TGLC11NA	C	C1	3	1	95.132	7.807	0.068	0.106	12	BAT	0.0089	99.205	8.142
TGLC21KA	C	C2	3	2	*	7.909	**	0.104	12	HIT	0.0087		8.055
TGLC21LA	C	C2	3	2	*	7.716	**	0.104	12	HIT	0.0086		7.841
TGLC21MA	C	C2	3	2	97.337	8.279	0.043	0.104	12	BGM	0.0086	99.007	8.421
TGLC21NA	C	C2	3	2	96.074	8.631	0.082	0.104	12	BGM / HAT	0.0087	97.879	8.793
TGLC21OA	C	C2	3	2	99.168	8.226	0.097	0.104	12	BGM	0.0087	101.405	8.411

*** Compressive strength is not reported as unacceptable failure mode was observed**

**** Poisson's ratio was not reported due to non-linearity.**

Average	**100.140**	**8.022**	**0.051**	**$Average_{norm}$**	**0.0086**	**101.256**	**8.124**
Standard Dev.	**4.962**	**0.438**	**0.019**	**$Standard\ Dev._{norm}$**		**4.511**	**0.462**
Coeff. of Var. [%]	**4.955**	**5.456**	**37.732**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.455**	**5.691**
Min.	**93.556**	**6.985**	**0.031**	**Min.**	**0.0081**	**93.491**	**6.889**
Max.	**110.229**	**8.631**	**0.097**	**Max.**	**0.0089**	**109.311**	**8.793**
Number of Spec.	**19**	**25**	**23**	**Number of Spec.**		**19**	**25**


Warp Compression Properties (WC) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Strength [ksi]
0
20
40
60
80
100
120
140
0
1
2
3
4


Warp Compression Properties (WC) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Modulus [Msi]
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
0
1
2
3
4

Warp Compression Properties (WC) -- (ETD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

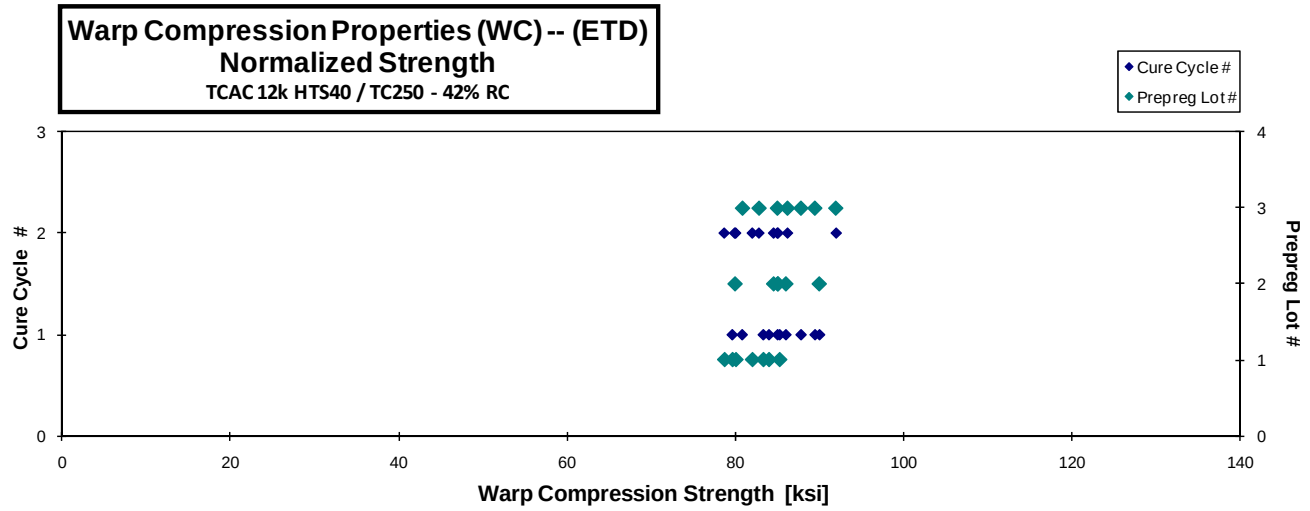
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGLA118G	A	C1	1	1	*	7.868	0.041	0.104	12	HIB	0.0087		8.013
TGLA119G	A	C1	1	1	83.493	7.873	0.054	0.104	12	BAB	0.0087	85.294	8.043
TGLA11AG	A	C1	1	1	81.702	7.068	0.038	0.104	12	BGM	0.0087	83.357	7.211
TGLA11BG	A	C1	1	1	82.719	6.928	0.042	0.104	12	BAT	0.0086	84.030	7.038
TGLA11CG	A	C1	1	1	78.755	7.473	0.052	0.103	12	HGM	0.0086	79.695	7.563
TGLA218G	A	C2	1	2	79.332	7.986	0.035	0.103	12	BGM	0.0086	80.097	8.063
TGLA219G	A	C2	1	2	81.028	7.732	0.026	0.103	12	BGM	0.0086	82.061	7.830
TGLA21AG	A	C2	1	2	77.569	8.116	0.060	0.104	12	BGM	0.0086	78.747	8.240
TGLB118G	B	C1	2	1	87.226	7.147	0.037	0.105	12	BGM	0.0088	89.991	7.373
TGLB119G	B	C1	2	1	82.134	7.139	0.043	0.106	12	BGM	0.0088	85.046	7.392
TGLB11AG	B	C1	2	1	*	6.743	0.021	0.105	12	HIT	0.0088		6.963
TGLB11BG	B	C1	2	1	83.398	6.486	0.016	0.105	12	BGM	0.0088	86.028	6.690
TGLB218G	B	C2	2	2	79.542	8.733	0.034	0.103	12	BGM	0.0085	79.984	8.782
TGLB219G	B	C2	2	2	84.673	8.453	0.037	0.103	12	BGM	0.0085	85.089	8.494
TGLB21AG	B	C2	2	2	83.615	8.347	0.030	0.103	12	BGM	0.0086	84.571	8.442
TGLC11AG	C	C1	3	1	83.942	7.791	**	0.107	12	BGM	0.0089	87.810	8.150
TGLC11BG	C	C1	3	1	77.062	7.479	0.061	0.107	12	HAB/BAB	0.0089	80.871	7.848
TGLC11CG	C	C1	3	1	85.873	7.946	0.058	0.106	12	BAT	0.0089	89.465	8.278
TGLC218G	C	C2	3	2	81.553	8.732	0.097	0.104	12	HAB/BAB	0.0086	82.839	8.870
TGLC219G	C	C2	3	2	88.860	7.905	0.061	0.106	12	BAB	0.0088	91.953	8.180
TGLC21AG	C	C2	3	2	*	8.125	0.054	0.106	12	HIB	0.0088		8.411
TGLC21BG	C	C2	3	2	84.166			0.104	12	BAB	0.0087	86.215	
TGLC21EG	C	C2	3	2	88.756			0.098	12	BAT	0.0081	85.021	

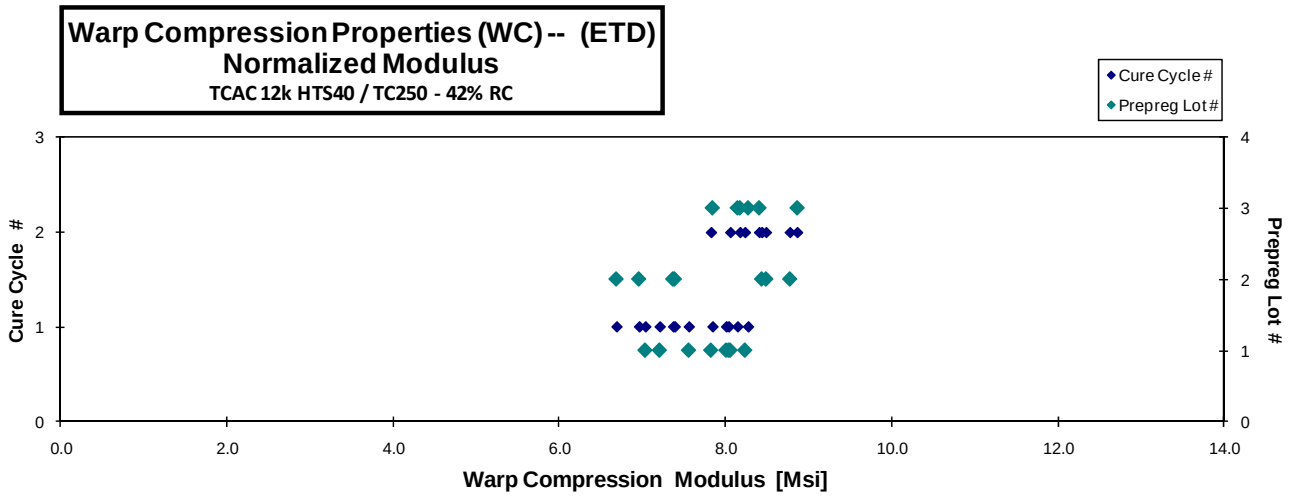
*** Compressive strength is not reported as unacceptable failure mode was observed**

**** Poisson's ratio was not reported due to non-linearity.**

	Strength [ksi]	Modulus [Msi]	Poisson's Ratio
Average	82.770	7.718	0.045
Standard Dev.	3.364	0.625	0.018
Coeff. of Var. [%]	4.064	8.105	40.480
Min.	77.062	6.486	0.016
Max.	88.860	8.733	0.097
Number of Spec.	20	21	20

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	0.0087	84.408	7.899
$Standard\ Dev._{norm}$		3.608	0.604
$Coeff.\ of\ Var.\ [\%]_{norm}$		4.274	7.650
Min.	0.0081	78.747	6.690
Max.	0.0089	91.953	8.870
Number of Spec.		20	21


Warp Compression Properties (WC) -- (ETD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Strength [ksi]
0
20
40
60
80
100
120
140


Warp Compression Properties (WC) -- (ETD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Modulus [Msi]
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0

Warp Compression Properties (WC) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

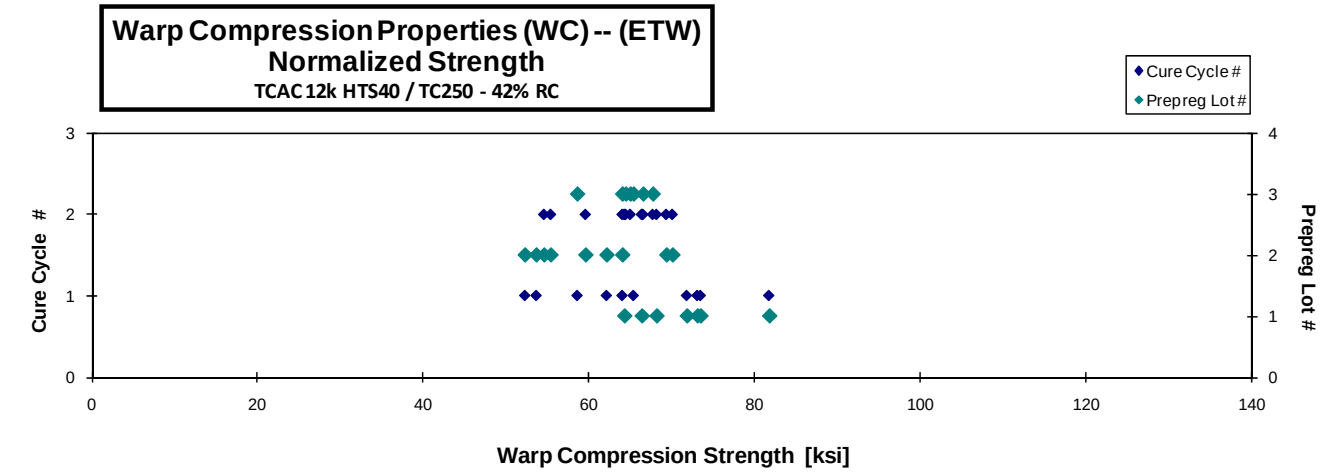
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGLA111F	A	C1	1	1	73.147	8.142	0.057	0.100	12	BGM	0.0083	71.772	7.989
TGLA112F	A	C1	1	1	74.514	8.112	0.061	0.101	12	BAB	0.0084	73.430	7.994
TGLA113F	A	C1	1	1	73.730	8.040	0.063	0.101	12	BAB	0.0084	73.043	7.965
TGLA114F	A	C1	1	1	81.518	8.239	0.057	0.102	12	BAB	0.0085	81.717	8.259
TGLA211F	A	C2	1	2	64.579	8.252	0.096	0.101	12	BAB	0.0085	64.231	8.207
TGLA212F	A	C2	1	2	*	7.733	0.068	0.102	12	BAT/HIT	0.0085		7.754
TGLA213F	A	C2	1	2	68.255	7.578	0.042	0.102	12	BAT	0.0085	68.121	7.563
TGLA214F	A	C2	1	2	66.439	7.579	**	0.102	12	HGM	0.0085	66.331	7.567
TGLB111F	B	C1	2	1	55.667	8.467	0.058	0.096	12	BGM	0.0080	52.211	7.941
TGLB112F	B	C1	2	1	55.719	8.013	0.057	0.098	12	BGM	0.0082	53.579	7.706
TGLB113F	B	C1	2	1	63.661	7.561	0.063	0.099	12	BGM	0.0083	62.079	7.373
TGLB211F	B	C2	2	2	70.670	8.108	0.023	0.100	12	BAB	0.0083	69.295	7.950
TGLB212F	B	C2	2	2	56.747	8.230	**	0.099	12	HAB	0.0083	55.328	8.024
TGLB213F	B	C2	2	2	55.082	7.968	**	0.101	12	HAT	0.0084	54.515	7.886
TGLB214F	B	C2	2	2	63.835	8.279	**	0.102	12	HAT	0.0085	63.981	8.298
TGLB215F	B	C2	2	2	60.602	8.528	**	0.100	12	BAT	0.0084	59.533	8.377
TGLB216F	B	C2	2	2	69.704	8.258	0.020	0.102	12	BAT	0.0085	70.034	8.298
TGLC111F	C	C1	3	1	61.550	8.483	0.032	0.097	12	HGM	0.0081	58.533	8.067
TGLC112F	C	C1	3	1	67.469	8.261	**	0.099	12	HGM	0.0082	65.325	7.999
TGLC113F	C	C1	3	1	64.988	7.897	0.053	0.100	12	HGM	0.0084	63.969	7.774
TGLC211F	C	C2	3	2	74.076	8.439	0.061	0.093	12	BGM	0.0078	67.661	7.708
TGLC212F	C	C2	3	2	69.624	7.652	**	0.095	12	BGM	0.0079	64.937	7.137
TGLC213F	C	C2	3	2	*	7.750	0.038	0.097	12	HIT	0.0081		7.344
TGLC215F	C	C2	3	2	65.534	7.583	0.064	0.100	12	BGM	0.0084	64.383	7.450
TGLC216F	C	C2	3	2	66.625	8.471	**	0.102	12	BAB	0.0085	66.489	8.454

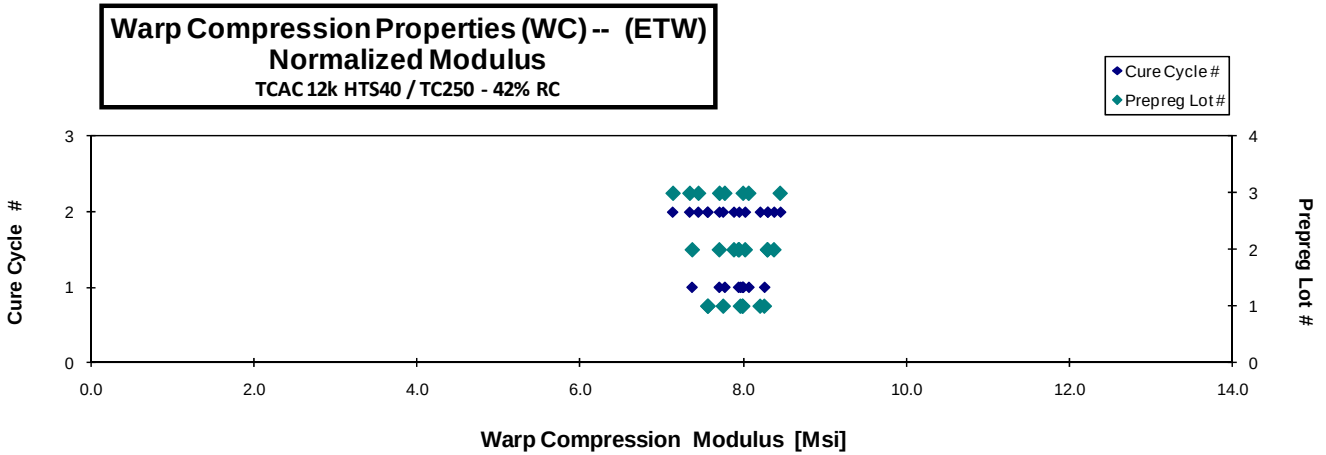
*** Compressive strength is not reported as unacceptable failure mode was observed**

**** Poisson's ratio was not reported due to non-linearity.**

Average	**66.249**	**8.065**	**0.054**
Standard Dev.	**6.823**	**0.320**	**0.018**
Coeff. of Var. [%]	**10.298**	**3.969**	**33.926**
Min.	**55.082**	**7.561**	**0.020**
Max.	**81.518**	**8.528**	**0.096**
Number of Spec.	**23**	**25**	**17**

$Average_{norm}$	**0.0083**	**64.804**	**7.883**
Standard $Dev._{norm}$		**7.089**	**0.345**
Coeff. of Var. $[\%]_{norm}$		**10.940**	**4.374**
Min.	**0.0078**	**52.211**	**7.137**
Max.	**0.0085**	**81.717**	**8.454**
Number of Spec.		**23**	**25**


Warp Compression Properties (WC) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
Warp Compression Strength [ksi]


Warp Compression Properties (WC) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
Warp Compression Modulus [Msi]

4.4 Fill Compression Properties

Fill Compression Properties (FC) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

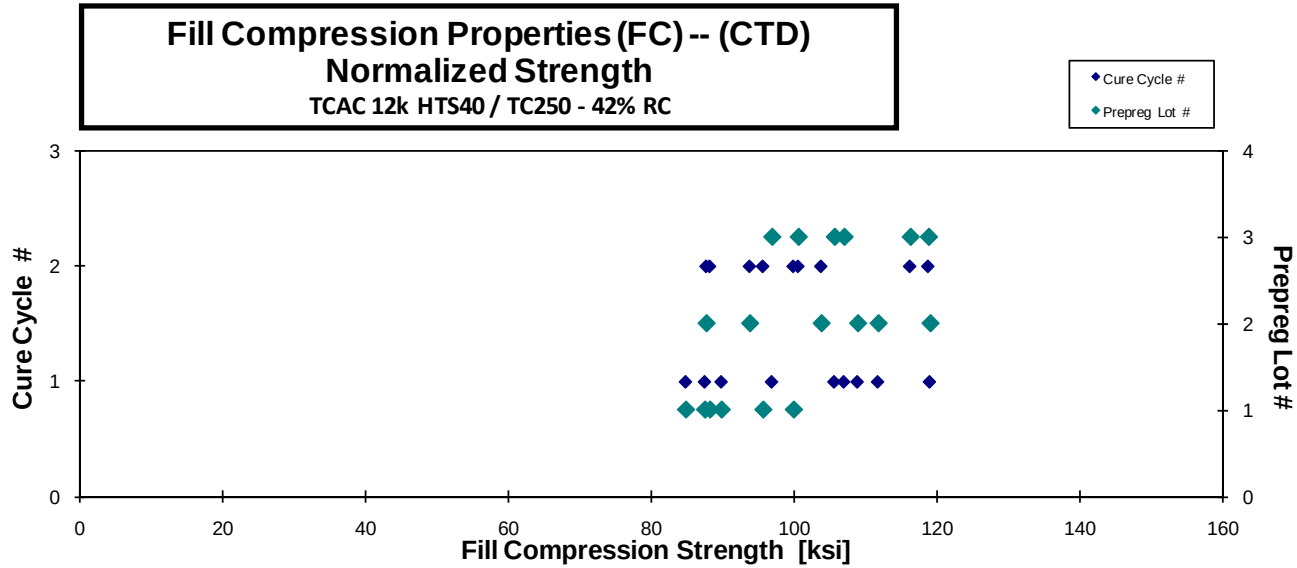
normalizing t_{ply} [in]: 0.0085

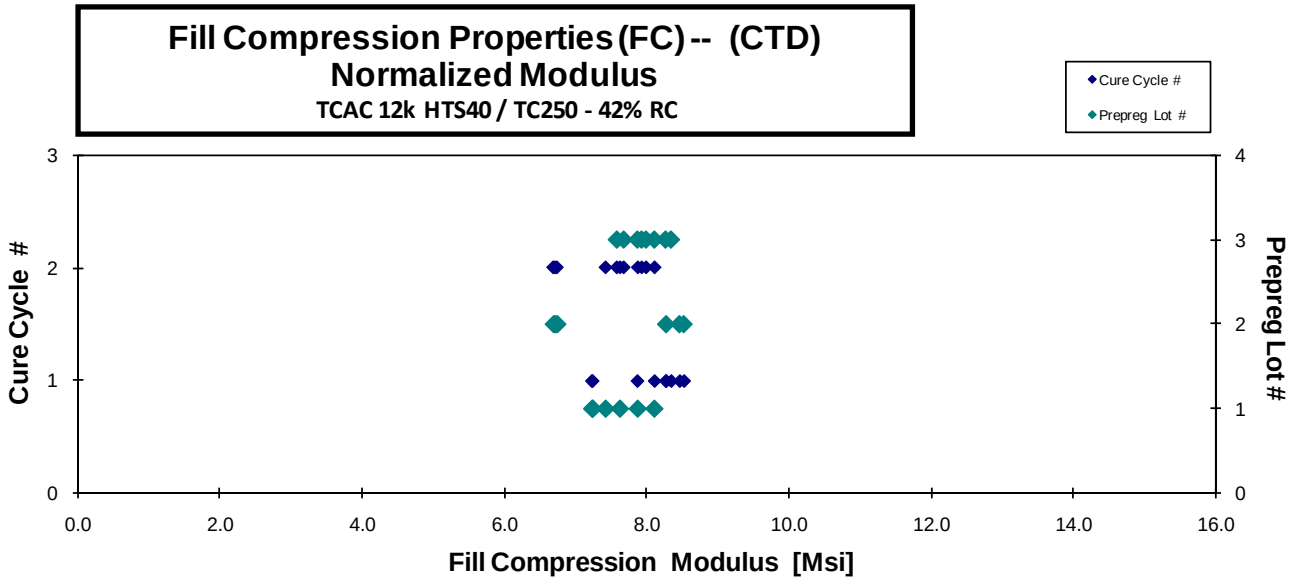
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGZA11FB	A	C1	1	1	81.310	6.943	0.039	0.106	12	BGM	0.0089	84.857	7.245
TGZA11GB	A	C1	1	1	88.476	7.125	0.040	0.104	12	BGM / BAB	0.0086	89.849	7.235
TGZA11HB	A	C1	1	1	88.229	8.172	**	0.101	12	BAT / BGM	0.0084	87.522	8.107
TGZA21FB	A	C2	1	2	97.878	7.712	0.051	0.104	12	BGM	0.0087	99.925	7.873
TGZA21GB	A	C2	1	2	95.694	7.628	0.049	0.102	12	BGM	0.0085	95.662	7.625
TGZA21HB	A	C2	1	2	90.554	7.620	0.046	0.099	12	BGM	0.0083	88.231	7.424
TGZB11FB	B	C1	2	1	109.358	8.493	0.063	0.102	12	BGM	0.0085	108.893	8.457
TGZB11GB	B	C1	2	1	111.864	8.279	0.083	0.102	12	BGM	0.0085	111.755	8.271
TGZB11HB	B	C1	2	1	118.067	8.449	0.089	0.103	12	BGM	0.0086	119.012	8.517
TGZB21FB	B	C2	2	2	103.941	6.757	0.054	0.102	12	BGM	0.0085	103.805	6.748
TGZB21GB	B	C2	2	2	94.121	6.742	0.048	0.102	12	BGM	0.0085	93.814	6.720
TGZB21HB	B	C2	2	2	89.268	6.814	0.054	0.100	12	BGM / HAB	0.0084	87.736	6.697
TGZC11FB	C	C1	3	1	111.816	8.714	0.041	0.098	12	BGM	0.0081	107.001	8.339
TGZC11GB	C	C1	3	1	99.336	8.469	0.039	0.100	12	BGM	0.0083	96.909	8.262
TGZC11HB	C	C1	3	1	106.817	7.955	0.057	0.101	12	BAB	0.0084	105.647	7.868
TGZC21FB	C	C2	3	2	*	7.814	0.071	0.099	12	HAT / HIT	0.0082		7.581
TGZC21GB	C	C2	3	2	*	8.129	**	0.100	12	BGM / ENDCRUSH	0.0084		7.989
TGZC21HB	C	C2	3	2	101.446	8.174	**	0.101	12	BGM	0.0084	100.601	8.106
TGZC21IB	C	C2	3	2	117.241	7.995	0.096	0.101	12	BGM	0.0084	116.245	7.927
TGZC21JB	C	C2	3	2	119.511	7.723	0.076	0.101	12	BGM	0.0084	118.789	7.676

*** Strength is not reported as unacceptable failure modes was observed**
**** Poisson's ratio was not reported due to non-linearity.**

Average	**101.385**	**7.785**	**0.059**	**$Average_{norm}$**	**0.0084**	**100.903**	**7.733**
Standard Dev.	**11.594**	**0.620**	**0.018**	**$Standard\ Dev._{norm}$**		**11.168**	**0.570**
Coeff. of Var. [%]	**11.435**	**7.966**	**31.060**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**11.068**	**7.377**
Min.	**81.310**	**6.742**	**0.039**	**Min.**	**0.0081**	**84.857**	**6.697**
Max.	**119.511**	**8.714**	**0.096**	**Max.**	**0.0089**	**119.012**	**8.517**
Number of Spec.	**18**	**20**	**17**	**Number of Spec.**		**18**	**20**

Modulus - strain data has been reviewed by the DRWG. High variability may be due to the large unit cell size of the weave. **Data should be used with discretion.**


Fill Compression Properties (FC) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
0
1
2
3
4


Fill Compression Properties (FC) -- (CTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
0
1
2
3
4

Fill Compression Properties (FC) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

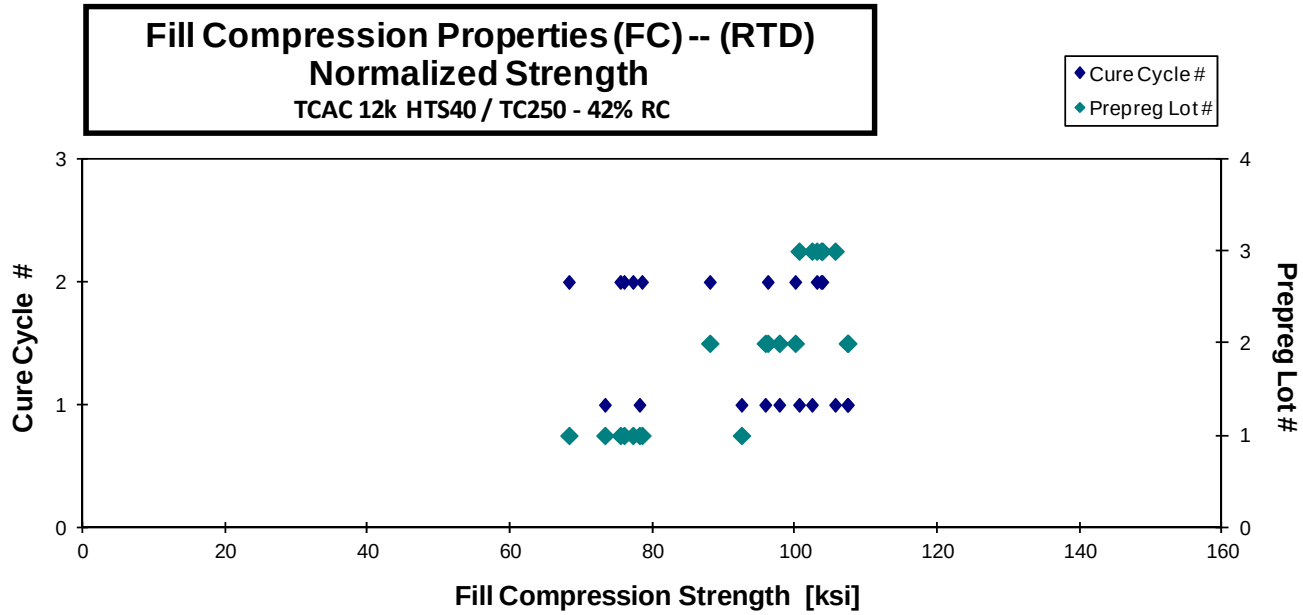
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGZA11KA	A	C1	1	1	99.454	8.490	0.075	0.095	12	BGM	0.0079	92.434	7.891
TGZA11LA	A	C1	1	1	*	7.981	0.033	0.107	12	HIT	0.0089		8.350
TGZA11MA	A	C1	1	1	71.172	7.844	0.036	0.105	12	BGM	0.0088	73.266	8.075
TGZA11NA	A	C1	1	1	76.971	8.011	0.042	0.104	12	BGM	0.0086	78.115	8.130
TGZA21KA	A	C2	1	2	74.060	7.934	0.054	0.106	12	BGM / HIB	0.0089	77.195	8.270
TGZA21LA	A	C2	1	2	75.783	8.135	0.056	0.106	12	BGM / HIB	0.0088	78.470	8.424
TGZA21MA	A	C2	1	2	73.549	8.255	0.073	0.105	12	BGM / HAT	0.0088	75.952	8.525
TGZA21NA	A	C2	1	2	66.585	8.103	0.039	0.105	12	BGM	0.0087	68.217	8.301
TGZA21OA	A	C2	1	2	75.070	8.120	0.049	0.102	12	BGM / HAB	0.0085	75.426	8.158
TGZB11KA	B	C1	2	1	*	7.523	**	0.106	12	END CRUSHED	0.0088		7.784
TGZB11LA	B	C1	2	1	103.854	7.797	0.041	0.105	12	BGM	0.0088	107.367	8.061
TGZB11MA	B	C1	2	1	103.659	8.310	0.041	0.106	12	BAB	0.0088	107.300	8.602
TGZB11NA	B	C1	2	1	92.441	8.239	0.074	0.106	12	BAB	0.0088	95.779	8.536
TGZB11OA	B	C1	2	1	93.942	8.252	0.070	0.106	12	BGM	0.0088	97.748	8.586
TGZB21LA	B	C2	2	2	92.659	8.062	0.048	0.106	12	BGM	0.0088	96.126	8.363
TGZB21MA	B	C2	2	2	85.871	7.621	0.052	0.105	12	BGM	0.0087	87.990	7.809
TGZB21NA	B	C2	2	2	99.465	7.623	0.048	0.103	12	BGM	0.0085	99.985	7.663
TGZC11KA	C	C1	3	1	101.304	8.170	0.056	0.106	12	BAT	0.0089	105.583	8.515
TGZC11LA	C	C1	3	1	97.899	7.842	0.027	0.107	12	BAT	0.0089	102.330	8.197
TGZC11MA	C	C1	3	1	95.880	7.915	**	0.107	12	BAT	0.0089	100.526	8.299
TGZC21KA	C	C2	3	2	103.300	8.387	0.049	0.102	12	BAT	0.0085	102.996	8.362
TGZC21LA	C	C2	3	2	103.384	8.338	0.042	0.102	12	BGM	0.0085	103.781	8.370
TGZC21MA	C	C2	3	2	102.872	7.937	0.030	0.103	12	BAB	0.0086	103.612	7.994

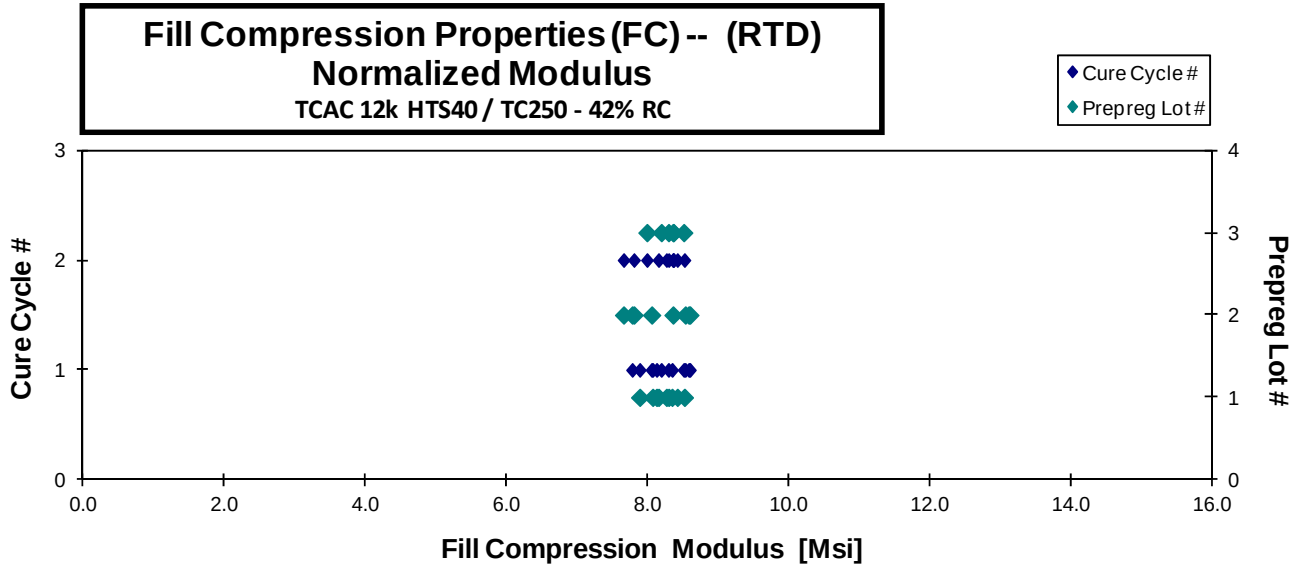
*** Strength is not reported as unacceptable failure modes was observed**

**** Poisson's ratio was not reported due to non-linearity.**

	Strength [ksi]	Modulus [Msi]	Poisson's Ratio
Average	89.961	8.039	0.049
Standard Dev.	12.984	0.257	0.014
Coeff. of Var. [%]	14.433	3.191	28.864
Min.	66.585	7.523	0.027
Max.	103.854	8.490	0.075
Number of Spec.	21	23	21

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	0.0087	91.914	8.229
$Standard\ Dev._{norm}$		13.071	0.268
$Coeff.\ of\ Var.\ [\%]_{norm}$		14.220	3.260
Min.	0.0079	68.217	7.663
Max.	0.0089	107.367	8.602
Number of Spec.	23	21	23


Fill Compression Properties (FC) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160


Fill Compression Properties (FC) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0

Fill Compression Properties (FC) -- (ETD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

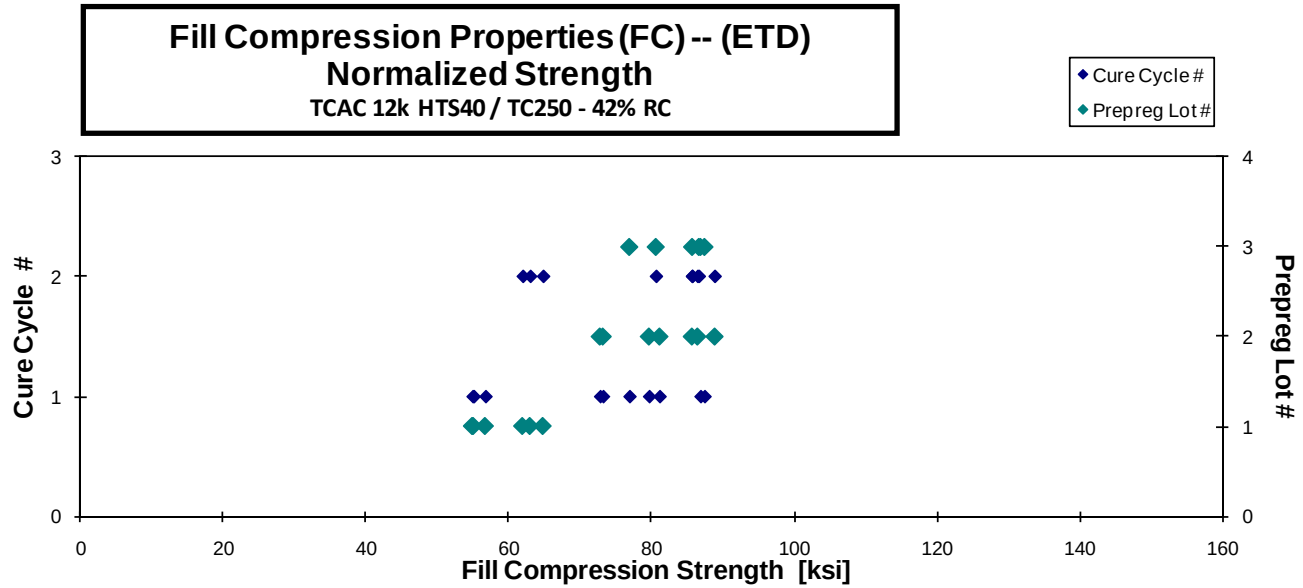
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGZA118G	A	C1	1	1	52.140	7.486	0.037	0.108	12	BGM	0.0090	55.071	7.906
TGZA119G	A	C1	1	1	51.413	7.454	0.059	0.109	12	BGM	0.0091	54.916	7.962
TGZA11AG	A	C1	1	1	*	6.981	0.034	0.110	12	HAB/HIB	0.0091		7.496
TGZA11CG	A	C1	1	1	53.296	7.525	0.027	0.109	12	BGM	0.0090	56.727	8.009
TGZA218G	A	C2	1	2	*	7.190	0.019	0.108	12	HIB	0.0090		7.642
TGZA219G	A	C2	1	2	60.635	7.277	**	0.109	12	HAB	0.0091	64.826	7.780
TGZA21AG	A	C2	1	2	59.165	6.989	**	0.109	12	HAT	0.0091	63.012	7.443
TGZA21BG	A	C2	1	2	58.757	7.120	**	0.108	12	HAB	0.0090	61.963	7.509
TGZB118G	B	C1	2	1	75.395	7.027	0.077	0.108	12	HAB / BGM	0.0090	79.744	7.432
TGZB119G	B	C1	2	1	68.801	6.667	0.040	0.109	12	BGM	0.0091	73.265	7.100
TGZB11AG	B	C1	2	1	76.934	7.000	0.031	0.108	12	HAB	0.0090	81.221	7.390
TGZB11CG	B	C1	2	1	68.727	7.785	0.026	0.108	12	BGM	0.0090	72.849	8.252
TGZB218G	B	C2	2	2	82.887	7.301	0.029	0.106	12	BGM	0.0088	85.772	7.555
TGZB219G	B	C2	2	2	85.919	7.366	0.020	0.106	12	BGM	0.0088	88.965	7.627
TGZB21AG	B	C2	2	2	83.561	7.727	0.029	0.106	12	HAT	0.0088	86.551	8.004
TGZC118G	C	C1	3	1	85.212	7.969	0.060	0.105	12	BAB	0.0087	87.545	8.187
TGZC119G	C	C1	3	1	84.599	7.591	0.072	0.105	12	BGM	0.0087	86.977	7.805
TGZC11AG	C	C1	3	1	74.604	7.578	0.059	0.105	12	BAB	0.0088	76.987	7.820
TGZC218G	C	C2	3	2	83.728	7.882	0.044	0.105	12	BAB	0.0087	85.815	8.078
TGZC219G	C	C2	3	2	78.116	7.769	0.054	0.105	12	BAT	0.0088	80.714	8.027
TGZC21AG	C	C2	3	2	83.373	7.471	0.028	0.106	12	BGM	0.0088	86.737	7.773

*** Strength is not reported as unacceptable failure modes was observed**

**** Poisson's ratio was not reported due to non-linearity.**

Average	**71.961**	**7.388**	**0.041**
Standard Dev.	**12.438**	**0.344**	**0.018**
Coeff. of Var. [%]	**17.284**	**4.663**	**43.124**
Min.	**51.413**	**6.667**	**0.019**
Max.	**85.919**	**7.969**	**0.077**
Number of Spec.	**19**	**21**	**18**

$Average_{norm}$	**0.0089**	**75.245**	**7.752**
$Standard\ Dev._{norm}$		**12.147**	**0.298**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**16.143**	**3.841**
Min.	**0.0087**	**54.916**	**7.100**
Max.	**0.0091**	**88.965**	**8.252**
Number of Spec.		**19**	**21**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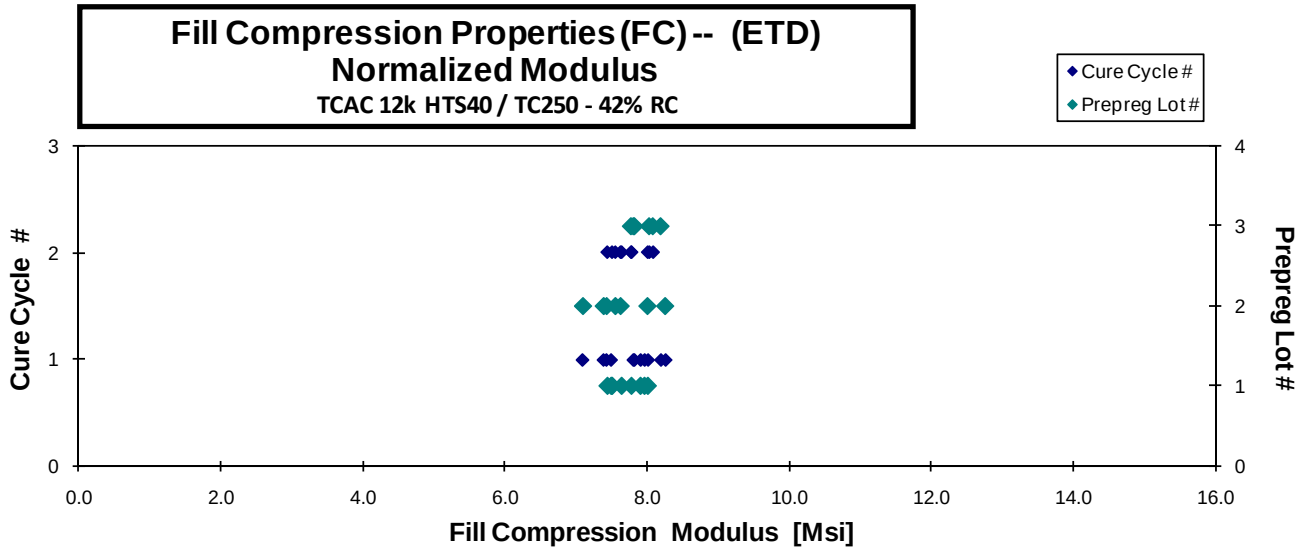
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
0
1
2
3
4


Fill Compression Properties (FC) -- (ETD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
0
1
2
3
4

Fill Compression Properties (FC) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

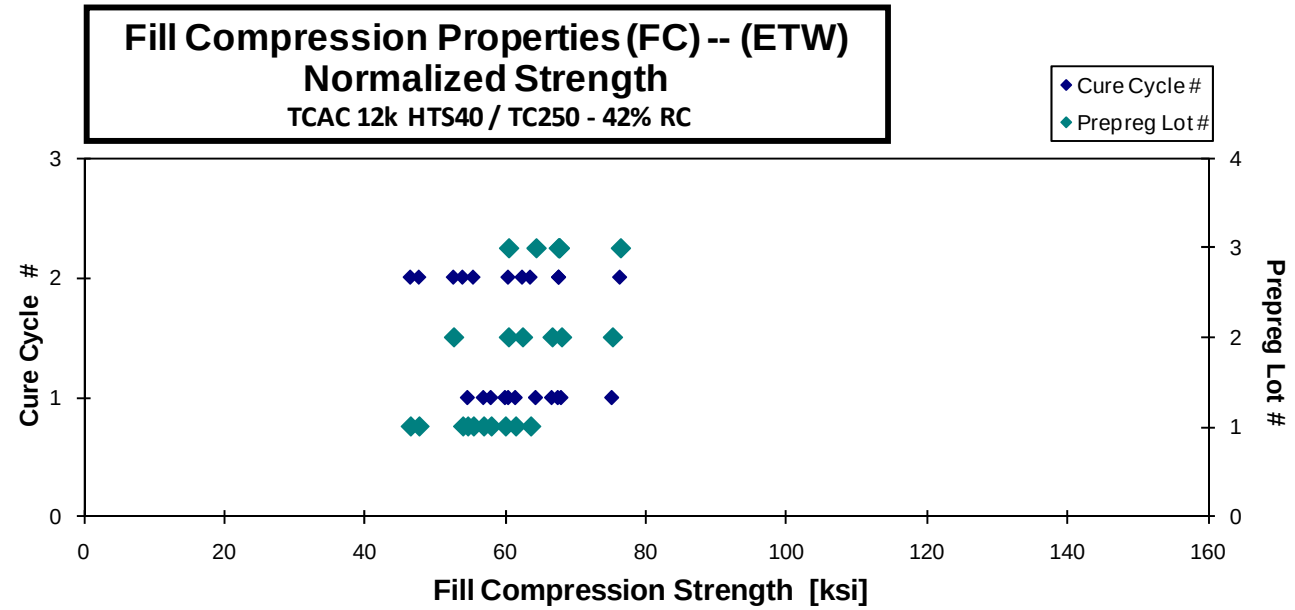
normalizing t_{ply} [in]: 0.0085

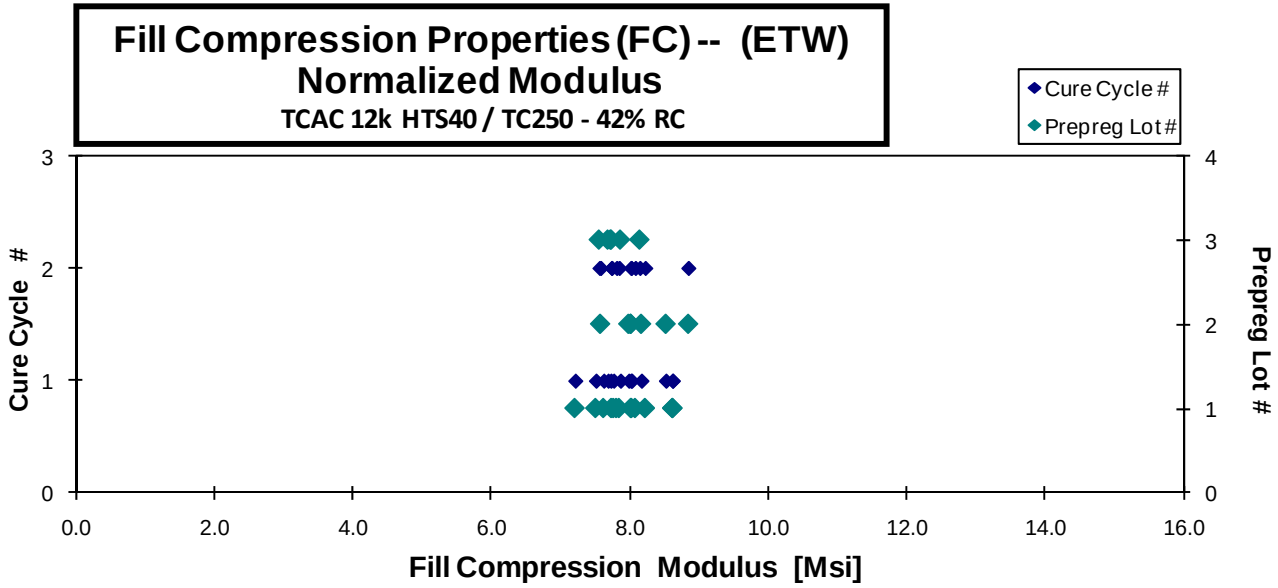
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGZA111F	A	C1	1	1	67.146	9.648	0.046	0.091	12	BGM	0.0076	59.960	8.615
TGZA112F	A	C1	1	1	58.916	7.782	0.051	0.095	12	BAB	0.0079	54.593	7.211
TGZA113F	A	C1	1	1	64.213	7.850	0.059	0.098	12	BGM	0.0081	61.432	7.510
TGZA114F	A	C1	1	1	*	8.720	0.046	0.101	12	BGM/HIB	0.0084		8.616
TGZA115F	A	C1	1	1	56.383	7.957	0.018	0.103	12	BAT	0.0086	56.862	8.025
TGZA116F	A	C1	1	1	*	7.457	0.048	0.104	12	BAB/HIB	0.0087		7.623
TGZA117F	A	C1	1	1	55.625	7.456	0.055	0.106	12	BAT	0.0089	57.934	7.766
TGZA211F	A	C2	1	2	64.351	7.905	0.064	0.101	12	HAT	0.0084	63.563	7.808
TGZA212F	A	C2	1	2	*	7.838	0.062	0.102	12	HGM/HIB	0.0085		7.846
TGZA213F	A	C2	1	2	52.764	7.575	0.048	0.104	12	BGM	0.0087	53.885	7.736
TGZA214F	A	C2	1	2	45.991	7.741	0.036	0.106	12	HAT	0.0088	47.645	8.019
TGZA215F	A	C2	1	2	44.709	7.918	0.030	0.106	12	HAB	0.0088	46.419	8.221
TGZA216F	A	C2	1	2	53.076	7.739	0.032	0.106	12	HGM	0.0089	55.400	8.078
TGZB111F	B	C1	2	1	*	8.100	0.049	0.103	12	BGM / HIT / CIB	0.0086		8.166
TGZB112F	B	C1	2	1	66.582	7.850	0.043	0.104	12	HAB	0.0087	67.974	8.014
TGZB113F	B	C1	2	1	73.386	7.787	**	0.105	12	HGM	0.0087	75.233	7.983
TGZB115F	B	C1	2	1	64.484	8.244	0.037	0.105	12	BGM	0.0088	66.633	8.519
TGZB211F	B	C2	2	2	52.909	7.626	0.034	0.101	12	BGM	0.0084	52.580	7.578
TGZB212F	B	C2	2	2	60.552	8.036	0.034	0.102	12	HAB	0.0085	60.403	8.016
TGZB213F	B	C2	2	2	62.426	8.845	0.070	0.102	12	BGM	0.0085	62.406	8.842
TGZC111F	C	C1	3	1	65.852	8.570	0.050	0.094	12	BAB	0.0078	60.429	7.864
TGZC112F	C	C1	3	1	68.346	8.164	0.039	0.096	12	BAB	0.0080	64.337	7.685
TGZC113F	C	C1	3	1	71.034	8.128	0.042	0.097	12	BAT	0.0081	67.512	7.725
TGZC211F	C	C2	3	2	76.910	8.200	0.020	0.101	12	BAB	0.0084	76.370	8.142
TGZC212F	C	C2	3	2	67.791	7.578	0.014	0.102	12	BAB	0.0085	67.630	7.560
TGZC213F	C	C2	3	2	66.530	7.608	0.016	0.104	12	BAB	0.0086	67.644	7.736

*** Strength is not reported as unacceptable failure modes was observed**
**** Poisson Ratio removed due to non-linearity**

Average	**61.817**	**8.012**	**0.042**
Standard Dev.	**8.431**	**0.489**	**0.015**
Coeff. of Var. [%]	**13.639**	**6.106**	**35.864**
Min.	**44.709**	**7.456**	**0.014**
Max.	**76.910**	**9.648**	**0.070**
Number of Spec.	**22**	**26**	**25**

$Average_{norm}$	**0.0085**	**61.220**	**7.958**
Standard $Dev._{norm}$		**7.812**	**0.381**
Coeff. of Var. $[\%]_{norm}$		**12.761**	**4.782**
Min.	**0.0076**	**46.419**	**7.211**
Max.	**0.0089**	**76.370**	**8.842**
Number of Spec.		**22**	**26**


Fill Compression Properties (FC) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
0
1
2
3
4


Fill Compression Properties (FC) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
0
1
2
3
4

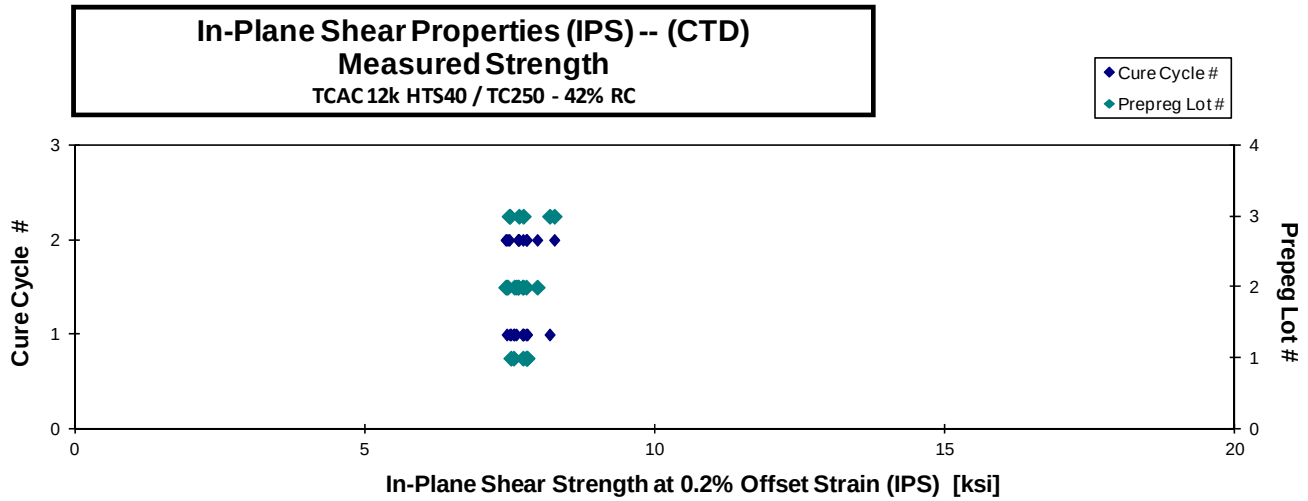
4.5 In-Plane Shear Properties

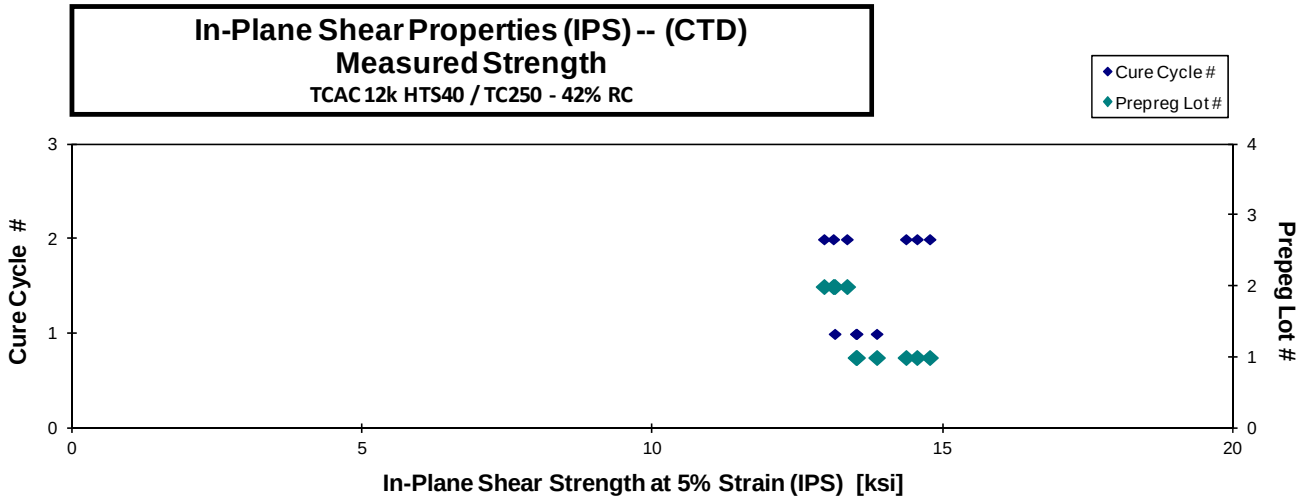
In-Plane Shear Properties (IPS) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

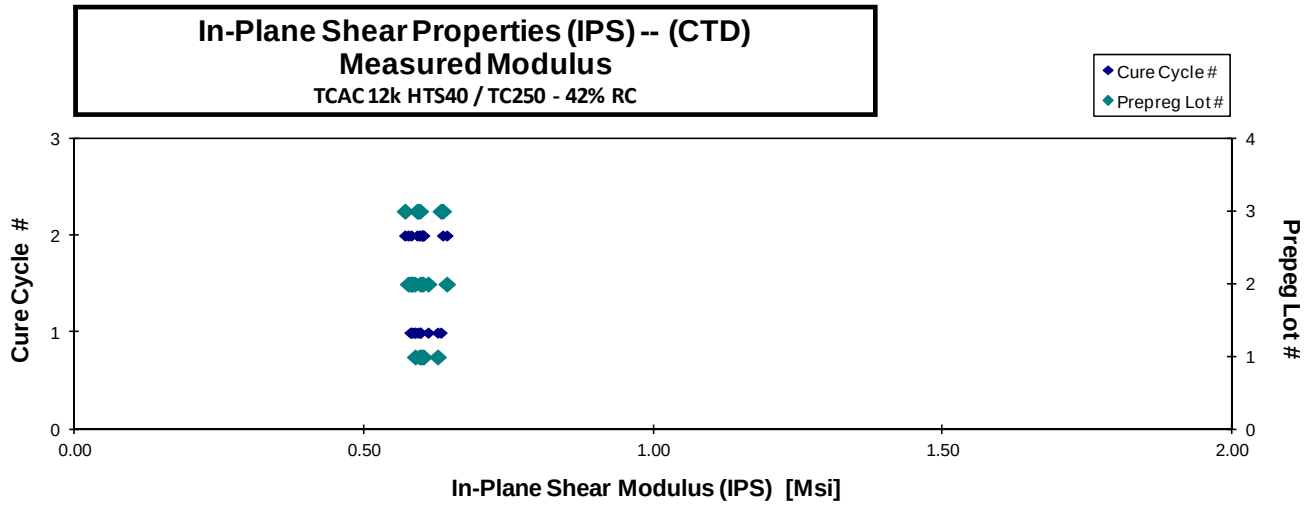
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength at 5% Strain [ksi]	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
TGNA117B	A	C1	1	1	13.522	7.508	0.599	0.067	8	0.0084
TGNA118B	A	C1	1	1	13.509	7.556	0.590	0.067	8	0.0083
TGNA119B	A	C1	1	1	13.867	7.790	0.629	0.064	8	0.0080
TGNA217B	A	C2	1	2	14.561	7.773	0.602	0.068	8	0.0085
TGNA218B	A	C2	1	2	14.780	7.717	0.598	0.068	8	0.0085
TGNA219B	A	C2	1	2	14.372	7.783	0.604	0.067	8	0.0084
TGNB117B	B	C1	2	1	13.144	7.438	0.585	0.068	8	0.0085
TGNB118B*	B	C1	2	1		7.723	0.612	0.066	8	0.0083
TGNB119B*	B	C1	2	1		7.771	0.598	0.068	8	0.0085
TGNB11AB*	B	C1	2	1		7.709	0.589	0.068	8	0.0085
TGNB11BB*	B	C1	2	1		7.567	0.581	0.068	8	0.0085
TGNB11CB*	B	C1	2	1		7.602	0.583	0.068	8	0.0085
TGNB217B	B	C2	2	2	13.120	7.420	0.578	0.070	8	0.0088
TGNB218B	B	C2	2	2	12.960	7.452	0.583	0.069	8	0.0087
TGNB219B*	B	C2	2	2		7.634	0.603	0.067	8	0.0083
TGNB21AB*	B	C2	2	2		7.963	0.644	0.063	8	0.0079
TGNB21BB	B	C2	2	2	13.354	7.635	0.601	0.068	8	0.0084
TGNC117B**	C	C1	3	1		7.723	0.595	0.070	8	0.0087
TGNC118B**	C	C1	3	1		7.491	0.598	0.069	8	0.0087
TGNC119B**	C	C1	3	1		8.177	0.634	0.066	8	0.0082
TGNC217B**	C	C2	3	2		7.480	0.572	0.071	8	0.0089
TGNC218B**	C	C2	3	2		7.648	0.593	0.069	8	0.0087
TGNC219B**	C	C2	3	2		8.257	0.637	0.064	8	0.0080

*** Specimen failed before it reached 5% strain**
**** Strain device removed prior to reaching 5% strain**

Average	**13.719**	**7.688**	**0.600**	**Average**	**0.0084**
Standard Dev.	**0.647**	**0.216**	**0.019**	**Standard Dev.**	
Coeff. of Var. [%]	**4.715**	**2.810**	**3.228**	**Coeff. of Var. [%]**	
Min.	**12.960**	**7.420**	**0.572**	**Min.**	**0.0079**
Max.	**14.780**	**8.257**	**0.644**	**Max.**	**0.0089**
Number of Spec.	**10**	**23**	**23**	**Number of Spec.**	**23**


In-Plane Shear Properties (IPS) -- (CTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
In-Plane Shear Strength at 0.2% Offset Strain (IPS) [ksi]


In-Plane Shear Properties (IPS) -- (CTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
In-Plane Shear Strength at 5% Strain (IPS) [ksi]

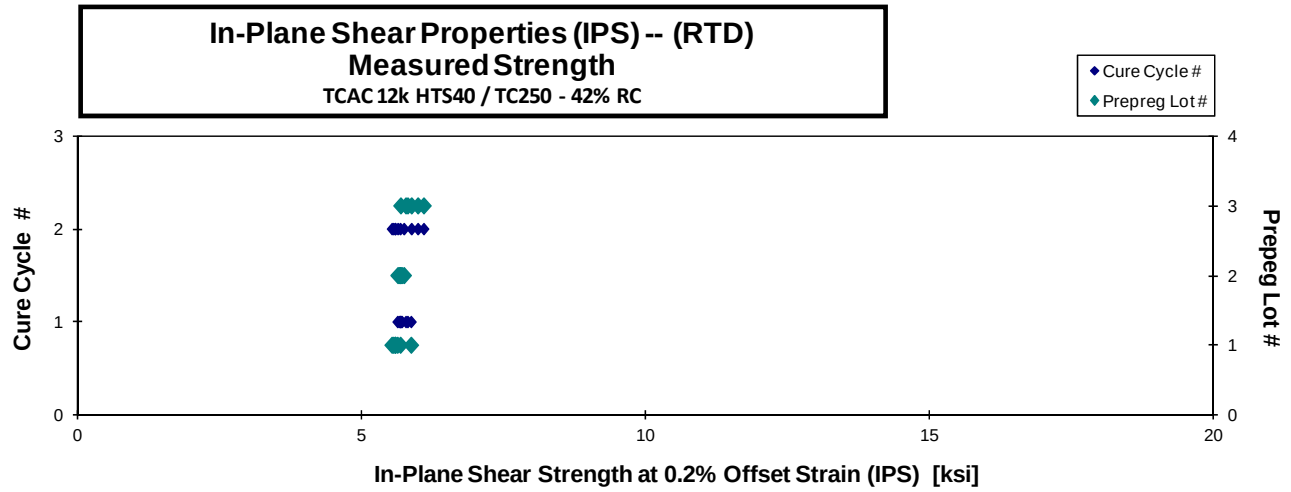

In-Plane Shear Properties (IPS) -- (CTD)
Measured Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
0
1
2
3
4
0.00
0.50
1.00
1.50
2.00
In-Plane Shear Modulus (IPS) [Msi]

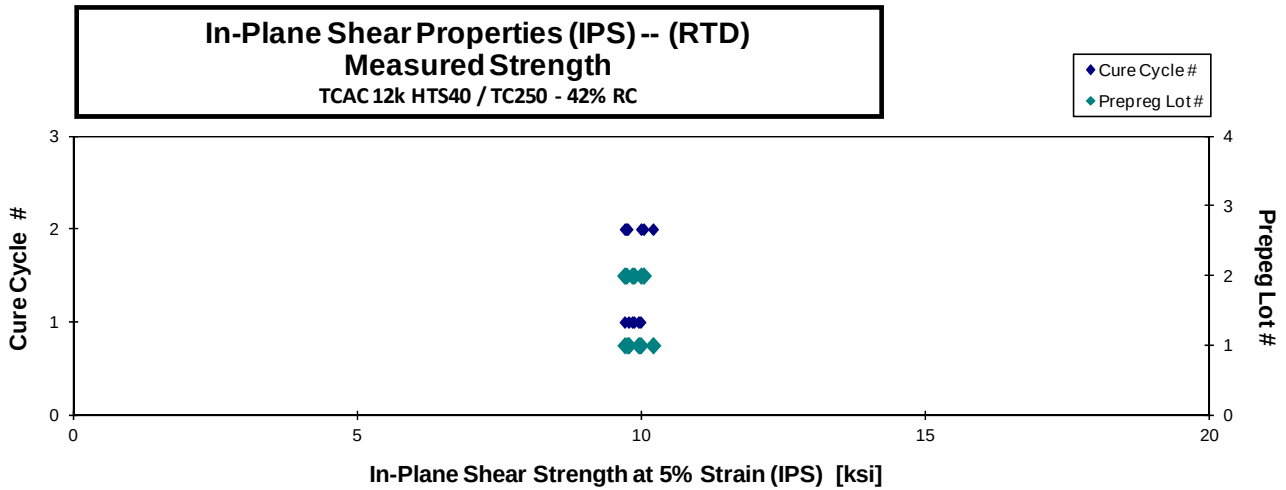
In-Plane Shear Properties (IPS) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

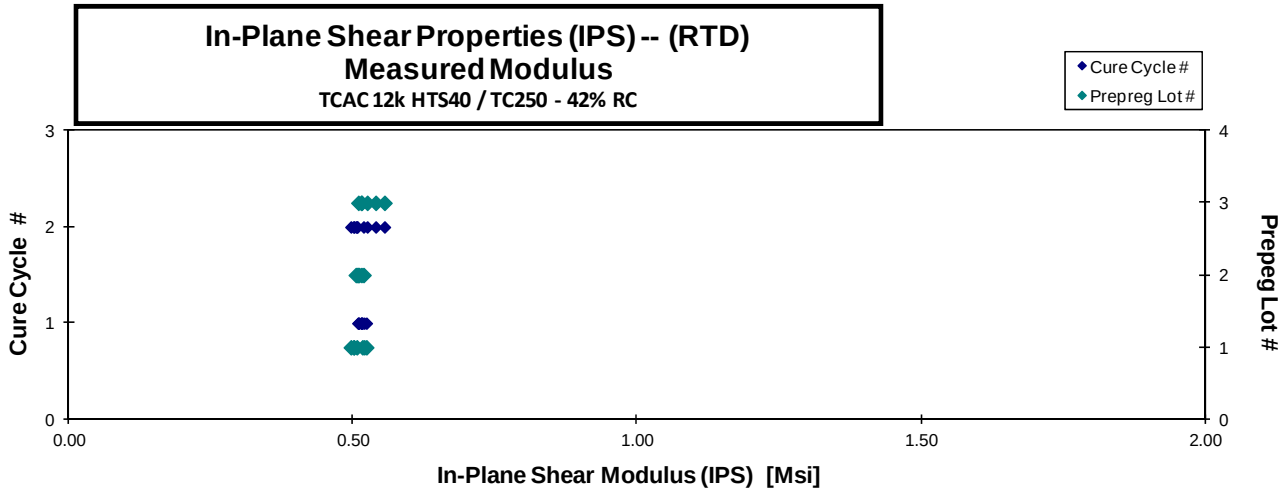
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength at 5% Strain [ksi]	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
TGNA11CA	A	C1	1	1	9.937	5.860	0.520	0.066	8	0.0083
TGNA11DA	A	C1	1	1	9.761	5.621	0.517	0.067	8	0.0083
TGNA11EA	A	C1	1	1	9.972	5.672	0.524	0.067	8	0.0084
TGNA21CA	A	C2	1	2	9.743	5.580	0.507	0.069	8	0.0087
TGNA21DA*	A	C2	1	2		5.523	0.496	0.070	8	0.0088
TGNA21EA	A	C2	1	2	9.695	5.549	0.501	0.070	8	0.0088
TGNA21FA	A	C2	1	2	10.192	5.581	0.502	0.070	8	0.0088
TGNB11DA	B	C1	2	1	9.825	5.698	0.511	0.068	8	0.0086
TGNB11EA	B	C1	2	1	9.691	5.648	0.509	0.068	8	0.0085
TGNB11FA	B	C1	2	1	9.856	5.675	0.515	0.068	8	0.0085
TGNB21CA	B	C2	2	2	10.025	5.735	0.519	0.068	8	0.0085
TGNB21DA	B	C2	2	2	9.981	5.670	0.508	0.069	8	0.0086
TGNB21EA	B	C2	2	2	9.722	5.627	0.505	0.069	8	0.0086
TGNC11CA*	C	C1	3	1		5.800	0.515	0.071	8	0.0089
TGNC11DA*	C	C1	3	1		5.767	0.515	0.071	8	0.0089
TGNC11EA*	C	C1	3	1		5.678	0.510	0.071	8	0.0089
TGNC21CA*	C	C2	3	2		6.083	0.556	0.066	8	0.0083
TGNC21DA*	C	C2	3	2		5.980	0.540	0.067	8	0.0084
TGNC21EA*	C	C2	3	2		5.867	0.525	0.068	8	0.0085

*** Strain device removed prior to reaching 5% strain**

Average	**9.867**	**5.717**	**0.515**	**Average**	**0.0086**
Standard Dev.	**0.156**	**0.147**	**0.014**	**Standard Dev.**	
Coeff. of Var. [%]	**1.584**	**2.571**	**2.710**	**Coeff. of Var. [%]**	
Min.	**9.691**	**5.523**	**0.496**	**Min.**	**0.0083**
Max.	**10.192**	**6.083**	**0.556**	**Max.**	**0.0089**
Number of Spec.	**12**	**19**	**19**	**Number of Spec.**	**19**


In-Plane Shear Properties (IPS) -- (RTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
0
1
2
3
4
0
5
10
15
20
In-Plane Shear Strength at 0.2% Offset Strain (IPS) [ksi]


In-Plane Shear Properties (IPS) -- (RTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
0
1
2
3
4
0
5
10
15
20
In-Plane Shear Strength at 5% Strain (IPS) [ksi]

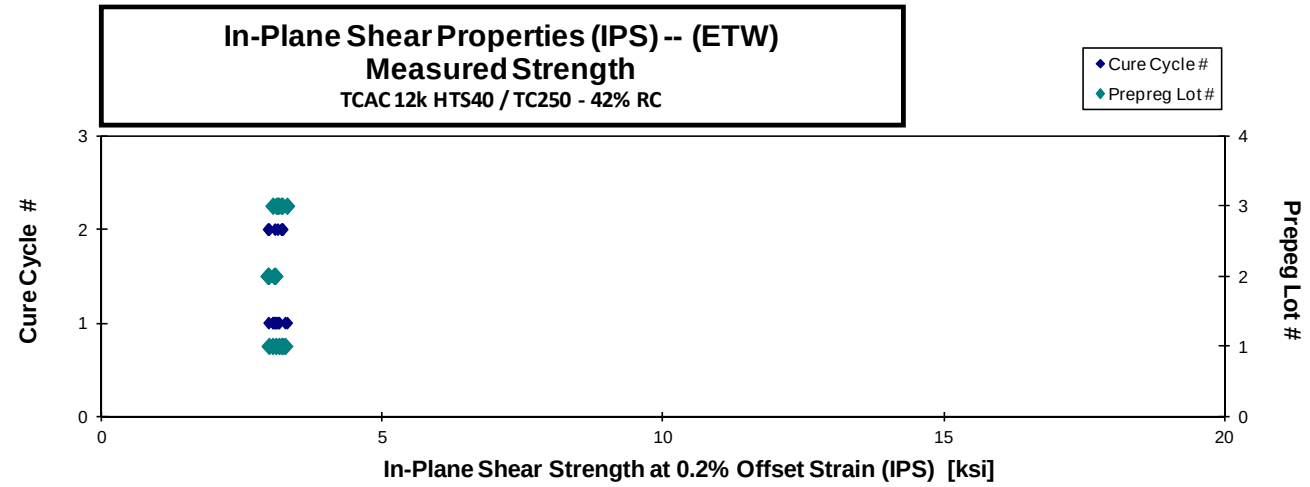

In-Plane Shear Properties (IPS) -- (RTD)
Measured Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
0
1
2
3
4
0.00
0.50
1.00
1.50
2.00
In-Plane Shear Modulus (IPS) [Msi]

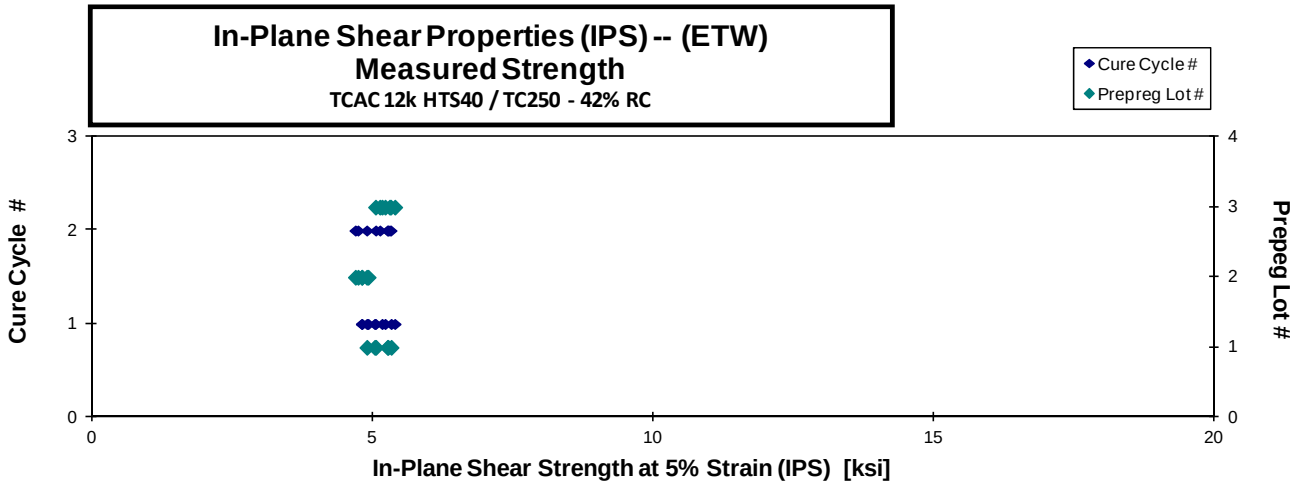
In-Plane Shear Properties (IPS) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

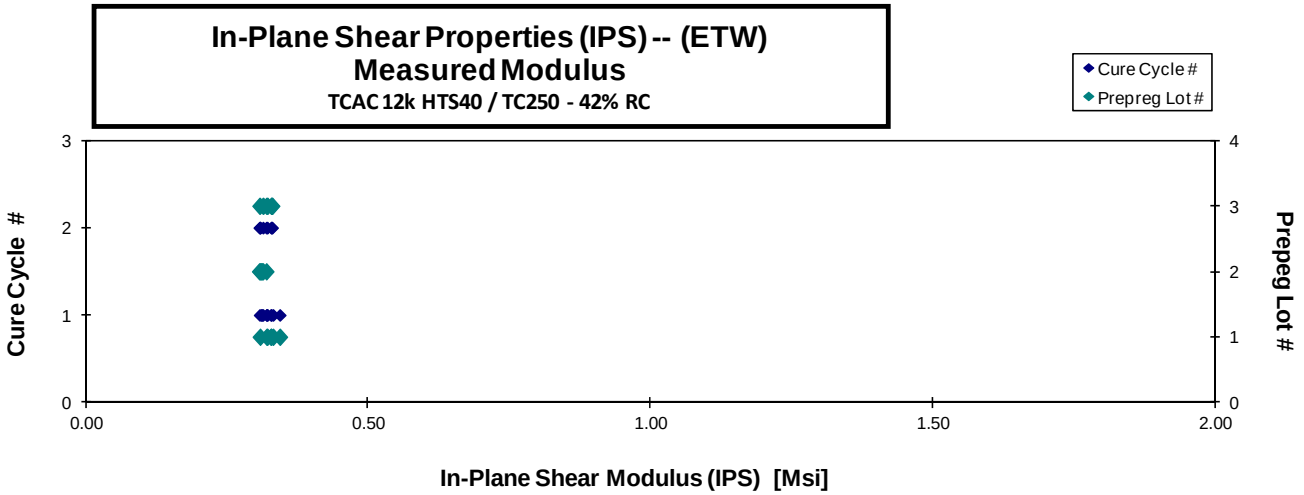
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength at 5% Strain [ksi]	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
TGNA111F	A	C1	1	1	5.339	3.250	0.343	0.062	8	0.0078
TGNA112F*	A	C1	1	1		3.143	0.331	0.064	8	0.0079
TGNA113F	A	C1	1	1	5.044	3.088	0.327	0.065	8	0.0082
TGNA114F	A	C1	1	1	4.906	3.029	0.320	0.067	8	0.0084
TGNA211F	A	C2	1	2	5.272	3.192	0.321	0.066	8	0.0083
TGNA212F	A	C2	1	2	5.064	2.963	0.308	0.068	8	0.0085
TGNA213F	A	C2	1	2	5.281	3.206	0.328	0.068	8	0.0085
TGNB111F	B	C1	2	1	4.816	2.954	0.311	0.069	8	0.0086
TGNB112F	B	C1	2	1	4.815	3.074	0.313	0.070	8	0.0087
TGNB113F	B	C1	2	1	4.929	3.055	0.310	0.070	8	0.0087
TGNB211F	B	C2	2	2	4.904	3.068	0.319	0.064	8	0.0080
TGNB212F	B	C2	2	2	4.748	2.943	0.308	0.068	8	0.0086
TGNB213F	B	C2	2	2	4.700	2.954	0.307	0.070	8	0.0087
TGNC111F	C	C1	3	1	5.404	3.286	0.321	0.064	8	0.0080
TGNC112F	C	C1	3	1	5.059	3.032	0.307	0.068	8	0.0085
TGNC113F	C	C1	3	1	5.177	3.096	0.319	0.069	8	0.0086
TGNC114F	C	C1	3	1	5.231	3.131	0.328	0.071	8	0.0089
TGNC211F	C	C2	3	2	5.310	3.183	0.328	0.065	8	0.0081
TGNC212F	C	C2	3	2	5.331	3.200	0.329	0.067	8	0.0084
TGNC213F	C	C2	3	2	5.138	3.118	0.313	0.070	8	0.0088

*** Specimen failed before it reached 5% strain**

Average	**5.077**	**3.098**	**0.320**	**Average**	**0.0084**
Standard Dev.	**0.221**	**0.102**	**0.010**	**Standard Dev.**	
Coeff. of Var. [%]	**4.357**	**3.280**	**3.106**	**Coeff. of Var. [%]**	
Min.	**4.700**	**2.943**	**0.307**	**Min.**	**0.0078**
Max.	**5.404**	**3.286**	**0.343**	**Max.**	**0.0089**
Number of Spec.	**19**	**20**	**20**	**Number of Spec.**	**20**


In-Plane Shear Properties (IPS) -- (ETW)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
In-Plane Shear Strength at 0.2% Offset Strain (IPS) [ksi]


In-Plane Shear Properties (IPS) -- (ETW)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
In-Plane Shear Strength at 5% Strain (IPS) [ksi]


In-Plane Shear Properties (IPS) -- (ETW)
Measured Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepeg Lot #
0
1
2
3
4
0.00
0.50
1.00
1.50
2.00
In-Plane Shear Modulus (IPS) [Msi]

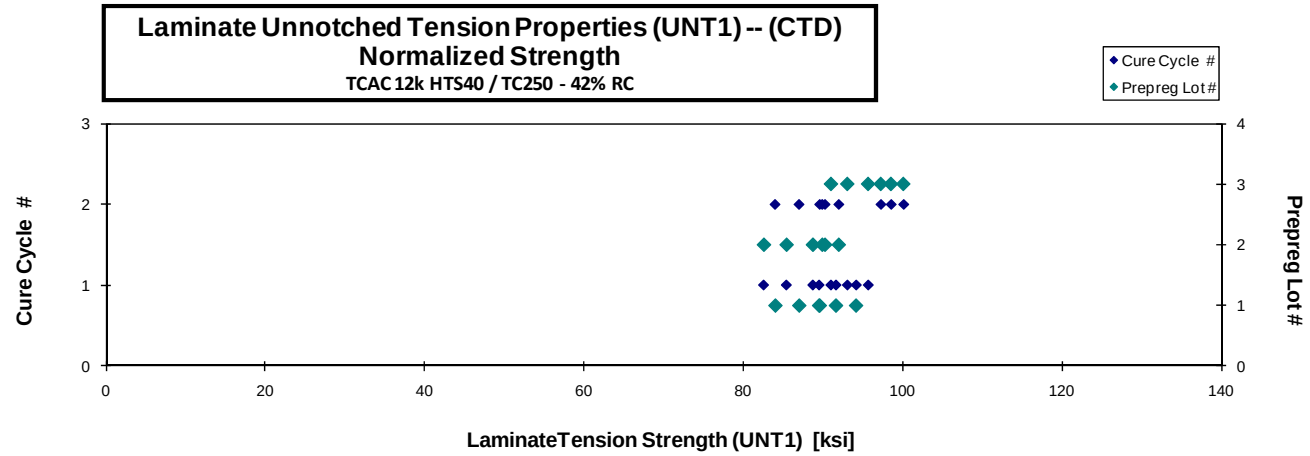
4.6 Unnotched Tension 1 Properties

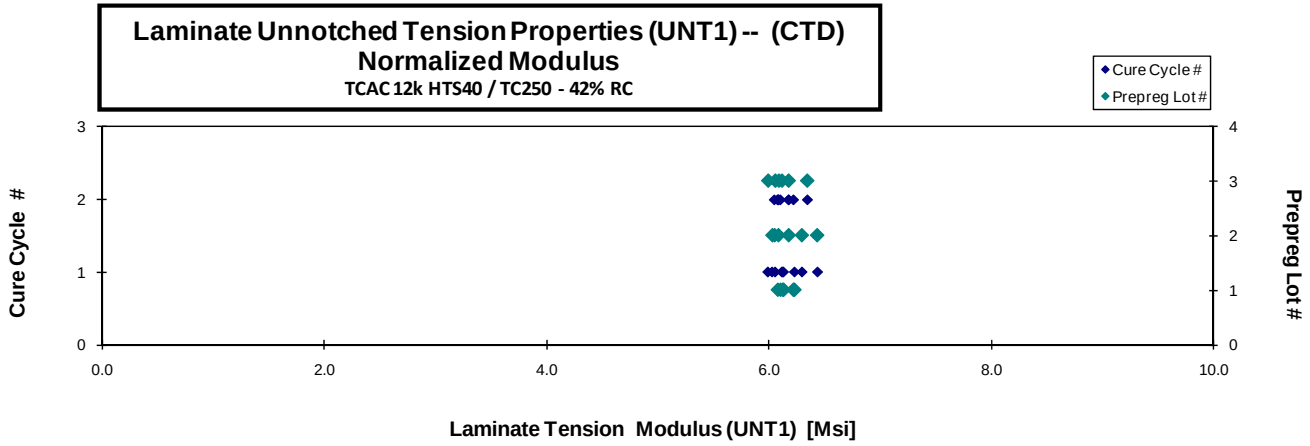
Laminate Unnotched Tension Properties (UNT1) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGAA117B	A	C1	1	1	93.152	6.069	0.137	16	LWT	0.0086	94.134	6.133
TGAA118B	A	C1	1	1	90.844	6.178	0.137	16	LGM	0.0086	91.601	6.230
TGAA119B	A	C1	1	1	89.196	6.106	0.136	16	LGM	0.0085	89.480	6.125
TGAA217B	A	C2	1	2	84.793	5.890	0.144	16	LWT/LGM	0.0090	89.562	6.221
TGAA218B	A	C2	1	2	83.603	5.845	0.141	16	LWB	0.0088	86.973	6.081
TGAA219B	A	C2	1	2	77.346	5.624	0.148	16	LWB	0.0092	83.971	6.106
TGAB117B	B	C1	2	1	86.347	6.100	0.134	16	LGM	0.0084	85.385	6.032
TGAB118B	B	C1	2	1	81.073	6.321	0.138	16	LGM	0.0087	82.533	6.434
TGAB119B	B	C1	2	1	85.939	6.101	0.140	16	LWB	0.0088	88.699	6.297
TGAB217B	B	C2	2	2	87.525	5.881	0.143	16	LWT	0.0089	91.955	6.179
TGAB218B	B	C2	2	2	87.121	5.843	0.141	16	LGM	0.0088	90.228	6.052
TGAB219B	B	C2	2	2	87.769	5.944	0.139	16	LGM	0.0087	89.877	6.087
TGAC117B	C	C1	3	1	87.726	5.843	0.141	16	LGM	0.0088	90.962	6.059
TGAC118B	C	C1	3	1	90.769	5.970	0.139	16	LWT	0.0087	93.027	6.118
TGAC119B	C	C1	3	1	97.805	6.131	0.133	16	LGM	0.0083	95.636	5.995
TGAC217B	C	C2	3	2	93.087	5.831	0.142	16	LWB	0.0089	97.228	6.091
TGAC218B	C	C2	3	2	94.982	6.118	0.141	16	LGM	0.0088	98.509	6.345
TGAC219B	C	C2	3	2	103.251	6.374	0.132	16	LWB	0.0082	100.075	6.178

Average	**89.018**	**6.009**	**Average$_{norm}$**	**0.0087**	**91.102**	**6.153**
Standard Dev.	**6.076**	**0.190**	**Standard Dev.$_{norm}$**		**4.817**	**0.115**
Coeff. of Var. [%]	**6.826**	**3.161**	**Coeff. of Var. [%]$_{norm}$**		**5.287**	**1.872**
Min.	**77.346**	**5.624**	**Min.**	**0.0082**	**82.533**	**5.995**
Max.	**103.251**	**6.374**	**Max.**	**0.0092**	**100.075**	**6.434**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**


Laminate Unnotched Tension Properties (UNT1) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
LaminateTension Strength (UNT1) [ksi]

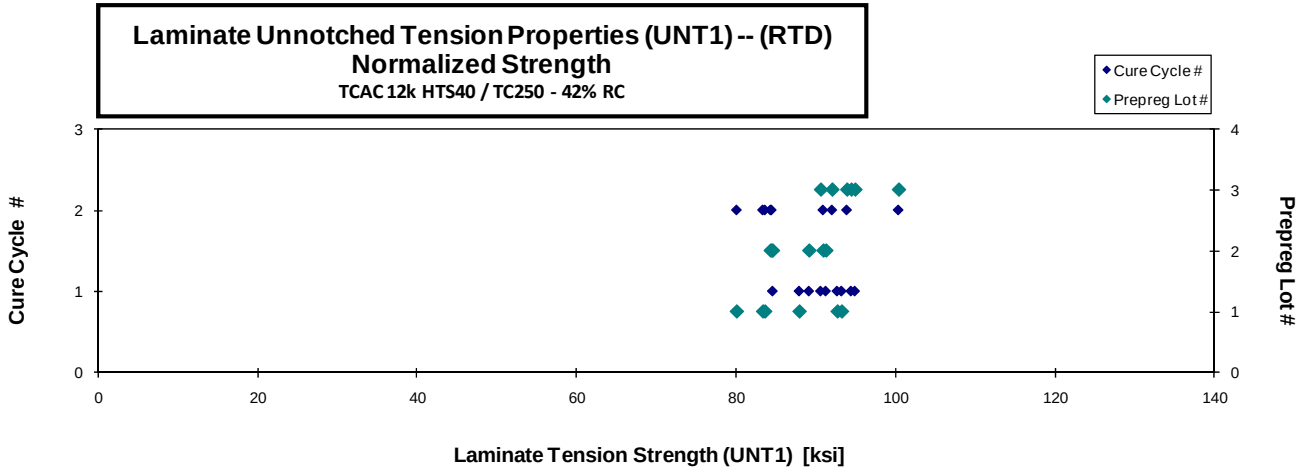

Laminate Unnotched Tension Properties (UNT1) -- (CTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT1) [Msi]

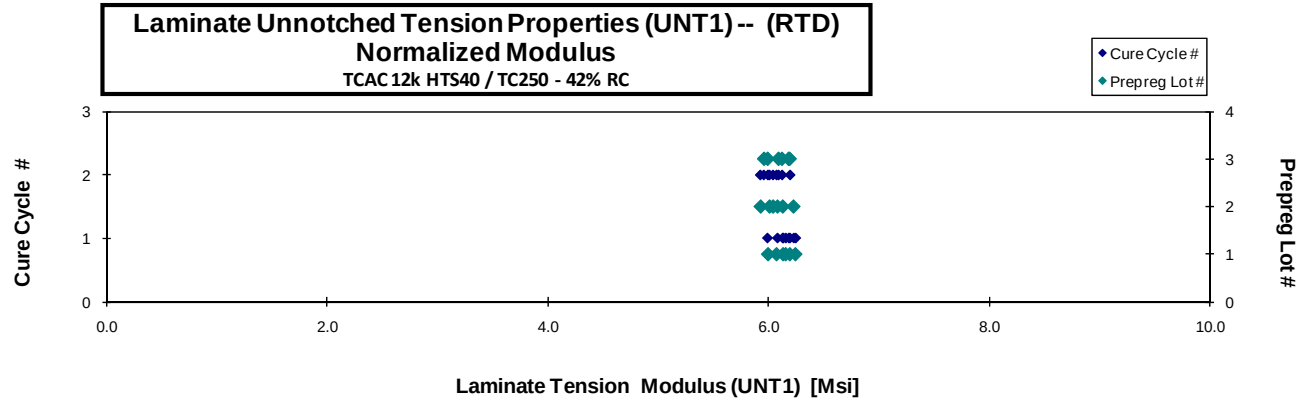
Laminate Unnotched Tension Properties (UNT1) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGAA11CA	A	C1	1	1	91.083	6.103	0.139	16	LGM	0.0087	93.237	6.247
TGAA11DA	A	C1	1	1	89.453	5.921	0.141	16	LWB	0.0088	92.687	6.135
TGAA11EA	A	C1	1	1	84.685	5.932	0.141	16	LGM	0.0088	87.913	6.158
TGAA21CA	A	C2	1	2	75.167	5.409	0.151	16	LWT/LWB	0.0094	83.338	5.997
TGAA21DA	A	C2	1	2	72.387	5.603	0.150	16	LGM/LWB	0.0094	80.052	6.197
TGAA21EA	A	C2	1	2	76.955	5.591	0.148	16	LWT/LWB	0.0092	83.603	6.074
TGAB11CA	B	C1	2	1	87.911	5.906	0.141	16	LGM / LWB	0.0088	91.261	6.131
TGAB11DA	B	C1	2	1	82.339	5.923	0.140	16	LWT	0.0087	84.569	6.084
TGAB11EA	B	C1	2	1	87.755	6.133	0.138	16	LGM	0.0086	89.142	6.230
TGAB21CA	B	C2	2	2	82.096	5.853	0.140	16	LGM	0.0087	84.310	6.011
TGAB21DA	B	C2	2	2	86.739	5.766	0.143	16	LWT / LWB	0.0089	90.917	6.043
TGAB21EA	B	C2	2	2	80.054	5.621	0.143	16	LGM	0.0090	84.440	5.929
TGAC11CA	C	C1	3	1	92.441	6.024	0.140	16	LWT / LWB	0.0087	94.911	6.185
TGAC11DA	C	C1	3	1	87.969	6.015	0.140	16	LGM	0.0088	90.611	6.195
TGAC11EA	C	C1	3	1	92.427	5.865	0.139	16	LWT	0.0087	94.443	5.993
TGAC21CA	C	C2	3	2	98.490	6.009	0.139	16	LWT / LWB	0.0087	100.385	6.125
TGAC21DA	C	C2	3	2	91.390	5.930	0.140	16	LWT	0.0087	93.899	6.093
TGAC21EA	C	C2	3	2	89.038	5.766	0.141	16	LGM	0.0088	92.038	5.960

Average	**86.021**	**5.854**	**$Average_{norm}$**	**0.0089**	**89.542**	**6.099**
Standard Dev.	**6.757**	**0.194**	**$Standard\ Dev._{norm}$**		**5.258**	**0.095**
Coeff. of Var. [%]	**7.855**	**3.320**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.872**	**1.556**
Min.	**72.387**	**5.409**	**Min.**	**0.0086**	**80.052**	**5.929**
Max.	**98.490**	**6.133**	**Max.**	**0.0094**	**100.385**	**6.247**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**


Laminate Unnotched Tension Properties (UNT1) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
Laminate Tension Strength (UNT1) [ksi]

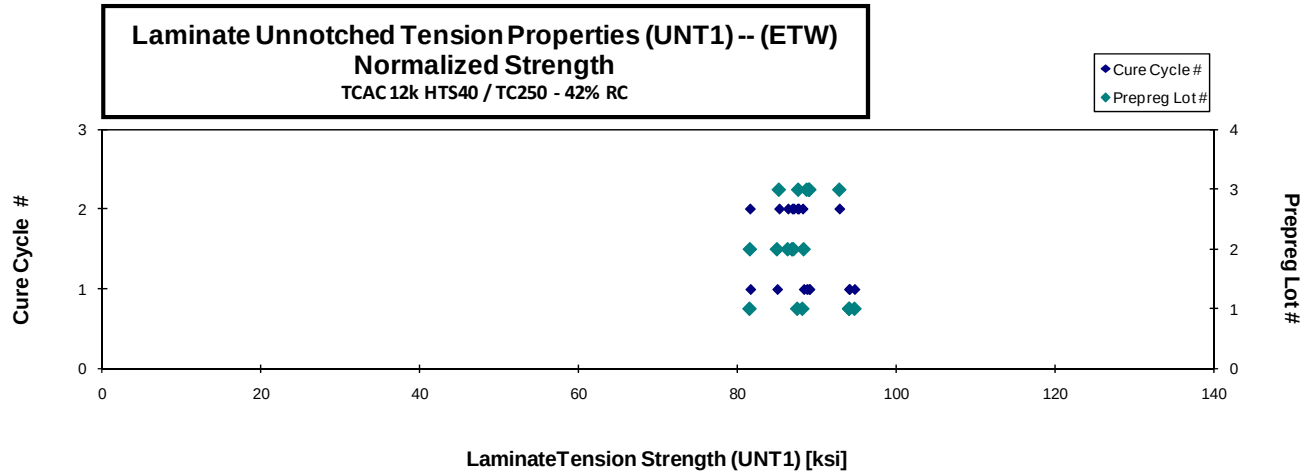

Laminate Unnotched Tension Properties (UNT1) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT1) [Msi]

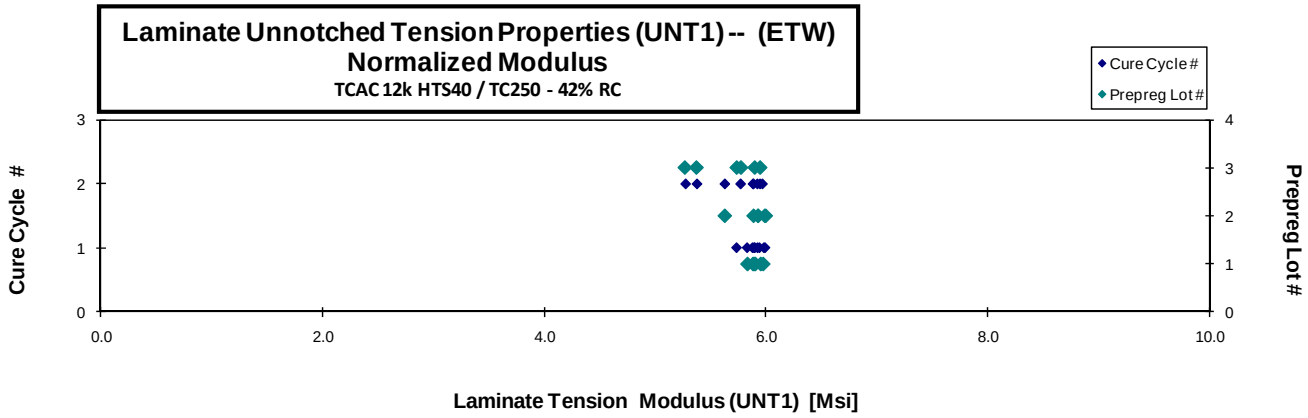
Laminate Unnotched Tension Properties (UNT1) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGAA111F	A	C1	1	1	94.484	5.926	0.135	16	LGM	0.0085	94.114	5.903
TGAA112F	A	C1	1	1	93.597	5.809	0.138	16	LWT/LAB	0.0086	94.779	5.882
TGAA113F	A	C1	1	1	91.448	5.668	0.140	16	LGM/LWB	0.0087	94.104	5.832
TGAA212F	A	C2	1	2	82.004	5.594	0.145	16	LGM	0.0091	87.561	5.973
TGAA213F	A	C2	1	2	82.744	5.582	0.145	16	LGM	0.0091	88.209	5.951
TGAA214F	A	C2	1	2	75.913	5.485	0.146	16	LWT	0.0091	81.532	5.891
TGAB112F	B	C1	2	1	86.961	5.834	0.138	16	LGM / LWB	0.0086	88.358	5.928
TGAB113F	B	C1	2	1	82.257	5.803	0.141	16	LGM	0.0088	84.989	5.996
TGAB114F	B	C1	2	1	77.872	5.714	0.142	16	LGM / LWB	0.0089	81.584	5.986
TGAB211F	B	C2	2	2	89.165	6.069	0.133	16	LGM	0.0083	87.067	5.926
TGAB212F	B	C2	2	2	86.478	5.895	0.136	16	LGM / LWT	0.0085	86.350	5.887
TGAB213F	B	C2	2	2	84.903	5.500	0.139	16	LWB / LGM	0.0087	86.901	5.629
TGAC111F	C	C1	3	1	89.875	6.021	0.134	16	LWT / LWB	0.0084	88.740	5.945
TGAC112F	C	C1	3	1	88.388	5.856	0.137	16	LGM	0.0086	89.005	5.897
TGAC113F	C	C1	3	1	87.046	5.605	0.139	16	LGM	0.0087	89.083	5.736
TGAC211F	C	C2	3	2	86.053	5.323	0.135	16	LWT / LGM	0.0084	85.231	5.272
TGAC212F	C	C2	3	2	91.318	5.678	0.138	16	LWT / LGM	0.0086	92.862	5.774
TGAC213F	C	C2	3	2	84.693	5.193	0.141	16	LWT / LGB	0.0088	87.682	5.376

Average	**86.400**	**5.698**	**$Average_{norm}$**	**0.0087**	**88.231**	**5.821**
Standard Dev.	**5.024**	**0.232**	**$Standard\ Dev._{norm}$**		**3.843**	**0.204**
Coeff. of Var. [%]	**5.815**	**4.072**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.355**	**3.503**
Min.	**75.913**	**5.193**	**Min.**	**0.0083**	**81.532**	**5.272**
Max.	**94.484**	**6.069**	**Max.**	**0.0091**	**94.779**	**5.996**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**


Laminate Unnotched Tension Properties (UNT1) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
LaminateTension Strength (UNT1) [ksi]


Laminate Unnotched Tension Properties (UNT1) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT1) [Msi]

4.7 Unnotched Tension 2 Properties

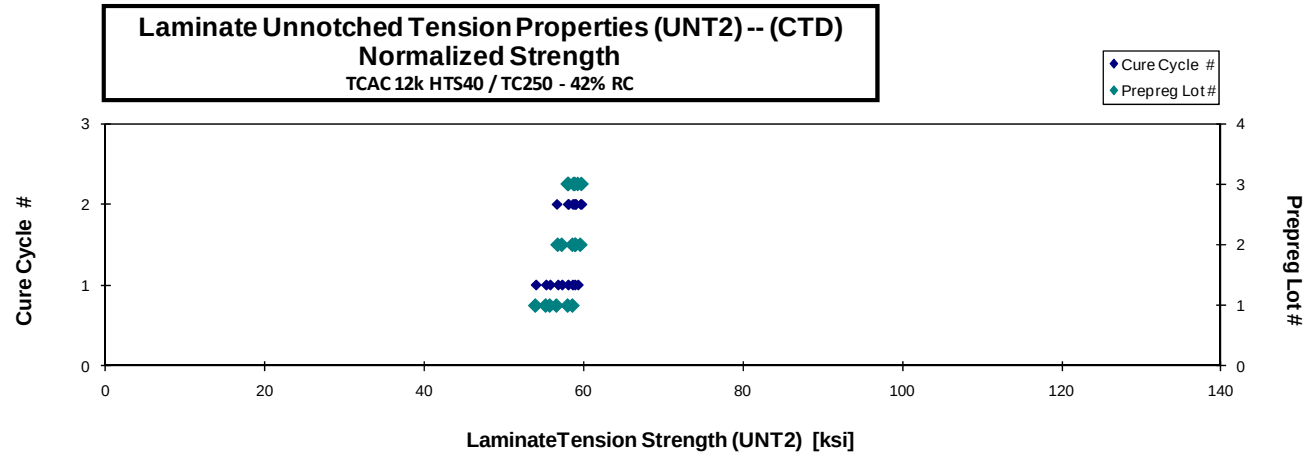
Laminate Unnotched Tension Properties (UNT2) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

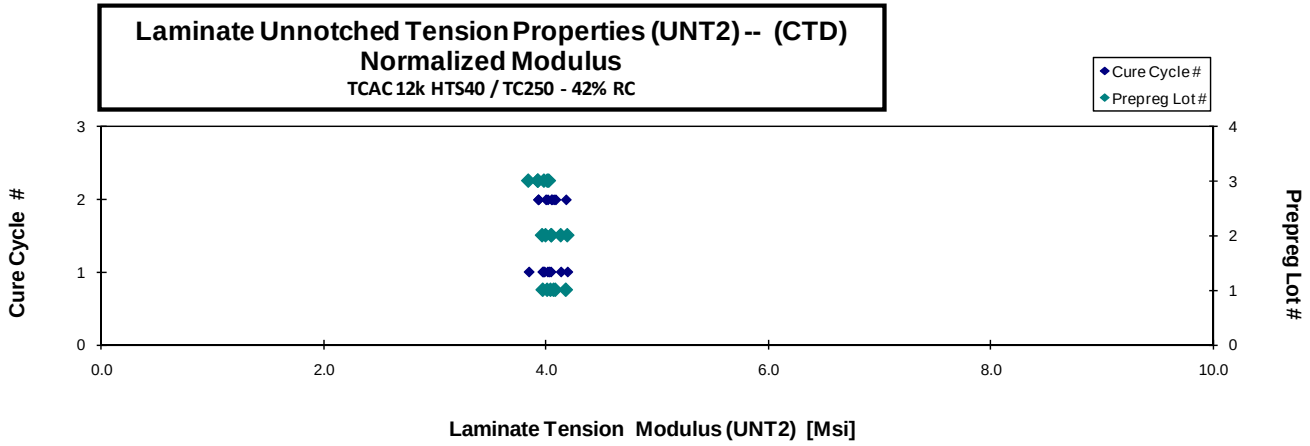
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGBA117B	A	C1	1	1	53.403	3.839	0.176	20	AGM	0.0088	55.277	3.973
TGBA118B	A	C1	1	1	54.332	3.937	0.175	20	MGM	0.0087	55.792	4.042
TGBA119B	A	C1	1	1	53.194	3.954	0.173	20	MGM	0.0086	53.992	4.013
TGBA217B	A	C2	1	2	57.092	4.070	0.175	20	AGM	0.0087	58.631	4.179
TGBA218B	A	C2	1	2	57.153	4.008	0.173	20	AGM	0.0086	58.033	4.070
TGBA219B	A	C2	1	2	56.445	4.073	0.171	20	AWT	0.0085	56.622	4.085
TGBB117B	B	C1	2	1	55.810	3.865	0.175	20	LWT	0.0087	57.292	3.968
TGBB118B	B	C1	2	1	55.926	4.071	0.173	20	LGM	0.0086	56.787	4.134
TGBB119B	B	C1	2	1	58.633	4.193	0.170	20	LWB	0.0085	58.627	4.193
TGBB217B	B	C2	2	2	56.904	3.866	0.178	20	LGM	0.0089	59.615	4.050
TGBB218B	B	C2	2	2	56.710	3.846	0.177	20	LWT	0.0088	58.961	3.999
TGBB219B	B	C2	2	2	58.232	3.996	0.172	20	LGM	0.0086	59.015	4.050
TGBC117B	C	C1	3	1	58.566	3.960	0.171	20	LWB	0.0086	58.922	3.984
TGBC119B	C	C1	3	1	56.845	3.861	0.177	20	LWT	0.0089	59.297	4.027
TGBC11BB	C	C1	3	1	54.971	3.640	0.180	20	LGM	0.0090	58.059	3.844
TGBC217B	C	C2	3	2	55.943	3.741	0.179	20	LWB	0.0089	58.779	3.930
TGBC218B	C	C2	3	2	55.686	3.848	0.177	20	LWB	0.0089	58.104	4.015
TGBC219B	C	C2	3	2	60.753	3.995	0.167	20	LGM	0.0084	59.753	3.929

	Strength [ksi]	Modulus [Msi]
Average	**56.478**	**3.931**
Standard Dev.	**1.884**	**0.133**
Coeff. of Var. [%]	**3.336**	**3.382**
Min.	**53.194**	**3.640**
Max.	**60.753**	**4.193**
Number of Spec.	**18**	**18**

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	**0.0087**	**57.864**	**4.027**
Standard $Dev._{norm}$		**1.599**	**0.088**
Coeff. of Var. $[\%]_{norm}$		**2.764**	**2.173**
Min.	**0.0084**	**53.992**	**3.844**
Max.	**0.0090**	**59.753**	**4.193**
Number of Spec.		**18**	**18**


Laminate Unnotched Tension Properties (UNT2) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
LaminateTension Strength (UNT2) [ksi]

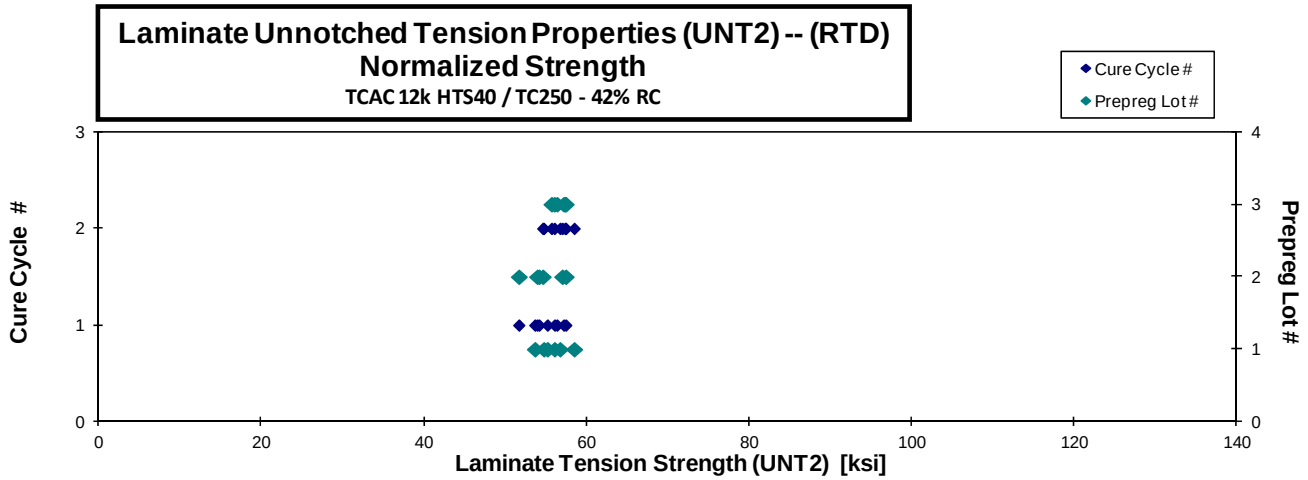

Laminate Unnotched Tension Properties (UNT2) -- (CTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT2) [Msi]

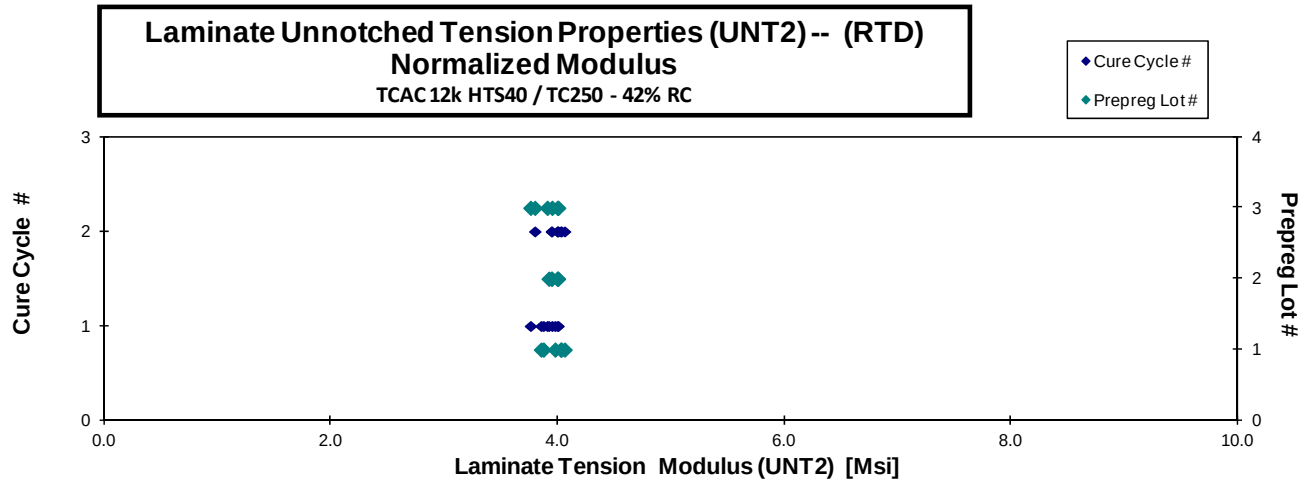
Laminate Unnotched Tension Properties (UNT2) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGBA11CA	A	C1	1	1	52.211	3.745	0.175	20	LGM	0.0088	53.757	3.856
TGBA11DA	A	C1	1	1	53.748	3.710	0.178	20	MWB	0.0089	56.167	3.877
TGBA11EA	A	C1	1	1	52.842	3.803	0.178	20	MGM	0.0089	55.292	3.979
TGBA21CA	A	C2	1	2	53.165	3.911	0.175	20	MWT	0.0088	54.843	4.035
TGBA21DA	A	C2	1	2	55.102	3.906	0.175	20	MWT	0.0088	56.836	4.029
TGBA21EA	A	C2	1	2	56.512	3.920	0.176	20	MWT	0.0088	58.585	4.064
TGBB11CA	B	C1	2	1	52.636	3.901	0.175	20	LWB	0.0087	54.035	4.004
TGBB11DA	B	C1	2	1	52.447	3.792	0.176	20	LGM	0.0088	54.272	3.924
TGBB11EA	B	C1	2	1	49.880	3.857	0.176	20	LGM	0.0088	51.778	4.004
TGBB21DA	B	C2	2	2	52.969	3.821	0.176	20	LWB	0.0088	54.724	3.948
TGBB21EA	B	C2	2	2	55.314	3.844	0.177	20	LGM	0.0088	57.548	3.999
TGBB21FA	B	C2	2	2	54.461	3.765	0.178	20	LWB	0.0089	57.120	3.949
TGBC11CA	C	C1	3	1	54.994	3.794	0.177	20	LWT	0.0089	57.291	3.953
TGBC11DA	C	C1	3	1	54.535	3.634	0.176	20	LWT	0.0088	56.476	3.763
TGBC11EA	C	C1	3	1	55.903	3.798	0.175	20	LGM	0.0088	57.548	3.910
TGBC21CA	C	C2	3	2	56.330	3.929	0.173	20	LGM	0.0087	57.446	4.007
TGBC21DA	C	C2	3	2	54.803	3.904	0.174	20	LGM	0.0087	56.152	4.000
TGBC21EA	C	C2	3	2	54.116	3.686	0.175	20	LGM	0.0088	55.798	3.801

Average	**53.998**	**3.818**	**$Average_{norm}$**	**0.0088**	**55.870**	**3.950**
Standard Dev.	**1.681**	**0.087**	**$Standard\ Dev._{norm}$**		**1.721**	**0.082**
Coeff. of Var. [%]	**3.114**	**2.278**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.081**	**2.081**
Min.	**49.880**	**3.634**	**Min.**	**0.0087**	**51.778**	**3.763**
Max.	**56.512**	**3.929**	**Max.**	**0.0089**	**58.585**	**4.064**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**


Laminate Unnotched Tension Properties (UNT2) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
Laminate Tension Strength (UNT2) [ksi]

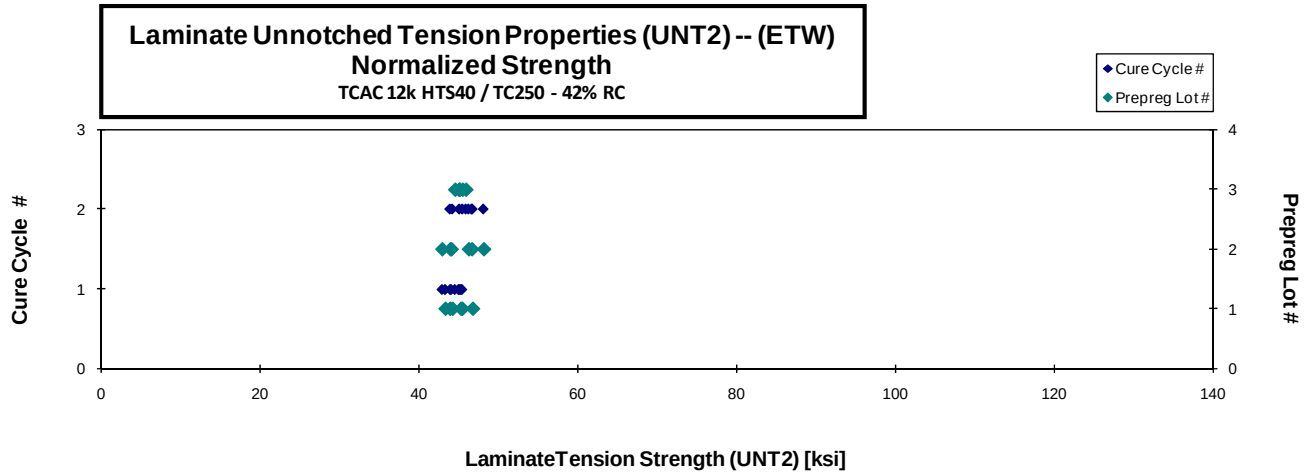

Laminate Unnotched Tension Properties (UNT2) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT2) [Msi]

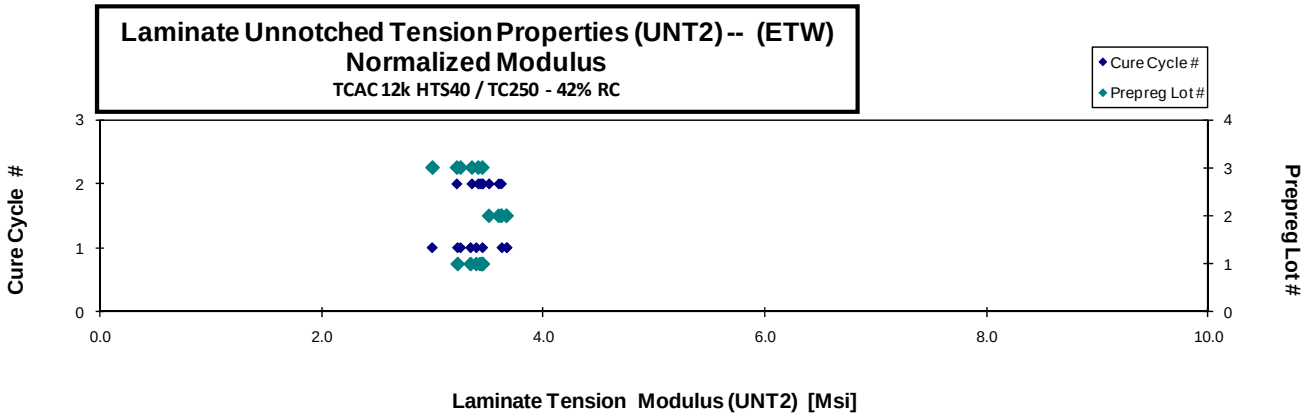
Laminate Unnotched Tension Properties (UNT2) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGBA111F	A	C1	1	1	43.337	3.229	0.170	20	DGM	0.0085	43.362	3.231
TGBA112F	A	C1	1	1	44.652	3.299	0.173	20	DGM	0.0086	45.313	3.347
TGBA113F	A	C1	1	1	44.317	3.311	0.174	20	DGM	0.0087	45.486	3.399
TGBA214F	A	C2	1	2	43.101	3.366	0.173	20	DGM	0.0087	43.955	3.432
TGBA215F	A	C2	1	2	45.830	3.386	0.174	20	DGM	0.0087	46.796	3.457
TGBA216F	A	C2	1	2	43.203	3.367	0.174	20	DGM	0.0087	44.266	3.450
TGBB111F	B	C1	2	1	44.598	3.712	0.168	20	AWT	0.0084	44.118	3.672
TGBB112F	B	C1	2	1	43.685	3.644	0.171	20	AWT	0.0086	43.994	3.670
TGBB113F	B	C1	2	1	42.184	3.561	0.173	20	AWT	0.0087	42.966	3.627
TGBB211F	B	C2	2	2	46.553	3.532	0.169	20	DGM / AGM	0.0085	46.302	3.513
TGBB212F	B	C2	2	2	46.086	3.553	0.172	20	AGM	0.0086	46.692	3.600
TGBB213F	B	C2	2	2	46.722	3.512	0.175	20	AGM	0.0088	48.183	3.622
TGBC111F	C	C1	3	1	43.337	2.889	0.177	20	LGM	0.0088	45.062	3.004
TGBC112F	C	C1	3	1	43.734	3.156	0.175	20	LGM	0.0088	45.140	3.257
TGBC113F	C	C1	3	1	42.728	3.311	0.177	20	LGM	0.0089	44.580	3.454
TGBC211F	C	C2	3	2	46.284	3.383	0.169	20	LGM	0.0084	45.957	3.359
TGBC212F	C	C2	3	2	44.894	3.369	0.172	20	LGT	0.0086	45.528	3.417
TGBC213F	C	C2	3	2	43.829	3.131	0.175	20	LGM	0.0088	45.144	3.225

Average	**44.393**	**3.373**	**$Average_{norm}$**	**0.0086**	**45.158**	**3.430**
Standard Dev.	**1.397**	**0.199**	**$Standard\ Dev._{norm}$**		**1.316**	**0.177**
Coeff. of Var. [%]	**3.147**	**5.907**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.915**	**5.171**
Min.	**42.184**	**2.889**	**Min.**	**0.0084**	**42.966**	**3.004**
Max.	**46.722**	**3.712**	**Max.**	**0.0089**	**48.183**	**3.672**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**


Laminate Unnotched Tension Properties (UNT2) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
LaminateTension Strength (UNT2) [ksi]


Laminate Unnotched Tension Properties (UNT2) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT2) [Msi]

4.8 Unnotched Tension 3 Properties

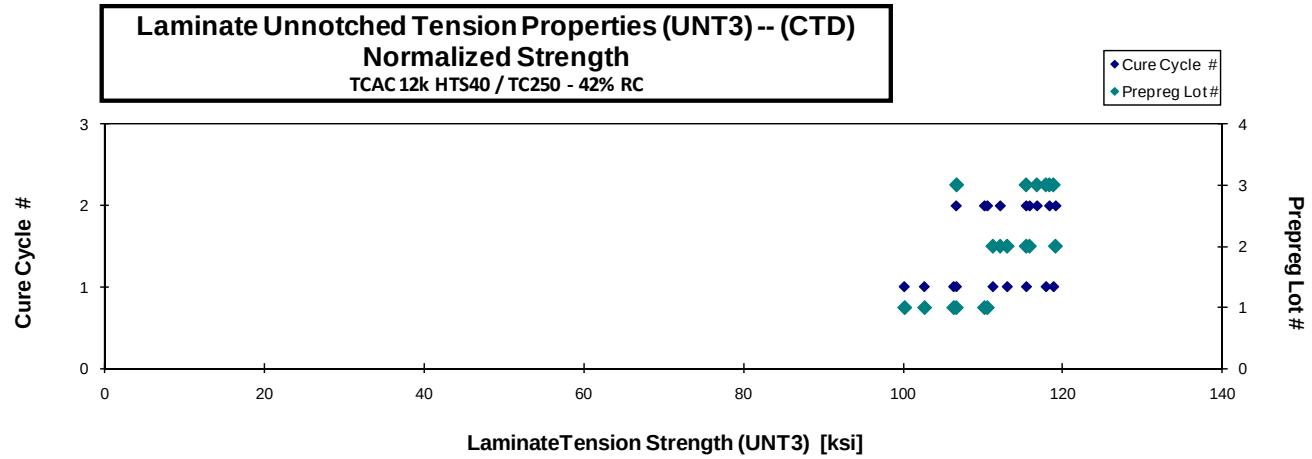
Laminate Unnotched Tension Properties (UNT3) -- (CTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

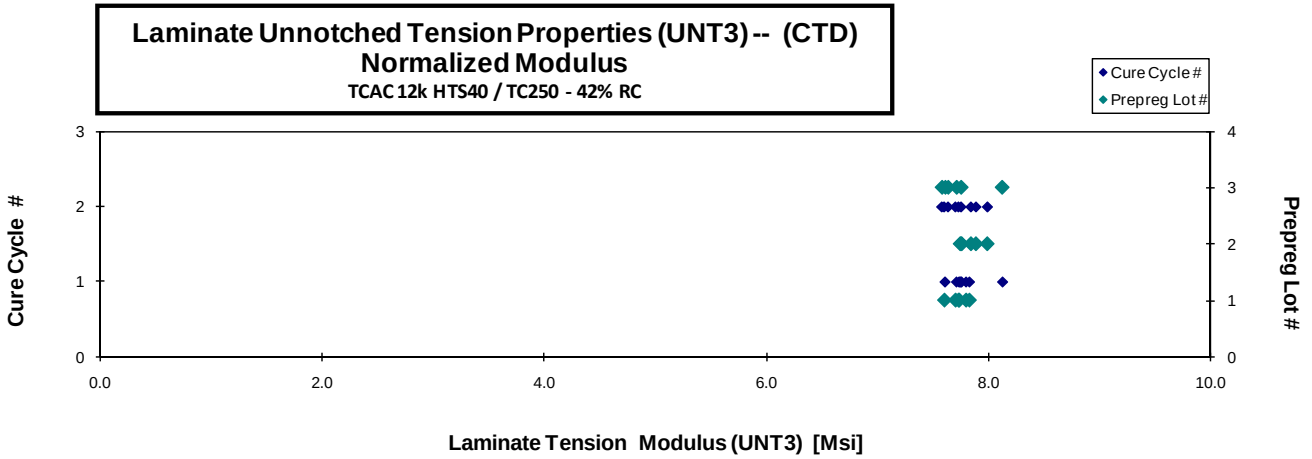
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGCA117B	A	C1	1	1	101.271	7.631	0.129	15	LWB	0.0086	102.661	7.736
TGCA118B	A	C1	1	1	100.107	7.824	0.128	15	LGM	0.0085	100.160	7.828
TGCA119B	A	C1	1	1	107.912	7.915	0.126	15	LGM	0.0084	106.318	7.798
TGCA217B	A	C2	1	2	101.173	7.213	0.134	15	LAT	0.0090	106.635	7.602
TGCA218B	A	C2	1	2	107.727	7.534	0.131	15	LWT	0.0087	110.530	7.730
TGCA219B	A	C2	1	2	110.312	7.713	0.127	15	LWT/LAB	0.0085	110.168	7.702
TGCB117B	B	C1	2	1	108.329	7.423	0.133	15	LGM	0.0089	113.002	7.743
TGCB118B	B	C1	2	1	111.839	7.512	0.132	15	LAT	0.0088	115.391	7.751
TGCB119B	B	C1	2	1	111.098	7.750	0.128	15	LWT/LWB	0.0085	111.215	7.758
TGCB217B	B	C2	2	2	114.015	7.764	0.130	15	LGM	0.0086	115.803	7.886
TGCB218B	B	C2	2	2	119.278	8.003	0.127	15	LGM	0.0085	119.060	7.988
TGCB219B	B	C2	2	2	113.168	7.913	0.126	15	LWT	0.0084	112.132	7.841
TGCC117B	C	C1	3	1	101.517	7.243	0.134	15	LWB	0.0089	106.666	7.611
TGCC118B	C	C1	3	1	113.747	7.778	0.133	15	LWB	0.0089	118.787	8.123
TGCC119B	C	C1	3	1	117.340	7.680	0.128	15	LWT / LAB	0.0085	117.847	7.713
TGCC211B	C	C2	3	2	118.640	7.776	0.127	15	LGM	0.0085	118.283	7.753
TGCC216B	C	C2	3	2	111.136	7.302	0.132	15	LWT / LWB	0.0088	115.378	7.581
TGCC219B	C	C2	3	2	118.180	7.732	0.126	15	LGM	0.0084	116.728	7.637

	Strength [ksi]	Modulus [Msi]
Average	110.377	7.650
Standard Dev.	6.237	0.233
Coeff. of Var. [%]	5.651	3.046
Min.	100.107	7.213
Max.	119.278	8.003
Number of Spec.	18	18

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	0.0086	112.042	7.766
$Standard\ Dev._{norm}$		5.705	0.136
$Coeff.\ of\ Var.\ [\%]_{norm}$		5.092	1.748
Min.	0.0084	100.160	7.581
Max.	0.0090	119.060	8.123
Number of Spec.		18	18


Laminate Unnotched Tension Properties (UNT3) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
LaminateTension Strength (UNT3) [ksi]

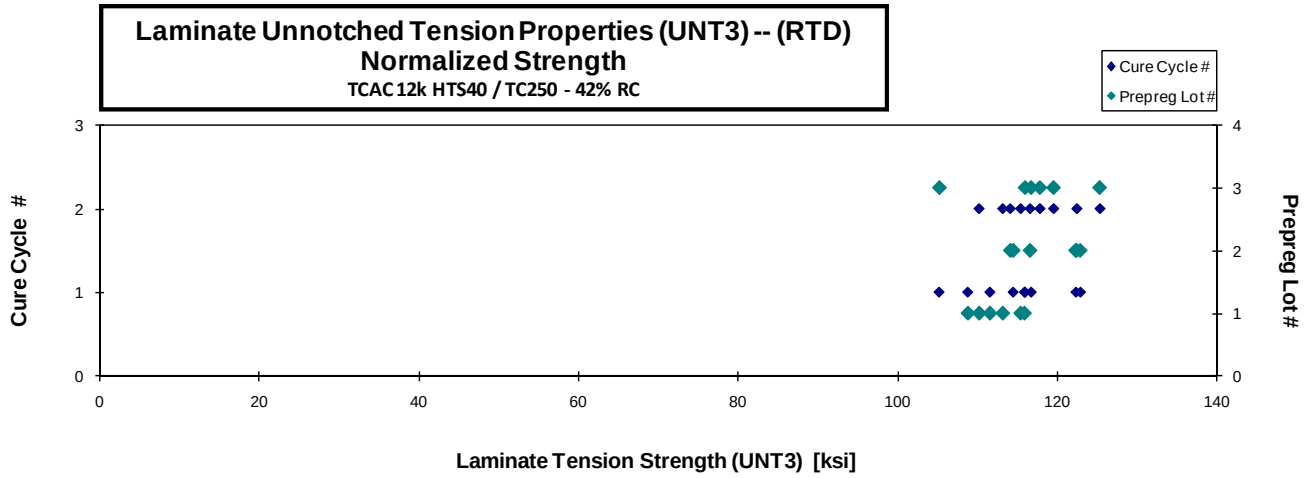

Laminate Unnotched Tension Properties (UNT3) -- (CTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT3) [Msi]

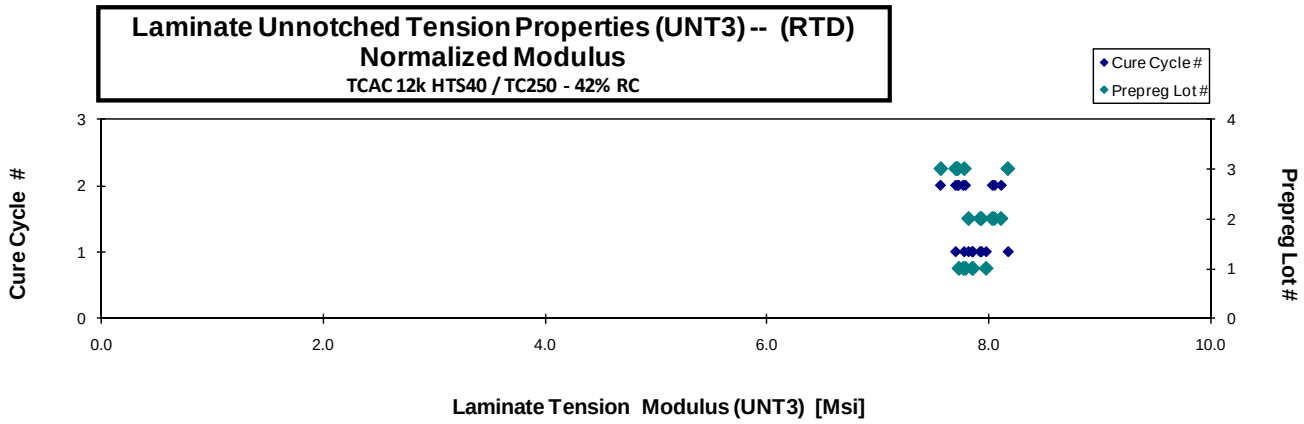
Laminate Unnotched Tension Properties (UNT3) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGCA11CA	A	C1	1	1	106.026	7.659	0.131	15	LAB	0.0087	108.797	7.859
TGCA11DA	A	C1	1	1	107.733	7.704	0.132	15	LGM	0.0088	111.564	7.978
TGCA11EA	A	C1	1	1	111.795	7.574	0.132	15	LAB	0.0088	115.901	7.853
TGCA21CA	A	C2	1	2	111.007	7.643	0.130	15	LGM	0.0087	113.169	7.792
TGCA21DA	A	C2	1	2	111.768	7.527	0.132	15	LGM	0.0088	115.420	7.773
TGCA21EA	A	C2	1	2	105.393	7.394	0.133	15	LWB	0.0089	110.215	7.732
TGCB11CA	B	C1	2	1	122.732	7.950	0.127	15	LGM	0.0085	122.331	7.924
TGCB11DA	B	C1	2	1	111.561	7.734	0.131	15	LAB/LWT	0.0087	114.477	7.936
TGCB11EA	B	C1	2	1	118.083	7.514	0.133	15	LWB	0.0088	122.898	7.820
TGCB21CA	B	C2	2	2	115.471	7.976	0.129	15	LWB	0.0086	116.588	8.053
TGCB21DA	B	C2	2	2	111.594	7.932	0.130	15	LAB	0.0087	114.118	8.112
TGCB21EA	B	C2	2	2	119.770	7.857	0.130	15	LAB/LWT	0.0087	122.447	8.033
TGCC11CA	C	C1	3	1	112.378	7.540	0.132	15	LWT	0.0088	115.977	7.781
TGCC11DA	C	C1	3	1	102.315	7.494	0.131	15	LGM / LWB	0.0087	105.204	7.705
TGCC11EA	C	C1	3	1	112.313	7.865	0.133	15	LGM	0.0088	116.732	8.174
TGCC21CA	C	C2	3	2	115.146	7.397	0.130	15	LAT	0.0087	117.825	7.569
TGCC21DA	C	C2	3	2	116.663	7.519	0.131	15	LAT / LAB	0.0087	119.545	7.705
TGCC21EA	C	C2	3	2	123.517	7.611	0.129	15	LWT / LAB	0.0086	125.341	7.723

	Strength [ksi]	Modulus [Msi]			$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	**113.070**	**7.661**	**$Average_{norm}$**	**0.0087**	**116.031**	**7.862**
Standard Dev.	**5.746**	**0.187**	**Standard $Dev._{norm}$**		**5.253**	**0.161**
Coeff. of Var. [%]	**5.082**	**2.446**	**Coeff. of Var. $[\%]_{norm}$**		**4.527**	**2.047**
Min.	**102.315**	**7.394**	**Min.**	**0.0085**	**105.204**	**7.569**
Max.	**123.517**	**7.976**	**Max.**	**0.0089**	**125.341**	**8.174**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**


Laminate Unnotched Tension Properties (UNT3) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
20
40
60
80
100
120
140
Laminate Tension Strength (UNT3) [ksi]


Laminate Unnotched Tension Properties (UNT3) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT3) [Msi]

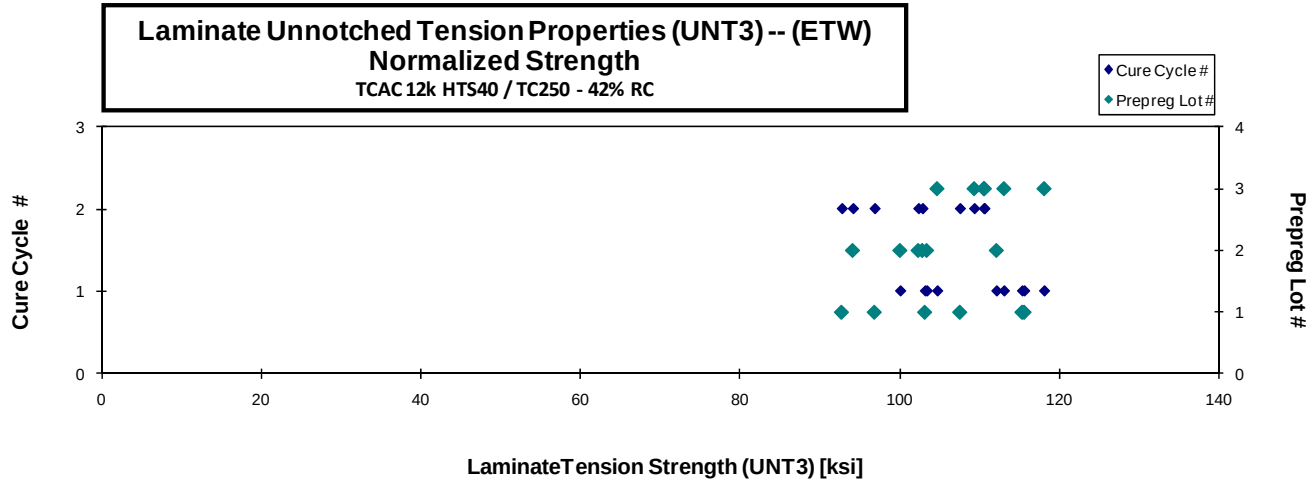
Laminate Unnotched Tension Properties (UNT3) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

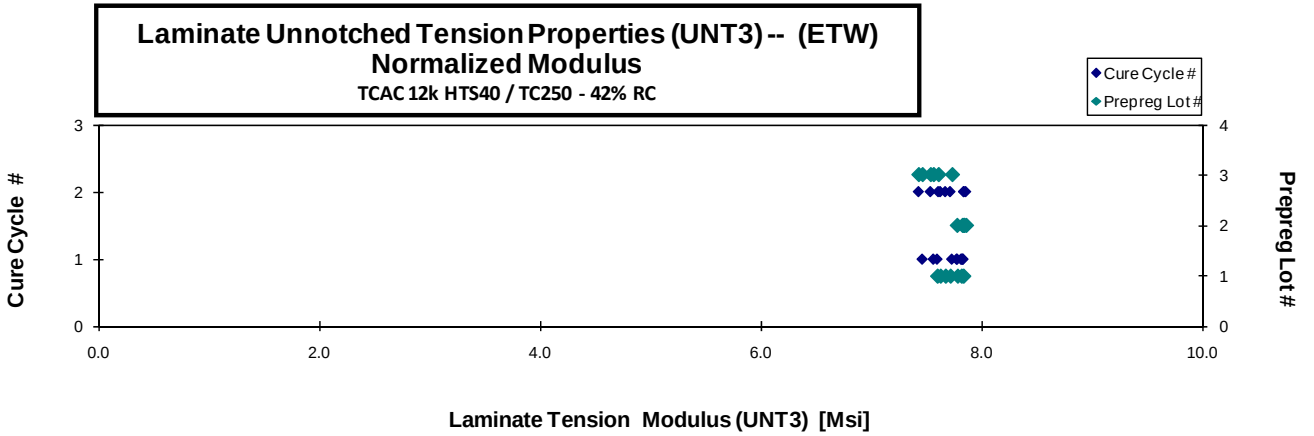
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGCA111F	A	C1	1	1	118.966	8.067	0.124	15	LGM/LWT	0.0082	115.281	7.817
TGCA112F	A	C1	1	1	116.393	7.892	0.127	15	LWT/LWB	0.0084	115.541	7.834
TGCA113F*	A	C1	1	1		7.686	0.129	15	LGM/LIT	0.0086		7.782
TGCA114F	A	C1	1	1	100.544	7.410	0.131	15	LGM/LAT	0.0087	103.120	7.600
TGCA211F	A	C2	1	2	93.273	7.674	0.127	15	LAT	0.0084	92.713	7.628
TGCA212F	A	C2	1	2	95.556	7.573	0.129	15	LAT/LGM	0.0086	96.817	7.673
TGCA213F	A	C2	1	2	104.009	7.466	0.132	15	LGM/LAT	0.0088	107.503	7.717
TGCB111F	B	C1	2	1	114.009	7.911	0.125	15	LGM	0.0084	112.071	7.777
TGCB112F	B	C1	2	1	102.722	7.785	0.128	15	LGM/LWB	0.0086	103.353	7.833
TGCB113F	B	C1	2	1	97.246	7.606	0.131	15	LGM/LWT	0.0087	100.018	7.823
TGCB211F	B	C2	2	2	102.409	7.812	0.128	15	LGM/LAT	0.0085	102.810	7.843
TGCB212F	B	C2	2	2	92.196	7.681	0.130	15	LGM/LWB	0.0087	94.100	7.840
TGCB213F	B	C2	2	2	98.711	7.583	0.132	15	LGM/LAT	0.0088	102.298	7.859
TGCC111F	C	C1	3	1	115.149	7.380	0.131	15	MGM	0.0087	118.039	7.566
TGCC112F	C	C1	3	1	109.629	7.242	0.131	15	LWT / LGM	0.0088	113.011	7.465
TGCC113F	C	C1	3	1	101.599	7.507	0.131	15	MGM	0.0088	104.654	7.733
TGCC212F	C	C2	3	2	106.467	7.239	0.131	15	MGM	0.0087	109.292	7.431
TGCC213F	C	C2	3	2	106.458	7.331	0.132	15	LGM / LAB	0.0088	110.508	7.610
TGCC214F	C	C2	3	2	106.301	7.248	0.133	15	MGM / LWB	0.0088	110.567	7.539

*** Strength removed due to bad failures occurred secondary to the first failure**

Average	**104.535**	**7.584**	**$Average_{norm}$**	**0.0086**	**106.205**	**7.704**
Standard Dev.	**7.923**	**0.243**	**$Standard\ Dev._{norm}$**		**7.440**	**0.137**
Coeff. of Var. [%]	**7.579**	**3.200**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**7.005**	**1.781**
Min.	**92.196**	**7.239**	**Min.**	**0.0082**	**92.713**	**7.431**
Max.	**118.966**	**8.067**	**Max.**	**0.0088**	**118.039**	**7.859**
Number of Spec.	**18**	**19**	**Number of Spec.**		**18**	**19**


Laminate Unnotched Tension Properties (UNT3) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
20
40
60
80
100
120
140
LaminateTension Strength (UNT3) [ksi]


Laminate Unnotched Tension Properties (UNT3) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Tension Modulus (UNT3) [Msi]

4.9 Unnotched Compression 1 Properties

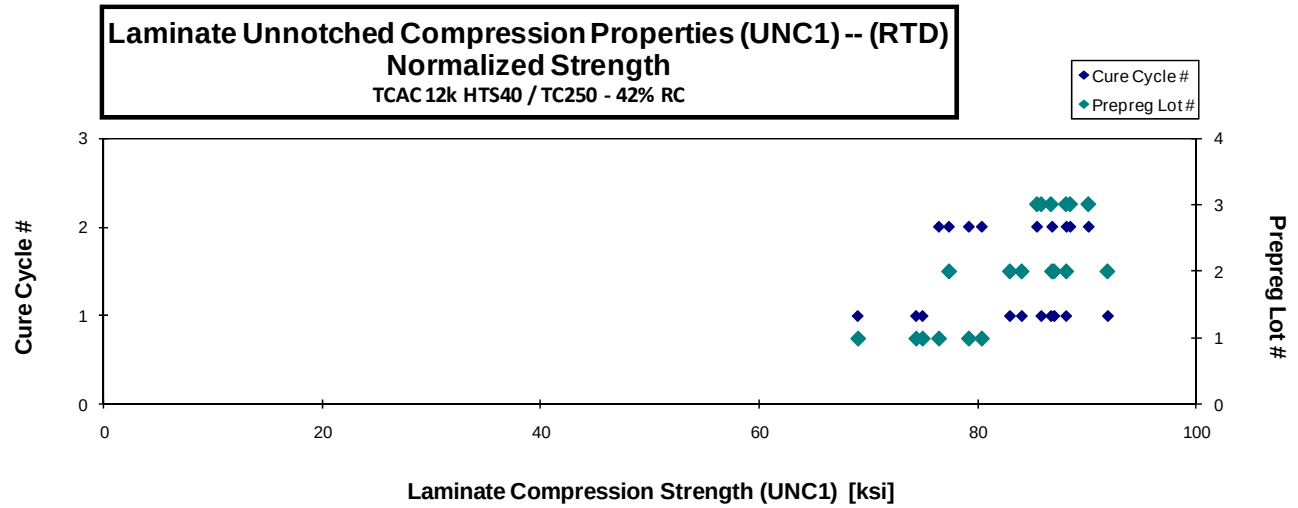
Laminate Unnotched Compression Properties (UNC1) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

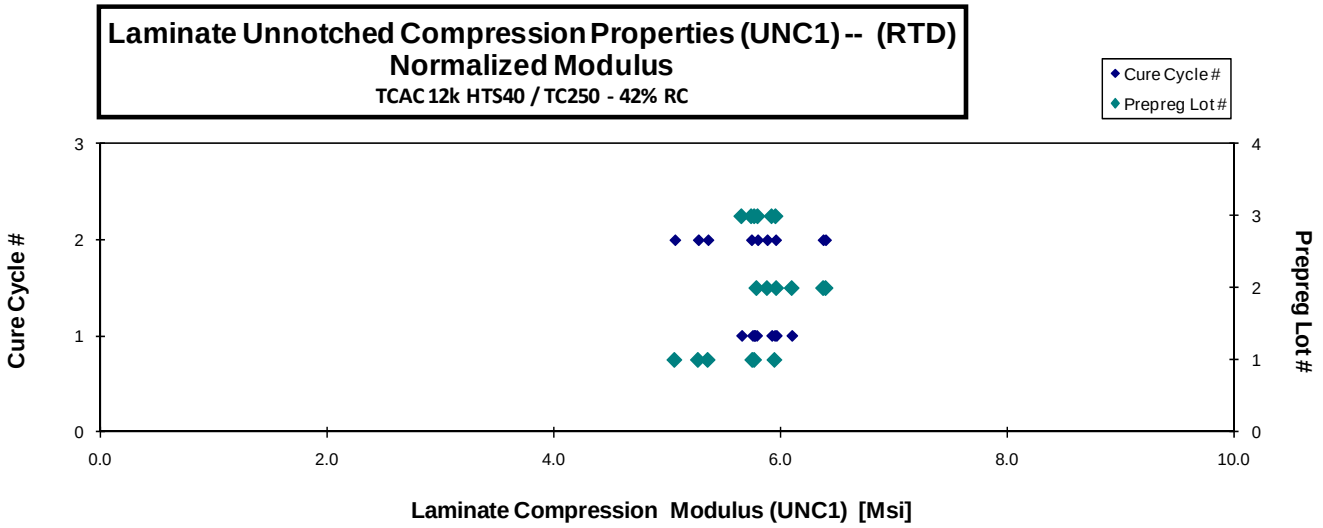
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TG0A118A	A	C1	1	1	73.731	5.702	0.137	16	BGM	0.0086	74.408	5.754
TG0A119A	A	C1	1	1	74.016	5.695	0.138	16	BGM	0.0086	74.996	5.770
TG0A11AA	A	C1	1	1	68.899	5.934	0.136	16	BGM	0.0085	69.076	5.949
TG0A218A	A	C2	1	2	82.701	5.504	0.130	16	BGM	0.0081	79.235	5.273
TG0A219A	A	C2	1	2	83.972	5.596	0.130	16	BGM	0.0081	80.421	5.359
TG0A21AA	A	C2	1	2	79.920	5.293	0.130	16	BGM	0.0081	76.492	5.066
TG0B118A	B	C1	2	1	81.826	5.635	0.140	16	BGM	0.0087	84.072	5.790
TG0B119A	B	C1	2	1	80.590	5.792	0.140	16	BGM	0.0088	82.990	5.965
TG0B11AA	B	C1	2	1	89.256	5.924	0.140	16	BGM	0.0088	91.936	6.102
TG0B11BA*	B	C1	2	1	84.193		0.141	16	BGM	0.0088	87.041	
TG0B218A	B	C2	2	2	84.307	6.192	0.140	16	BGM	0.0088	86.849	6.379
TG0B219A	B	C2	2	2	75.571	5.743	0.139	16	BGM	0.0087	77.414	5.883
TG0B21AA	B	C2	2	2	85.495	6.207	0.140	16	BGM	0.0088	88.166	6.400
TG0C118A	C	C1	3	1	82.902	5.462	0.141	16	BGM	0.0088	85.858	5.657
TG0C119A	C	C1	3	1	84.939	5.709	0.141	16	BGM	0.0088	88.130	5.924
TG0C11AA	C	C1	3	1	83.509	5.555	0.141	16	BGM	0.0088	86.748	5.771
TG0C218A	C	C2	3	2	89.618	5.921	0.137	16	BGM	0.0086	90.183	5.959
TG0C219A	C	C2	3	2	84.504	5.734	0.138	16	BGM/BAT	0.0086	85.468	5.800
TG0C21AA	C	C2	3	2	87.438	5.674	0.138	16	BGM	0.0086	88.509	5.744

*** Strength only**
Note: NDI of batch A cure cycle C1 indicates high porosity in the panel.

Average	**81.968**	**5.737**	**$Average_{norm}$**	**0.0086**	**83.052**	**5.808**
Standard Dev.	**5.459**	**0.235**	**$Standard\ Dev._{norm}$**		**6.243**	**0.336**
Coeff. of Var. [%]	**6.660**	**4.090**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**7.517**	**5.786**
Min.	**68.899**	**5.293**	**Min.**	**0.0081**	**69.076**	**5.066**
Max.	**89.618**	**6.207**	**Max.**	**0.0088**	**91.936**	**6.400**
Number of Spec.	**19**	**18**	**Number of Spec.**		**19**	**18**


Laminate Unnotched Compression Properties (UNC1) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Compression Strength (UNC1) [ksi]


Laminate Unnotched Compression Properties (UNC1) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Compression Modulus (UNC1) [Msi]

Laminate Unnotched Compression Properties (UNC1) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TG0A111F	A	1	1	1	55.031	5.855	0.131	16	BGM	0.0082	53.069	5.646
TG0A112F	A	1	1	1	56.179	5.592	0.134	16	BGM	0.0084	55.284	5.502
TG0A113F	A	1	1	1	47.561	5.650	0.135	16	BGM	0.0084	47.130	5.599
TG0A211F	A	2	1	2	53.187	5.353	0.124	16	BGM	0.0077	48.468	4.878
TG0A212F	A	2	1	2	52.216	5.241	0.128	16	BAB	0.0080	48.978	4.916
TG0A213F	A	2	1	2	50.374	5.139	0.129	16	BAB	0.0081	47.849	4.881
TG0B111F**	B	1	2	1		5.441	0.135	16	ENDCRUSH	0.0085		5.409
TG0B112F	B	1	2	1	48.984	5.342	0.135	16	BGM	0.0084	48.588	5.299
TG0B113F	B	1	2	1	51.367	5.534	0.134	16	BGM	0.0084	50.763	5.469
TG0B117F*	B	1	2	1	50.889		0.136	16	BGM	0.0085	50.833	
TG0B211F	B	2	2	2	41.300	5.784	0.134	16	BGM	0.0084	40.718	5.702
TG0B212F	B	2	2	2	47.940	6.249	0.134	16	BGM	0.0084	47.400	6.179
TG0B213F	B	2	2	2	44.420	5.900	0.135	16	BGM	0.0085	44.235	5.876
TG0B214F*	B	2	2	2	48.762		0.137	16	BAT	0.0086	49.145	
TG0B215F*	B	2	2	2	40.970		0.138	16	BAT	0.0086	41.668	
TG0C111F	C	1	3	1	63.735	5.786	0.133	16	BGM	0.0083	62.138	5.641
TG0C112F	C	1	3	1	60.402	5.929	0.134	16	BGM	0.0084	59.518	5.842
TG0C113F	C	1	3	1	51.753	5.655	0.135	16	BGM	0.0084	51.443	5.621
TG0C211F	C	2	3	2	57.913	5.766	0.134	16	BGM	0.0084	57.207	5.696
TG0C212F	C	2	3	2	58.658	5.826	0.134	16	BGM	0.0084	57.663	5.727
TG0C213F	C	2	3	2	55.078	5.550	0.134	16	BGM	0.0084	54.332	5.475

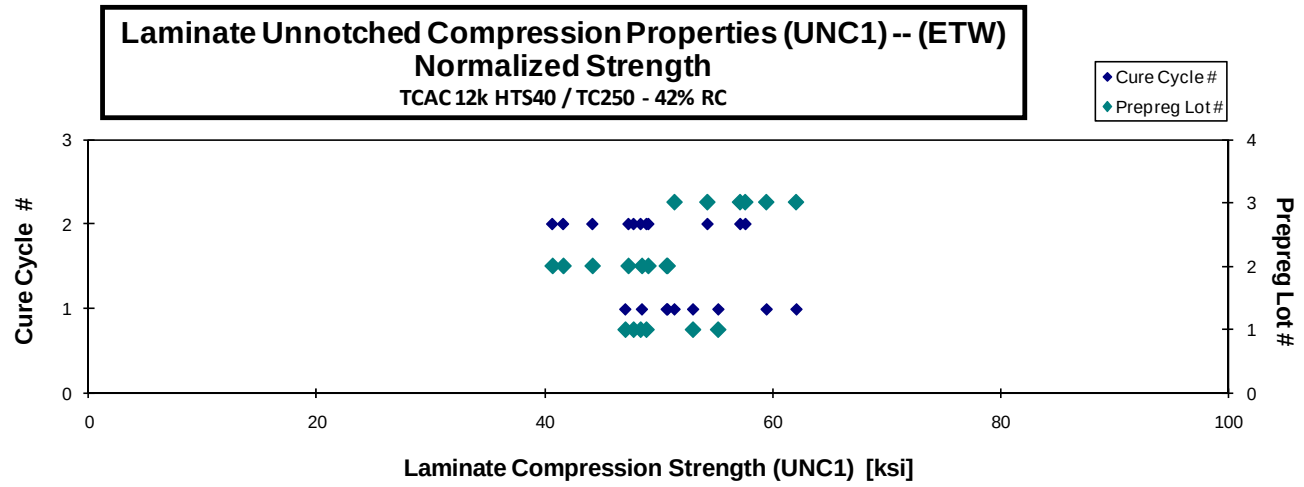
*** Strength only**

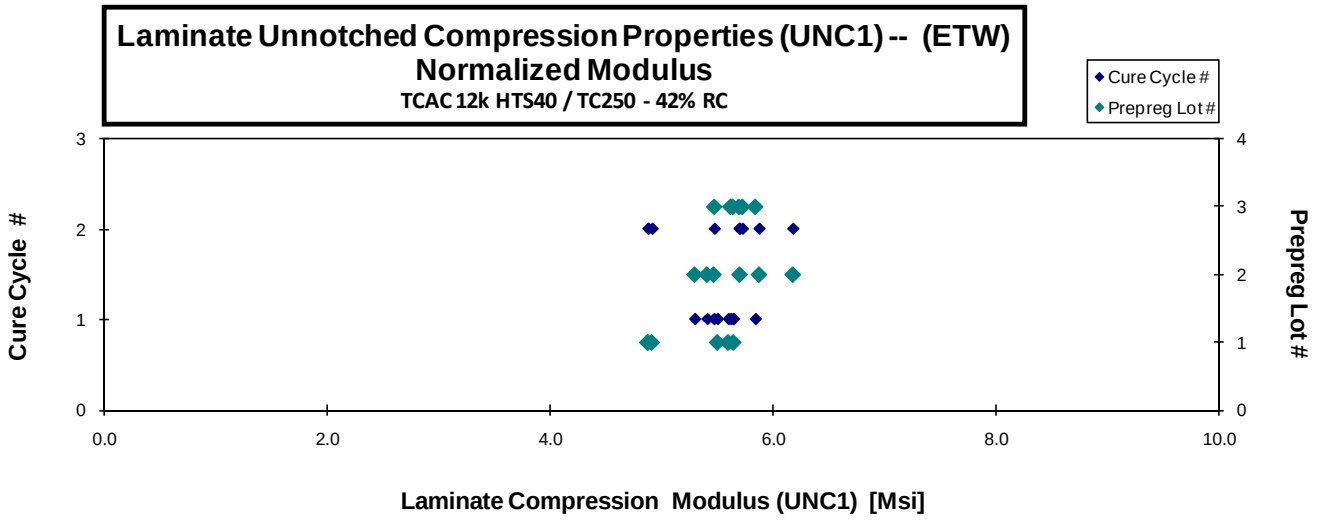
**** Compressive strength is not reported as unacceptable failure mode was observed**

Note: NDI of batch A cure cycle C1 indicates high porosity in the panel.

Average	51.836	5.644
Standard Dev.	5.975	0.277
Coeff. of Var. [%]	11.527	4.906
Min.	40.970	5.139
Max.	63.735	6.249
Number of Spec.	20	18

$Average_{norm}$	0.0083	50.821	5.520
$Standard\ Dev._{norm}$		5.662	0.349
$Coeff.\ of\ Var.\ [\%]_{norm}$		11.141	6.320
Min.	0.0077	40.718	4.878
Max.	0.0086	62.138	6.179
Number of Spec.		20	18


Laminate Unnotched Compression Properties (UNC1) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
20
40
60
80
100
Laminate Compression Strength (UNC1) [ksi]


Laminate Unnotched Compression Properties (UNC1) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Compression Modulus (UNC1) [Msi]

4.10 Unnotched Compression 2 Properties

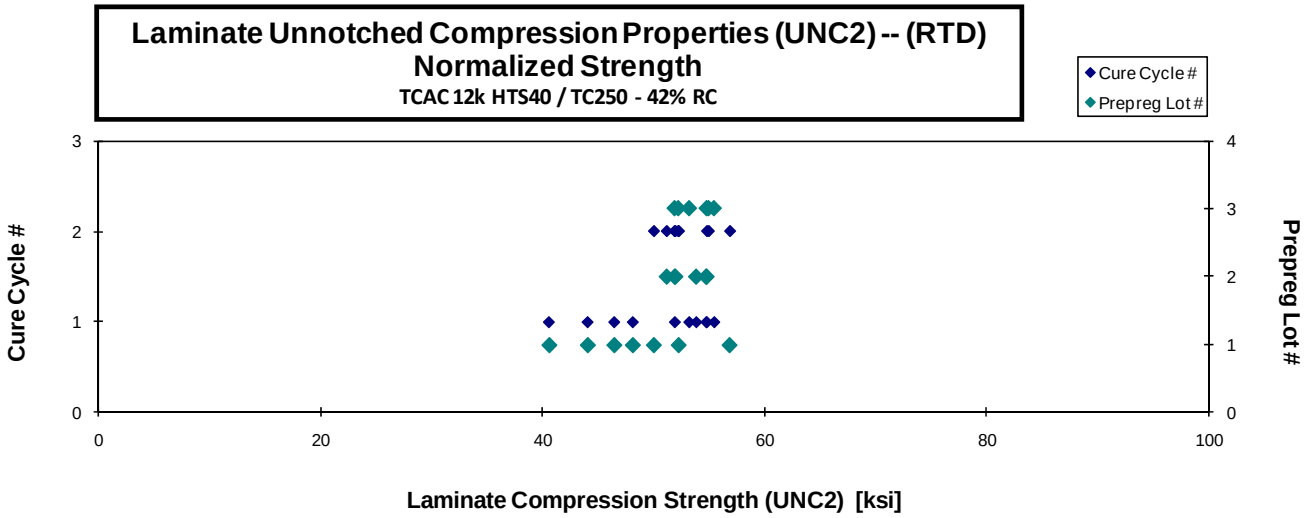
Laminate Unnotched Compression Properties (UNC2) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

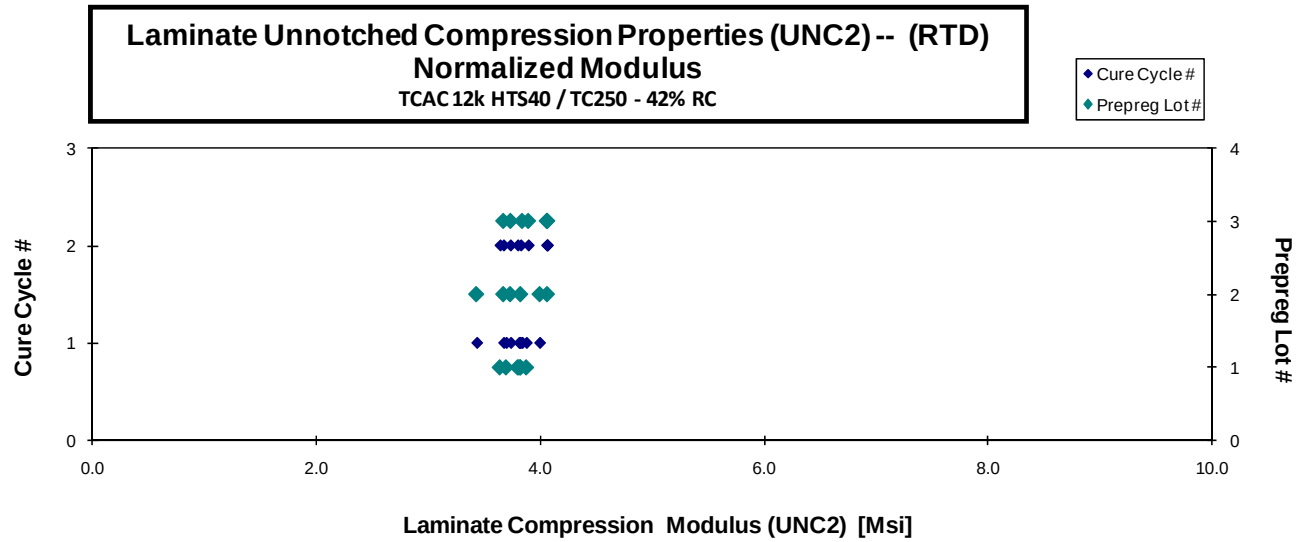
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGXA118A	A	C1	1	1	47.574	3.833	0.172	20	BGM	0.0086	48.143	3.879
TGXA119A	A	C1	1	1	43.458	3.760	0.172	20	BGM	0.0086	44.080	3.813
TGXA11AA	A	C1	1	1	39.926	3.635	0.173	20	BGM	0.0086	40.607	3.697
TGXA11BA	A	C1	1	1	45.419	3.737	0.174	20	BGM	0.0087	46.470	3.823
TGXA218A	A	C2	1	2	56.019	3.587	0.173	20	BGM	0.0086	56.876	3.642
TGXA219A	A	C2	1	2	49.691	3.775	0.171	20	BGM	0.0086	50.042	3.802
TGXA21AA	A	C2	1	2	51.913	3.802	0.171	20	BGM	0.0086	52.279	3.829
TGXB118A	B	C1	2	1	54.624	3.990	0.170	20	BGM	0.0085	54.752	4.000
TGXB119A	B	C1	2	1	51.564	3.408	0.171	20	BGM	0.0086	51.918	3.431
TGXB11AA	B	C1	2	1	53.263	3.785	0.172	20	BGM	0.0086	53.848	3.826
TGXB218A	B	C2	2	2	51.133	3.613	0.173	20	BGM	0.0086	51.980	3.673
TGXB219A	B	C2	2	2	54.199	4.021	0.172	20	BGM	0.0086	54.810	4.066
TGXB21AA	B	C2	2	2	51.002	3.720	0.171	20	BGM	0.0085	51.197	3.735
TGXC113A	C	C1	3	1	56.502	3.808	0.167	20	BGM	0.0083	55.460	3.738
TGXC117A	C	C1	3	1	51.421	3.550	0.176	20	BGM	0.0088	53.213	3.674
TGXC11AA	C	C1	3	1	52.580	3.687	0.177	20	BGM	0.0089	54.794	3.842
TGXC218A	C	C2	3	2	52.851	4.112	0.168	20	BGM	0.0084	52.235	4.064
TGXC219A	C	C2	3	2	55.396	4.101	0.169	20	BGM	0.0084	54.972	4.070
TGXC21AA	C	C2	3	2	52.399	3.935	0.168	20	BGM	0.0084	51.901	3.897

Average	**51.102**	**3.782**	
Standard Dev.	**4.323**	**0.188**	
Coeff. of Var. [%]	**8.460**	**4.966**	
Min.	**39.926**	**3.408**	
Max.	**56.502**	**4.112**	
Number of Spec.	**19**	**19**	

$Average_{norm}$	**0.0086**	**51.557**	**3.816**
Standard $Dev._{norm}$		**4.161**	**0.163**
Coeff. of Var. $[\%]_{norm}$		**8.071**	**4.277**
Min.	**0.0083**	**40.607**	**3.431**
Max.	**0.0089**	**56.876**	**4.070**
Number of Spec.		**19**	**19**


Laminate Unnotched Compression Properties (UNC2) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Compression Strength (UNC2) [ksi]


Laminate Unnotched Compression Properties (UNC2) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Compression Modulus (UNC2) [Msi]

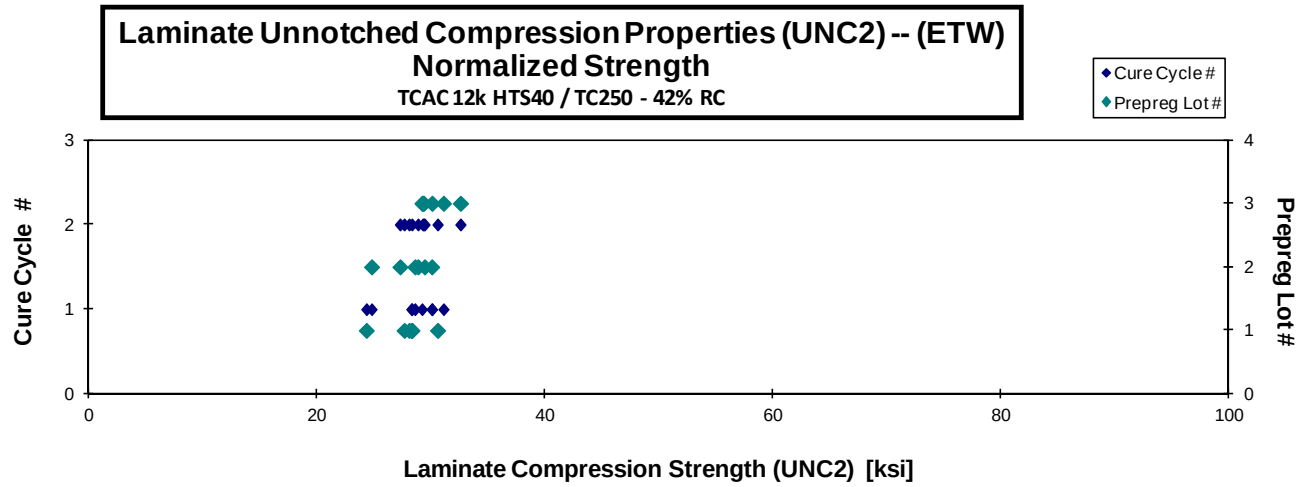
Laminate Unnotched Compression Properties (UNC2) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

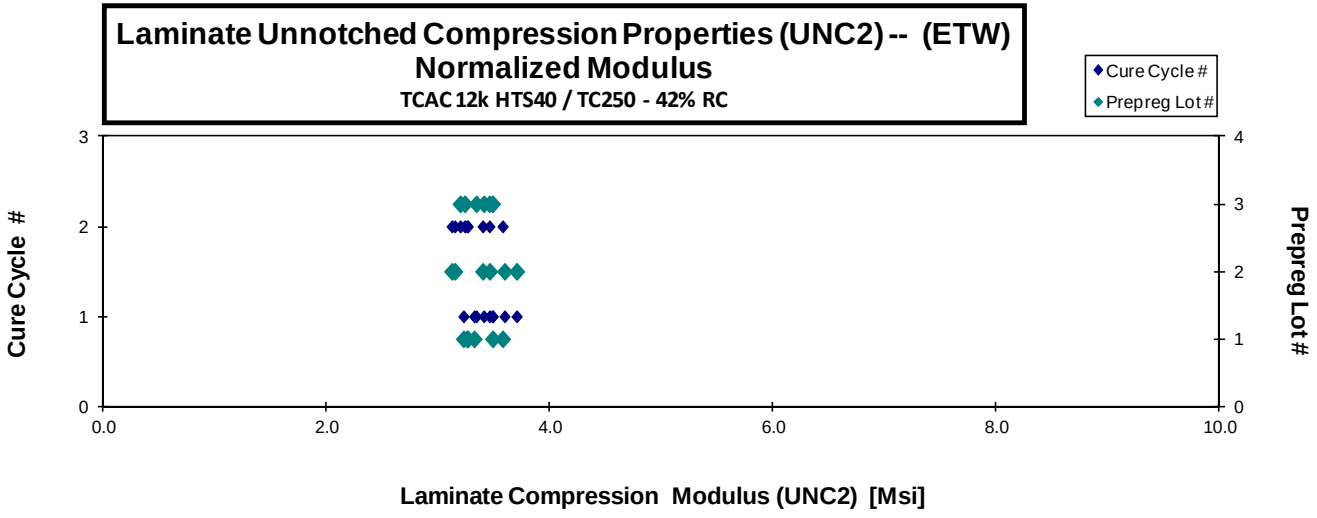
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGXA111F	A	C1	1	1	27.890	3.432	0.172	20	BGM	0.0086	28.289	3.481
TGXA112F	A	C1	1	1	24.064	3.281	0.172	20	BGM	0.0086	24.314	3.315
TGXA113F	A	C1	1	1	28.085	3.198	0.171	20	BGM	0.0086	28.272	3.219
TGXA211F	A	C2	1	2	28.399	*	0.168	20	BGM	0.0084	28.063	
TGXA212F	A	C2	1	2	30.825	3.277	0.169	20	BGM	0.0084	30.562	3.249
TGXA213F	A	C2	1	2	27.723	3.582	0.169	20	BGM	0.0085	27.631	3.570
TGXA215F	A	C2	1	2	27.985	3.220	0.172	20	BGM	0.0086	28.311	3.258
TGXB111F	B	C1	2	1	31.003	3.563	0.165	20	BGM	0.0082	30.048	3.454
TGXB112F	B	C1	2	1	29.142	3.659	0.167	20	BGM	0.0083	28.571	3.588
TGXB113F	B	C1	2	1	25.218	3.761	0.167	20	BGM	0.0084	24.775	3.695
TGXB211F	B	C2	2	2	29.772	3.501	0.165	20	BGM	0.0082	28.841	3.392
TGXB212F	B	C2	2	2	27.734	3.169	0.167	20	BGM	0.0084	27.266	3.115
TGXB213F	B	C2	2	2	29.678	3.170	0.169	20	BGM	0.0084	29.416	3.142
TGXC111F	C	C1	3	1	32.090	3.558	0.159	20	BGM	0.0080	30.070	3.334
TGXC112F	C	C1	3	1	32.330	3.620	0.163	20	BGM	0.0082	31.075	3.479
TGXC114F	C	C1	3	1	29.217	3.404	0.170	20	BGM	0.0085	29.193	3.401
TGXC211F	C	C2	3	2	33.334	3.306	0.166	20	BGM	0.0083	32.566	3.230
TGXC212F	C	C2	3	2	29.954	3.265	0.166	20	BGM	0.0083	29.261	3.190
TGXC213F	C	C2	3	2	29.706	3.494	0.168	20	BGM	0.0084	29.339	3.451

*** Modulus not reported due to erroneous strain data.**

	Strength [ksi]	Modulus [Msi]			$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	**29.166**	**3.414**	**$Average_{norm}$**	**0.0084**	**28.730**	**3.365**
Standard Dev.	**2.287**	**0.185**	**Standard $Dev._{norm}$**		**1.944**	**0.164**
Coeff. of Var. [%]	**7.841**	**5.425**	**Coeff. of Var. $[\%]_{norm}$**		**6.765**	**4.865**
Min.	**24.064**	**3.169**	**Min.**	**0.0080**	**24.314**	**3.115**
Max.	**33.334**	**3.761**	**Max.**	**0.0086**	**32.566**	**3.695**
Number of Spec.	**19**	**18**	**Number of Spec.**		**19**	**18**


Laminate Unnotched Compression Properties (UNC2) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Compression Strength (UNC2) [ksi]


Laminate Unnotched Compression Properties (UNC2) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Compression Modulus (UNC2) [Msi]

4.11 Unnotched Compression 3 Properties

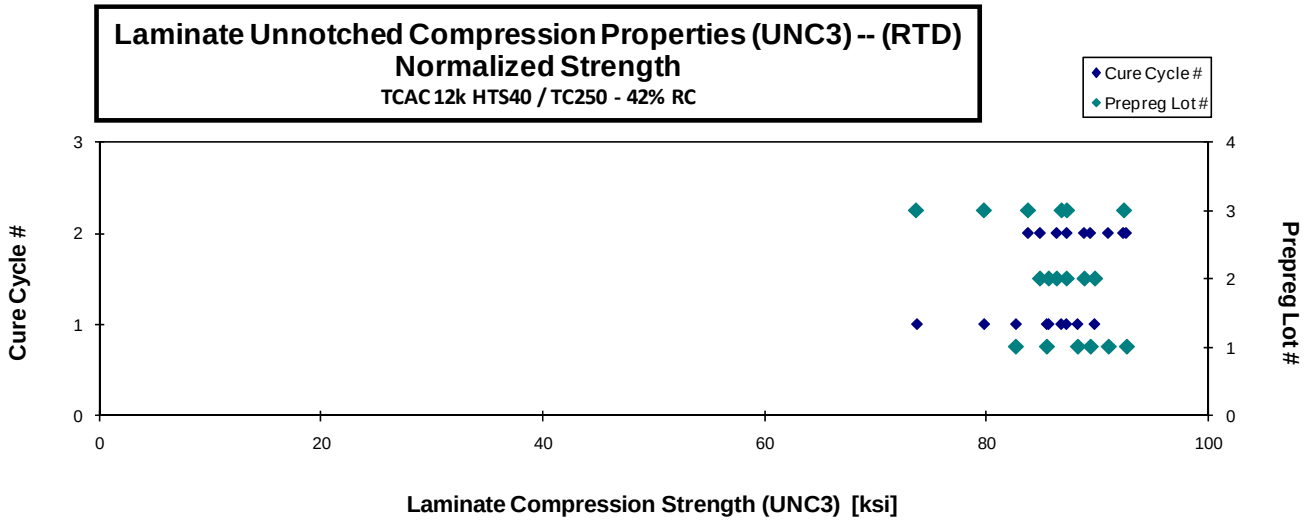
Laminate Unnotched Compression Properties (UNC3) -- (RTD)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

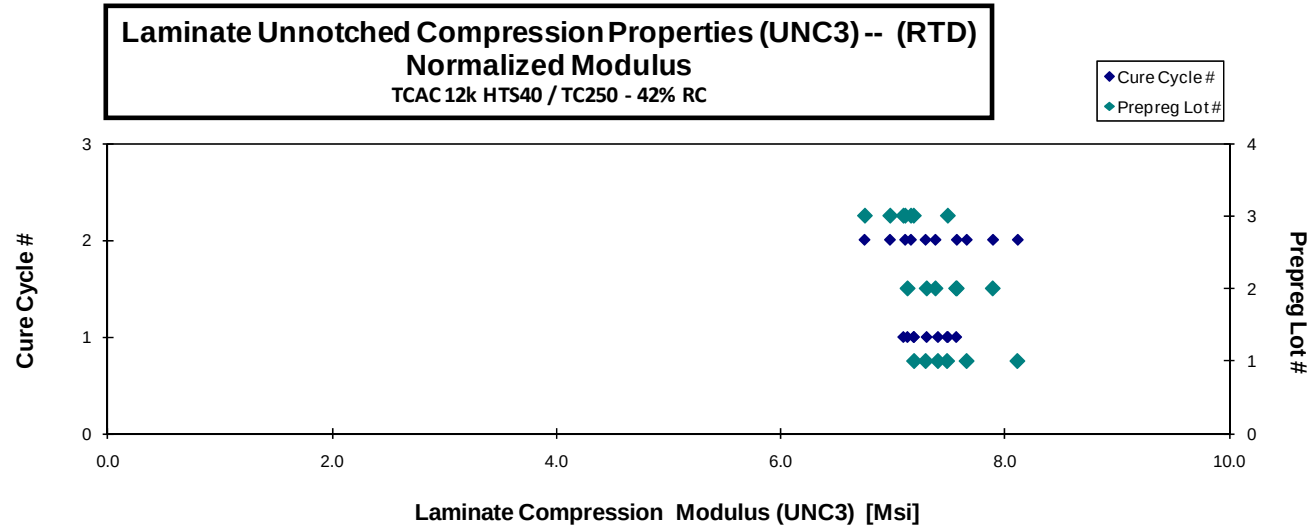
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGYA118A	A	C1	1	1	88.232	7.482	0.170	20	BGM	0.0085	88.232	7.482
TGYA119A	A	C1	1	1	85.575	7.411	0.170	20	BGM	0.0085	85.449	7.400
TGYA11BA	A	C1	1	1	83.289	7.241	0.169	20	BGM	0.0084	82.669	7.187
TGYA218A	A	C2	1	2	88.231	8.008	0.172	20	BGM	0.0086	89.381	8.112
TGYA219A	A	C2	1	2	92.147	7.617	0.171	20	BGM	0.0085	92.625	7.657
TGYA21AA	A	C2	1	2	90.113	7.220	0.172	20	BGM	0.0086	90.996	7.290
TGYB119A	B	C1	2	1	85.470	6.985	0.173	20	BGM	0.0087	87.221	7.128
TGYB11AA	B	C1	2	1	87.486	7.371	0.174	20	BGM	0.0087	89.768	7.563
TGYB11BA	B	C1	2	1	83.245	7.097	0.175	20	BGM	0.0087	85.620	7.300
TGYB218A	B	C2	2	2	82.354	7.527	0.178	20	BGM	0.0089	86.343	7.891
TGYB219A	B	C2	2	2	84.295	7.183	0.179	20	BGM	0.0090	88.823	7.569
TGYB21AA	B	C2	2	2	80.658	7.015	0.179	20	BGM	0.0089	84.833	7.378
TGYC118A	C	C1	3	1	*	6.864	0.176	20	BGM / HIT	0.0088		7.092
TGYC119A	C	C1	3	1	*	6.933	0.176	20	BGM / HIT	0.0088		7.184
TGYC11AA	C	C1	3	1	84.106	7.260	0.175	20	BGM	0.0088	86.766	7.489
TGYC11BA	C	C1	3	1	77.466	**	0.175	20	BGM	0.0088	79.794	
TGYC11CA	C	C1	3	1	71.985	**	0.174	20	BGM	0.0087	73.704	
TGYC211A	C	C2	3	2	*	7.162	0.166	20	BGM / HIT	0.0083		6.973
TGYC212A	C	C2	3	2	85.689	6.902	0.166	20	BGM	0.0083	83.748	6.746
TGYC213A	C	C2	3	2	88.781	7.286	0.167	20	BGM	0.0084	87.249	7.160
TGYC214A	C	C2	3	2	94.198	7.249	0.167	20	BGM	0.0083	92.370	7.109

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

Average	**85.184**	**7.253**		**$Average_{norm}$**	**0.0086**	**86.422**	**7.353**
Standard Dev.	**5.218**	**0.280**		**$Standard\ Dev._{norm}$**		**4.578**	**0.323**
Coeff. of Var. [%]	**6.126**	**3.864**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.297**	**4.393**
Min.	**71.985**	**6.864**		**Min.**	**0.0083**	**73.704**	**6.746**
Max.	**94.198**	**8.008**		**Max.**	**0.0090**	**92.625**	**8.112**
Number of Spec.	**18**	**19**		**Number of Spec.**		**18**	**19**


Laminate Unnotched Compression Properties (UNC3) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Compression Strength (UNC3) [ksi]

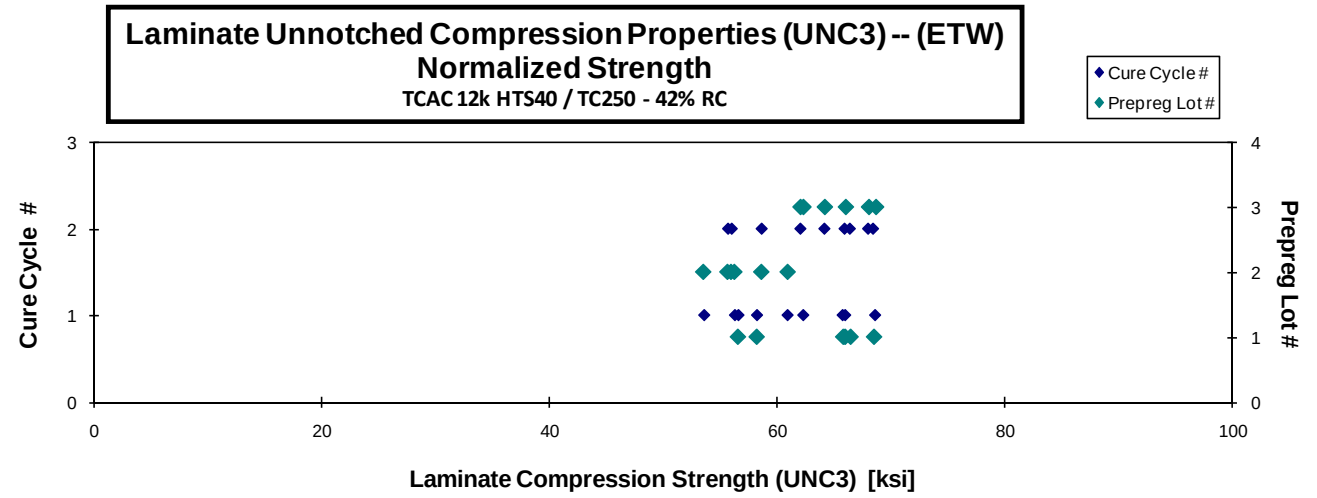

Laminate Unnotched Compression Properties (UNC3) -- (RTD)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Compression Modulus (UNC3) [Msi]

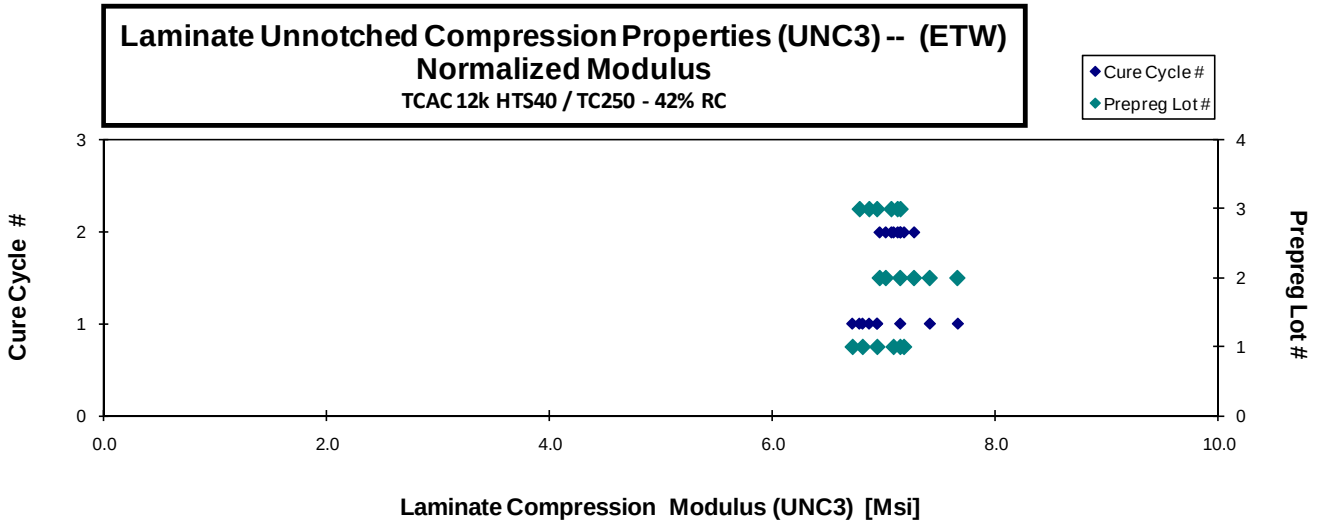
Laminate Unnotched Compression Properties (UNC3) -- (ETW)
Strength & Modulus
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
TGYA111F	A	C1	1	1	60.200	7.167	0.165	20	BAB	0.0082	58.252	6.935
TGYA112F	A	C1	1	1	57.967	6.872	0.166	20	BAT	0.0083	56.615	6.712
TGYA113F	A	C1	1	1	66.677	6.893	0.168	20	BGM	0.0084	65.808	6.803
TGYA211F	A	C2	1	2	70.713	7.408	0.165	20	BGM	0.0082	68.502	7.176
TGYA212F	A	C2	1	2	67.039	7.258	0.167	20	BAT	0.0084	65.974	7.143
TGYA213F	A	C2	1	2	66.633	7.102	0.170	20	BGM	0.0085	66.450	7.083
TGYB111F	B	C1	2	1	58.308	7.396	0.164	20	BGM	0.0082	56.302	7.142
TGYB112F	B	C1	2	1	62.822	7.894	0.165	20	BAB	0.0082	60.956	7.660
TGYB113F	B	C1	2	1	54.855	7.584	0.166	20	BAT	0.0083	53.586	7.408
TGYB211F	B	C2	2	2	58.530	7.251	0.170	20	BGM	0.0085	58.656	7.267
TGYB212F	B	C2	2	2	55.562	6.955	0.171	20	BGM	0.0086	56.014	7.011
TGYB213F	B	C2	2	2	54.740	6.837	0.173	20	BGM	0.0086	55.700	6.957
TGYC111F	C	C1	3	1	65.815	6.909	0.171	20	BGM	0.0085	66.044	6.933
TGYC112F	C	C1	3	1	67.568	6.665	0.173	20	BGM	0.0086	68.681	6.775
TGYC113F	C	C1	3	1	60.892	6.704	0.174	20	BGM	0.0087	62.333	6.863
TGYC216F	C	C2	3	2	69.101	7.228	0.167	20	BGM	0.0084	68.065	7.119
TGYC217F	C	C2	3	2	64.797	7.211	0.168	20	BGM	0.0084	64.206	7.145
TGYC218F	C	C2	3	2	62.508	7.111	0.169	20	BGM	0.0084	62.085	7.063

Average	**62.485**	**7.136**	**$Average_{norm}$**	**0.0084**	**61.902**	**7.066**
Standard Dev.	**5.069**	**0.314**	**$Standard\ Dev._{norm}$**		**5.024**	**0.232**
Coeff. of Var. [%]	**8.112**	**4.397**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**8.116**	**3.282**
Min.	**54.740**	**6.665**	**Min.**	**0.0082**	**53.586**	**6.712**
Max.	**70.713**	**7.894**	**Max.**	**0.0087**	**68.681**	**7.660**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**


Laminate Unnotched Compression Properties (UNC3) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
20
40
60
80
100
Laminate Compression Strength (UNC3) [ksi]


Laminate Unnotched Compression Properties (UNC3) -- (ETW)
Normalized Modulus
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0.0
2.0
4.0
6.0
8.0
10.0
Laminate Compression Modulus (UNC3) [Msi]

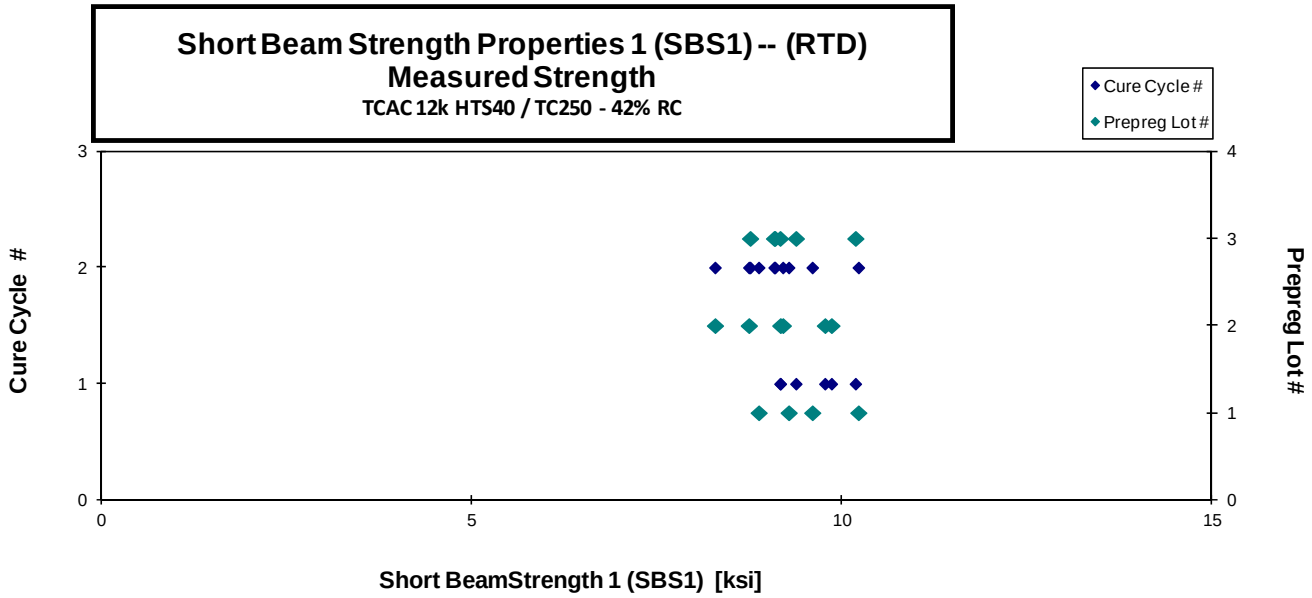
4.12 Laminate Short Beam Strength Properties

Short Beam Strength Properties 1 (SBS1) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
TGqA106A	A	C1	1	1	*	0.147	16	0.0092	INTERLAMINAR SHEAR
TGqA108A	A	C1	1	1	*	0.147	16	0.0092	INTERLAMINAR SHEAR
TGqA109A	A	C1	1	1	*	0.147	16	0.0092	INTERLAMINAR SHEAR
TGqA10AA	A	C1	1	1	*	0.147	16	0.0092	INTERLAMINAR SHEAR
TGqA206A	A	C2	1	2	10.230	0.135	16	0.0084	INTERLAMINAR SHEAR
TGqA207A	A	C2	1	2	8.884	0.135	16	0.0084	INTERLAMINAR SHEAR
TGqA208A	A	C2	1	2	9.607	0.135	16	0.0084	INTERLAMINAR SHEAR
TGqA209A	A	C2	1	2	9.289	0.135	16	0.0084	INTERLAMINAR SHEAR
TGqB108A	B	C1	2	1	9.866	0.128	16	0.0080	INTERLAMINAR SHEAR
TGqB109A	B	C1	2	1	9.778	0.127	16	0.0079	INTERLAMINAR SHEAR
TGqB10AA	B	C1	2	1	9.177	0.126	16	0.0079	INTERLAMINAR SHEAR
TGqB206A	B	C2	2	2	8.751	0.143	16	0.0089	INTERLAMINAR SHEAR
TGqB207A	B	C2	2	2	8.294	0.144	16	0.0090	INTERLAMINAR SHEAR
TGqB208A	B	C2	2	2	9.210	0.145	16	0.0091	INTERLAMINAR SHEAR
TGqC107A	C	C1	3	1	9.386	0.137	16	0.0086	INTERLAMINAR SHEAR
TGqC108A	C	C1	3	1	9.172	0.136	16	0.0085	INTERLAMINAR SHEAR
TGqC109A	C	C1	3	1	10.190	0.135	16	0.0084	INTERLAMINAR SHEAR
TGqC207A	C	C2	3	2	9.103	0.128	16	0.0080	INTERLAMINAR SHEAR
TGqC208A	C	C2	3	2	9.092	0.128	16	0.0080	INTERLAMINAR SHEAR
TGqC209A	C	C2	3	2	8.768	0.127	16	0.0079	INTERLAMINAR SHEAR

NOTE: ALL SBS1 specimens are machined from UNC1's panel.
*** Due to high porosity, the data has been censored by engineering judgment. This was reviewed by the DRWG.**

Average	**9.300**	**Average**	**0.0085**
Standard Dev.	**0.529**	**Standard Dev.**	
Coeff. of Var. [%]	**5.689**	**Coeff. of Var. [%]**	
Min.	**8.294**	**Min.**	**0.0079**
Max.	**10.230**	**Max.**	**0.0092**
Number of Spec.	**16**	**Number of Spec.**	**20**


Short Beam Strength Properties 1 (SBS1) -- (RTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short BeamStrength 1 (SBS1) [ksi]
0
1
2
3
4
5
10
15

Short Beam Strength Properties 1(SBS1) -- (ETW) Strength

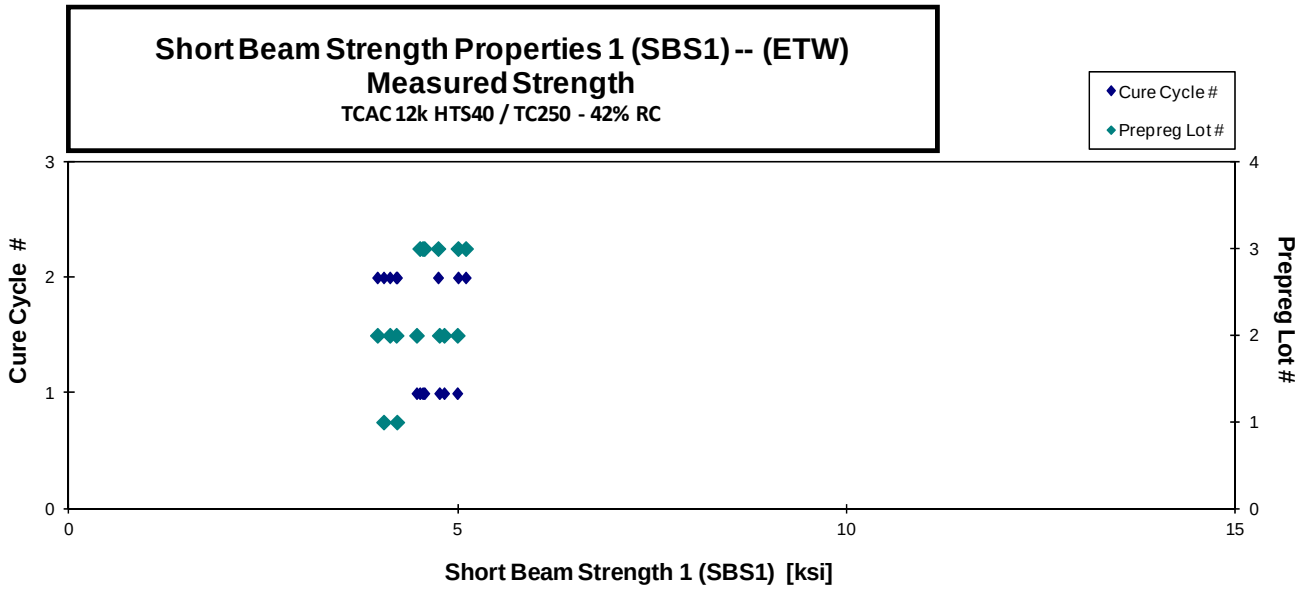
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
TGqA101F	A	C1	1	1	*	0.139	16	0.0087	INTERLAMINAR SHEAR
TGqA102F	A	C1	1	1	*	0.141	16	0.0088	INTERLAMINAR SHEAR
TGqA103F	A	C1	1	1	*	0.143	16	0.0090	INTERLAMINAR SHEAR
TGqA203F	A	C2	1	2	4.225	0.133	16	0.0083	INTERLAMINAR SHEAR
TGqA204F	A	C2	1	2	4.210	0.134	16	0.0084	INTERLAMINAR SHEAR
TGqA205F	A	C2	1	2	4.039	0.135	16	0.0084	INTERLAMINAR SHEAR
TGqB101F	B	C1	2	1	4.986	0.133	16	0.0083	INTERLAMINAR SHEAR
TGqB102F	B	C1	2	1	4.463	0.133	16	0.0083	INTERLAMINAR SHEAR
TGqB103F	B	C1	2	1	4.817	0.132	16	0.0082	INTERLAMINAR SHEAR
TGqB104F	B	C1	2	1	4.755	0.132	16	0.0082	INTERLAMINAR SHEAR
TGqB201F	B	C2	2	2	3.957	0.138	16	0.0086	INTERLAMINAR SHEAR
TGqB202F	B	C2	2	2	4.118	0.139	16	0.0087	INTERLAMINAR SHEAR
TGqB203F	B	C2	2	2	4.200	0.139	16	0.0087	INTERLAMINAR SHEAR
TGqC102F	C	C1	3	1	4.541	0.137	16	0.0086	INTERLAMINAR SHEAR
TGqC104F	C	C1	3	1	4.562	0.137	16	0.0086	INTERLAMINAR SHEAR
TGqC105F	C	C1	3	1	4.504	0.137	16	0.0086	INTERLAMINAR SHEAR
TGqC201F	C	C2	3	2	5.094	0.130	16	0.0081	INTERLAMINAR SHEAR
TGqC203F	C	C2	3	2	4.996	0.130	16	0.0081	INTERLAMINAR SHEAR
TGqC205F	C	C2	3	2	4.739	0.129	16	0.0081	INTERLAMINAR SHEAR

NOTE: ALL SBS1 specimens are machined from UNC1's panel. NDI of batch A cure cycle C1 indicates high porosity in the panel.

*** Due to high porosity, the data has been censored by engineering judgment. This was reviewed by the DRWG.**

Average	**4.513**	**Average**	**0.0085**
Standard Dev.	**0.362**	**Standard Dev.**	
Coeff. of Var. [%]	**8.021**	**Coeff. of Var. [%]**	
Min.	**3.957**	**Min.**	**0.0081**
Max.	**5.094**	**Max.**	**0.0090**
Number of Spec.	**16**	**Number of Spec.**	**19**

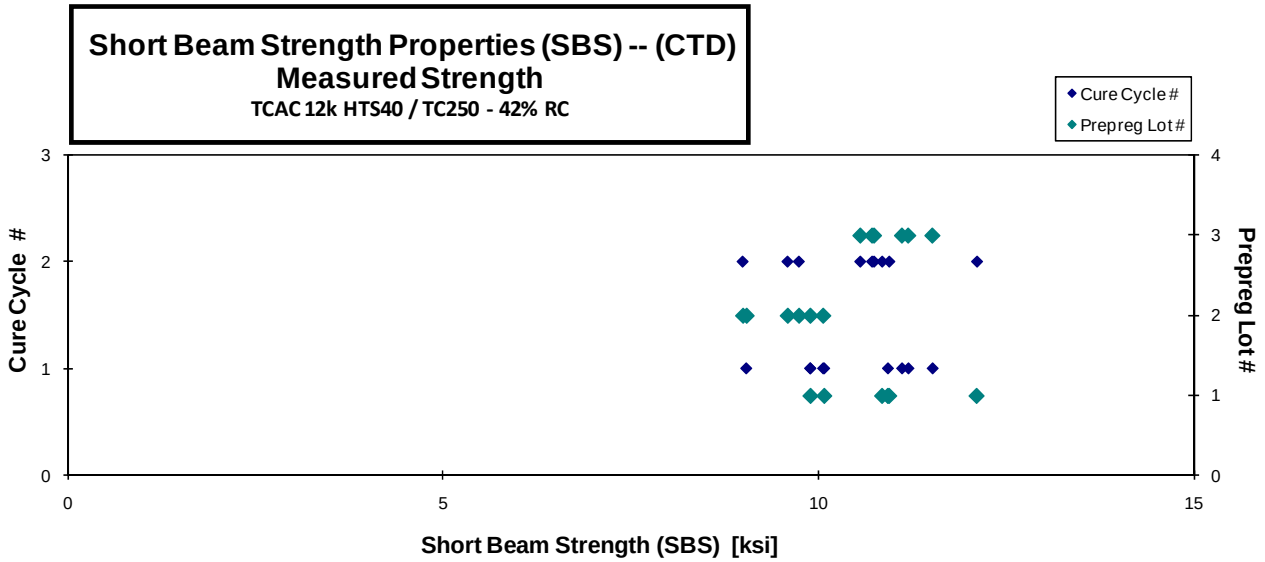

Short Beam Strength Properties 1 (SBS1) -- (ETW)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short Beam Strength 1 (SBS1) [ksi]
0
1
2
3
4
5
10
15

4.13 Lamina Short Beam Strength Properties

Short Beam Strength Properties (SBS) -- (CTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
TGQA118B	A	C1	1	1	10.073	0.274	32	0.0086	INTERLAMINAR SHEAR
TGQA119B	A	C1	1	1	9.889	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQA11AB	A	C1	1	1	10.920	0.274	32	0.0086	INTERLAMINAR SHEAR
TGQA21FB	A	C2	1	2	10.938	0.280	32	0.0088	INTERLAMINAR SHEAR
TGQA21GB	A	C2	1	2	10.844	0.280	32	0.0088	INTERLAMINAR SHEAR
TGQA21HB	A	C2	1	2	12.104	0.279	32	0.0087	INTERLAMINAR SHEAR
TGQB11FB	B	C1	2	1	9.888	0.279	32	0.0087	INTERLAMINAR SHEAR
TGQB11GB	B	C1	2	1	9.038	0.279	32	0.0087	INTERLAMINAR SHEAR
TGQB11HB	B	C1	2	1	10.059	0.280	32	0.0088	INTERLAMINAR SHEAR
TGQB21FB	B	C2	2	2	9.586	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQB21GB	B	C2	2	2	8.990	0.279	32	0.0087	INTERLAMINAR SHEAR
TGQB21HB	B	C2	2	2	9.737	0.281	32	0.0088	INTERLAMINAR SHEAR
TGQC11FB	C	C1	3	1	11.514	0.268	32	0.0084	INTERLAMINAR SHEAR
TGQC11IB	C	C1	3	1	11.192	0.266	32	0.0083	INTERLAMINAR SHEAR
TGQC11JB	C	C1	3	1	11.108	0.268	32	0.0084	INTERLAMINAR SHEAR
TGQC219B	C	C2	3	2	10.710	0.272	32	0.0085	INTERLAMINAR SHEAR
TGQC21AB	C	C2	3	2	10.553	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQC21BB	C	C2	3	2	10.736	0.269	32	0.0084	INTERLAMINAR SHEAR

Average	**10.438**	**Average**	**0.0086**
Standard Dev.	**0.838**	**Standard Dev.**	
Coeff. of Var. [%]	**8.025**	**Coeff. of Var. [%]**	
Min.	**8.990**	**Min.**	**0.0083**
Max.	**12.104**	**Max.**	**0.0088**
Number of Spec.	**18**	**Number of Spec.**	**18**

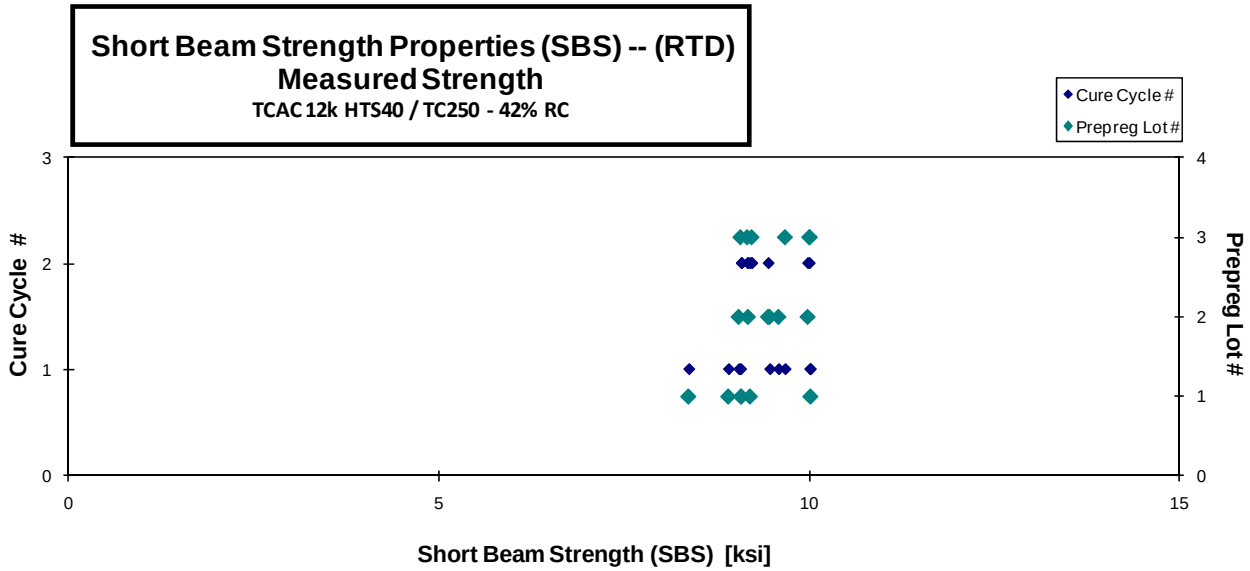

Short Beam Strength Properties (SBS) -- (CTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short Beam Strength (SBS) [ksi]
0
1
2
3
4
0
5
10
15

Short Beam Strength Properties (SBS) -- (RTD) Strength

TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
TGQA11BA	A	C1	1	1	10.020	0.276	32	0.0086	INTERLAMINAR SHEAR
TGQA11CA	A	C1	1	1	8.372	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQA11DA	A	C1	1	1	8.910	0.279	32	0.0087	INTERLAMINAR SHEAR
TGQA21KA	A	C2	1	2	9.085	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQA21LA	A	C2	1	2	9.083	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQA21MA	A	C2	1	2	9.204	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQB11KA	B	C1	2	1	9.469	0.274	32	0.0086	INTERLAMINAR SHEAR
TGQB11LA	B	C1	2	1	9.051	0.275	32	0.0086	INTERLAMINAR SHEAR
TGQB11MA	B	C1	2	1	9.588	0.275	32	0.0086	INTERLAMINAR SHEAR
TGQB21KA	B	C2	2	2	9.448	0.269	32	0.0084	INTERLAMINAR SHEAR
TGQB21LA	B	C2	2	2	9.177	0.271	32	0.0085	INTERLAMINAR SHEAR
TGQB21MA	B	C2	2	2	9.983	0.275	32	0.0086	INTERLAMINAR SHEAR
TGQC11KA	C	C1	3	1	10.011	0.273	32	0.0085	INTERLAMINAR SHEAR
TGQC11MA	C	C1	3	1	9.677	0.274	32	0.0086	INTERLAMINAR SHEAR
TGQC11OA	C	C1	3	1	9.074	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQC21LA	C	C2	3	2	9.165	0.269	32	0.0084	INTERLAMINAR SHEAR
TGQC21MA	C	C2	3	2	10.005	0.273	32	0.0085	INTERLAMINAR SHEAR
TGQC21NA	C	C2	3	2	9.226	0.271	32	0.0085	INTERLAMINAR SHEAR

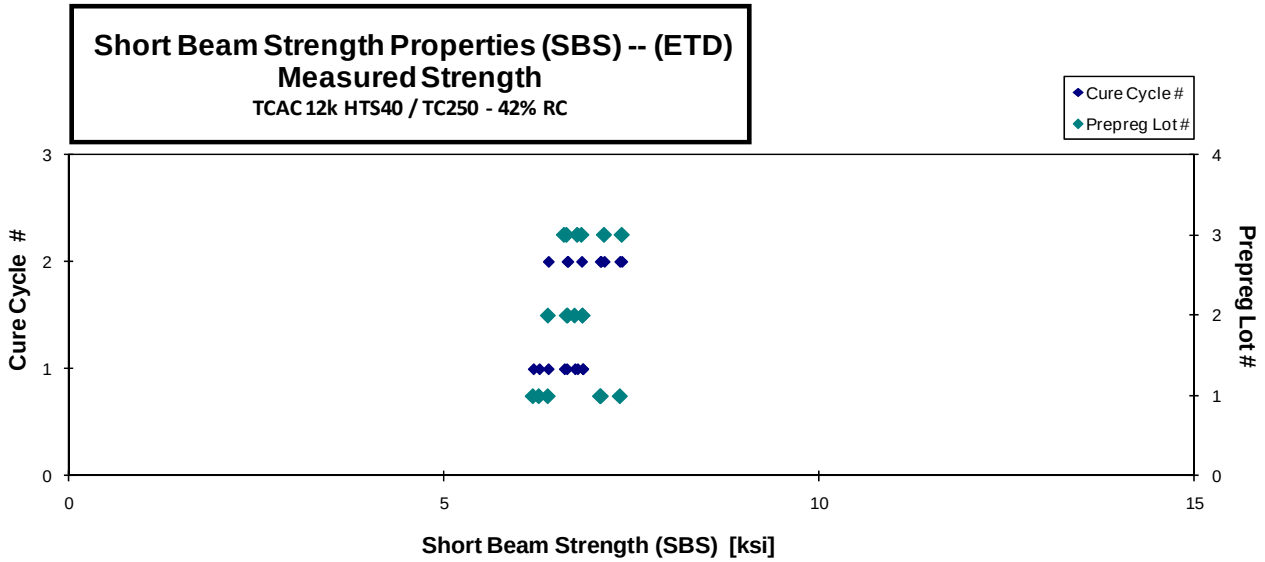
Average	**9.364**	**Average**	**0.0086**
Standard Dev.	**0.451**	**Standard Dev.**	
Coeff. of Var. [%]	**4.816**	**Coeff. of Var. [%]**	
Min.	**8.372**	**Min.**	**0.0084**
Max.	**10.020**	**Max.**	**0.0087**
Number of Spec.	**18**	**Number of Spec.**	**18**


Short Beam Strength Properties (SBS) -- (RTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short Beam Strength (SBS) [ksi]
0
1
2
3
4
0
5
10
15

Short Beam Strength Properties (SBS) -- (ETD)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
TGQA115G	A	C1	1	1	6.272	0.273	32	0.0085	INTERLAMINAR SHEAR
TGQA116G	A	C1	1	1	6.192	0.285	32	0.0089	INTERLAMINAR SHEAR
TGQA117G	A	C1	1	1	6.390	0.285	32	0.0089	INTERLAMINAR SHEAR
TGQA218G	A	C2	1	2	7.345	0.280	32	0.0088	INTERLAMINAR SHEAR
TGQA219G	A	C2	1	2	7.084	0.279	32	0.0087	INTERLAMINAR SHEAR
TGQA21AG	A	C2	1	2	7.092	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQB118G	B	C1	2	1	6.850	0.280	32	0.0088	INTERLAMINAR SHEAR
TGQB11AG	B	C1	2	1	6.746	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQB11BG	B	C1	2	1	6.851	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQB218G	B	C2	2	2	6.392	0.279	32	0.0087	INTERLAMINAR SHEAR
TGQB219G	B	C2	2	2	6.643	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQB21EG	B	C2	2	2	6.652	0.277	32	0.0087	INTERLAMINAR SHEAR
TGQC119G	C	C1	3	1	6.638	0.270	32	0.0084	INTERLAMINAR SHEAR
TGQC11BG	C	C1	3	1	6.780	0.271	32	0.0085	INTERLAMINAR SHEAR
TGQC11DG	C	C1	3	1	6.605	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQC21FG	C	C2	3	2	7.135	0.266	32	0.0083	INTERLAMINAR SHEAR
TGQC21HG	C	C2	3	2	7.370	0.267	32	0.0083	INTERLAMINAR SHEAR
TGQC21IG	C	C2	3	2	6.836	0.267	32	0.0083	INTERLAMINAR SHEAR

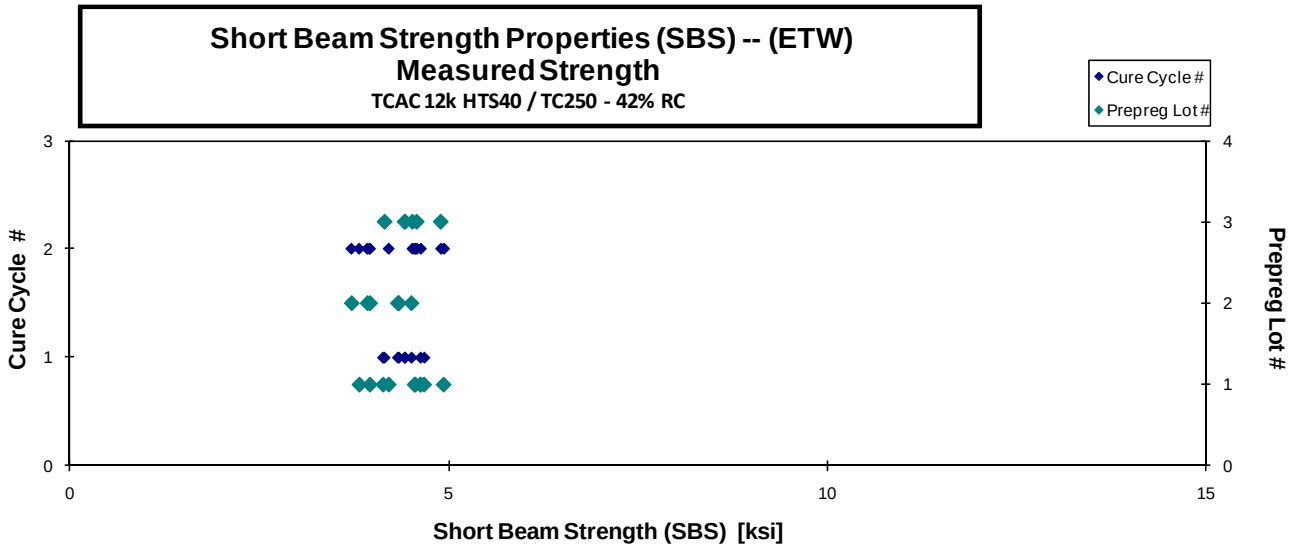
Average	**6.771**	**Average**	**0.0086**
Standard Dev.	**0.342**	**Standard Dev.**	
Coeff. of Var. [%]	**5.051**	**Coeff. of Var. [%]**	
Min.	**6.192**	**Min.**	**0.0083**
Max.	**7.370**	**Max.**	**0.0089**
Number of Spec.	**18**	**Number of Spec.**	**18**


Short Beam Strength Properties (SBS) -- (ETD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short Beam Strength (SBS) [ksi]
0
1
2
3
4
5
10
15

Short Beam Strength Properties (SBS) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
TGQA111F	A	C1	1	1	4.635	0.285	32	0.0089	INTERLAMINAR SHEAR
TGQA112F	A	C1	1	1	4.684	0.283	32	0.0088	INTERLAMINAR SHEAR
TGQA113F	A	C1	1	1	4.139	0.284	32	0.0089	INTERLAMINAR SHEAR
TGQA211F	A	C2	1	2	3.823	0.283	32	0.0088	INTERLAMINAR SHEAR
TGQA212F	A	C2	1	2	4.943	0.283	32	0.0088	INTERLAMINAR SHEAR
TGQA213F	A	C2	1	2	4.567	0.282	32	0.0088	INTERLAMINAR SHEAR
TGQA214F	A	C2	1	2	4.637	0.281	32	0.0088	INTERLAMINAR SHEAR
TGQA215F	A	C2	1	2	4.557	0.281	32	0.0088	INTERLAMINAR SHEAR
TGQA216F	A	C2	1	2	3.963	0.280	32	0.0088	INTERLAMINAR SHEAR
TGQA217F	A	C2	1	2	4.214	0.280	32	0.0088	INTERLAMINAR SHEAR
TGQB113F	B	C1	2	1	4.515	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQB114F	B	C1	2	1	4.348	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQB115F	B	C1	2	1	4.335	0.278	32	0.0087	INTERLAMINAR SHEAR
TGQB211F	B	C2	2	2	3.721	0.264	32	0.0083	INTERLAMINAR SHEAR
TGQB212F	B	C2	2	2	3.931	0.266	32	0.0083	INTERLAMINAR SHEAR
TGQB213F	B	C2	2	2	3.965	0.268	32	0.0084	INTERLAMINAR SHEAR
TGQC112F	C	C1	3	1	4.425	0.274	32	0.0085	INTERLAMINAR SHEAR
TGQC113F	C	C1	3	1	4.431	0.274	32	0.0086	INTERLAMINAR SHEAR
TGQC115F	C	C1	3	1	4.158	0.275	32	0.0086	INTERLAMINAR SHEAR
TGQC213F	C	C2	3	2	4.904	0.273	32	0.0085	INTERLAMINAR SHEAR
TGQC215F	C	C2	3	2	4.527	0.272	32	0.0085	INTERLAMINAR SHEAR
TGQC218F	C	C2	3	2	4.585	0.274	32	0.0086	INTERLAMINAR SHEAR

Average	**4.364**	**Average**	**0.0087**
Standard Dev.	**0.338**	**Standard Dev.**	
Coeff. of Var. [%]	**7.734**	**Coeff. of Var. [%]**	
Min.	**3.721**	**Min.**	**0.0083**
Max.	**4.943**	**Max.**	**0.0089**
Number of Spec.	**22**	**Number of Spec.**	**22**


Short Beam Strength Properties (SBS) -- (ETW)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short Beam Strength (SBS) [ksi]
0
1
2
3
4
5
10
15

4.14 Open Hole Tension 1 Properties

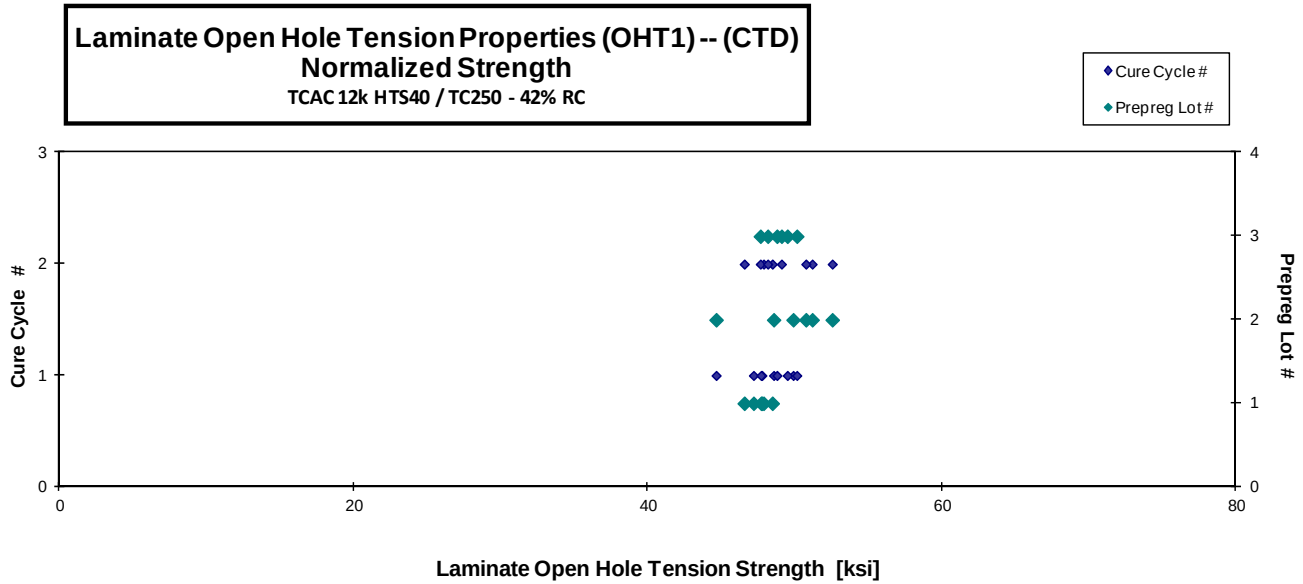
Laminate Open Hole Tension Properties (OHT1) -- (CTD)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGDA118B	A	C1	1	1	47.046	0.138	16	LGM	0.0086	47.720
TGDA119B	A	C1	1	1	45.359	0.141	16	LGM	0.0088	47.149
TGDA11AB	A	C1	1	1	45.970	0.141	16	LGM	0.0088	47.660
TGDA217B	A	C2	1	2	44.288	0.143	16	LGM	0.0089	46.524
TGDA218B	A	C2	1	2	46.107	0.141	16	LGM	0.0088	47.836
TGDA219B	A	C2	1	2	46.105	0.143	16	LGM	0.0089	48.427
TGDB117B	B	C1	2	1	41.763	0.145	16	LGM	0.0091	44.608
TGDB118B	B	C1	2	1	48.151	0.141	16	LGM	0.0088	49.844
TGDB119B	B	C1	2	1	46.887	0.141	16	LGM	0.0088	48.519
TGDB217B	B	C2	2	2	49.368	0.141	16	LGM	0.0088	51.140
TGDB218B	B	C2	2	2	51.756	0.138	16	LGM	0.0086	52.504
TGDB219B	B	C2	2	2	49.343	0.140	16	LGM	0.0087	50.710
TGDC117B	C	C1	3	1	47.528	0.139	16	LGM/AGM	0.0087	48.745
TGDC118B	C	C1	3	1	48.733	0.138	16	LGM/AGM	0.0086	49.450
TGDC119B	C	C1	3	1	48.353	0.141	16	LGM/AGM	0.0088	50.095
TGDC217B	C	C2	3	2	46.191	0.140	16	LGM/AGM	0.0088	47.618
TGDC218B	C	C2	3	2	48.148	0.139	16	LGM/AGM	0.0087	49.050
TGDC219B	C	C2	3	2	46.576	0.141	16	LGM/AGM	0.0088	48.117

Average	**47.093**	
Standard Dev.	**2.200**	
Coeff. of Var. [%]	**4.672**	
Min.	**41.763**	
Max.	**51.756**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**48.651**
$Standard\ Dev._{norm}$		**1.826**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**3.752**
Min.	**0.0086**	**44.608**
Max.	**0.0091**	**52.504**
Number of Spec.		**18**


Laminate Open Hole Tension Properties (OHT1) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Tension Strength [ksi]

Laminate Open Hole Tension Properties (OHT1) -- (RTD) Strength

TCAC 12k HTS40 / TC250 - 42% RC

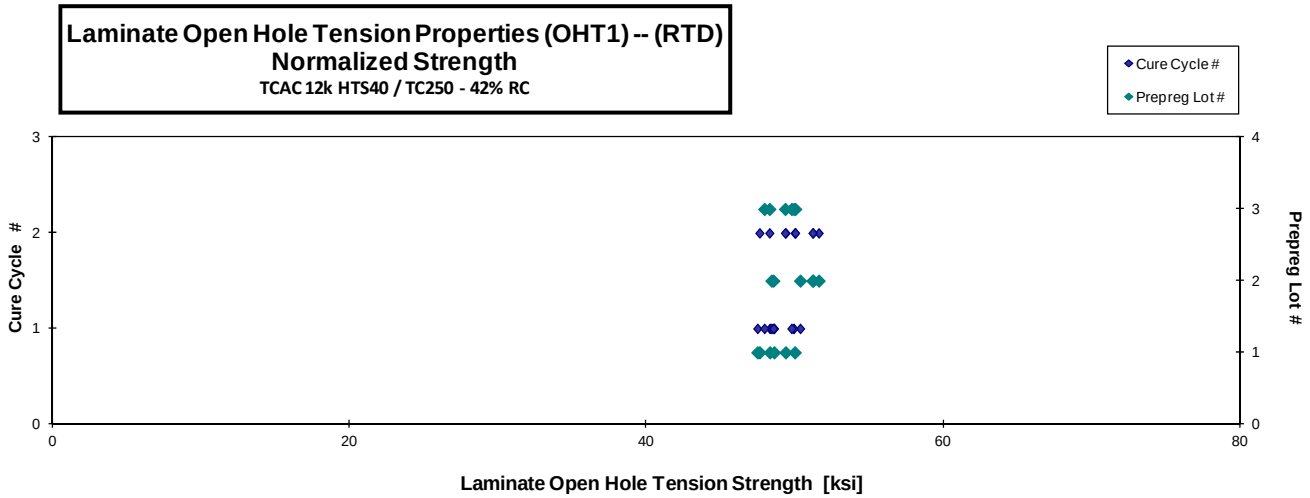
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGDA117B*	A	C1	1	1	46.722	0.141	16	LGM	0.0088	48.297
TGDA11CA	A	C1	1	1	45.061	0.143	16	LGM	0.0090	47.469
TGDA11DA	A	C1	1	1	46.446	0.142	16	LGM	0.0089	48.586
TGDA21CA	A	C2	1	2	47.408	0.143	16	LGM	0.0090	49.982
TGDA21DA	A	C2	1	2	45.228	0.143	16	LGM	0.0089	47.606
TGDA21EA	A	C2	1	2	46.434	0.145	16	LGM	0.0090	49.365
TGDB11CA	B	C1	2	1	46.931	0.146	16	LGM	0.0091	50.347
TGDB11DA	B	C1	2	1	44.387	0.148	16	LGM	0.0093	48.413
TGDB11EA	B	C1	2	1	46.428	0.142	16	LGM	0.0089	48.539
TGDB21CA	B	C2	2	2	49.417	0.142	16	LGM	0.0089	51.597
TGDB21DA	B	C2	2	2	49.253	0.141	16	LGM	0.0088	51.202
TGDB21EA	B	C2	2	2	49.026	0.142	16	LGM	0.0089	51.183
TGDC11CA	C	C1	3	1	46.863	0.145	16	MGM	0.0091	49.907
TGDC11DA	C	C1	3	1	47.029	0.144	16	LGM	0.0090	49.761
TGDC11EA	C	C1	3	1	45.441	0.143	16	MGM	0.0090	47.930
TGDC21CA	C	C2	3	2	45.415	0.145	16	LGM	0.0090	48.275
TGDC21DA	C	C2	3	2	47.297	0.144	16	LGM	0.0090	50.015
TGDC21EA	C	C2	3	2	46.807	0.143	16	LGM	0.0090	49.331

*** CTD's specimen tested as RTD**

Average	**46.755**	
Standard Dev.	**1.413**	
Coeff. of Var. [%]	**3.023**	
Min.	**44.387**	
Max.	**49.417**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0090**	**49.322**
$Standard\ Dev._{norm}$		**1.263**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**2.561**
Min.	**0.0088**	**47.469**
Max.	**0.0093**	**51.597**
Number of Spec.		**18**


Laminate Open Hole Tension Properties (OHT1) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
20
40
60
80
0
1
2
3
4

Laminate Open Hole Tension Properties (OHT1) -- (ETW) Strength

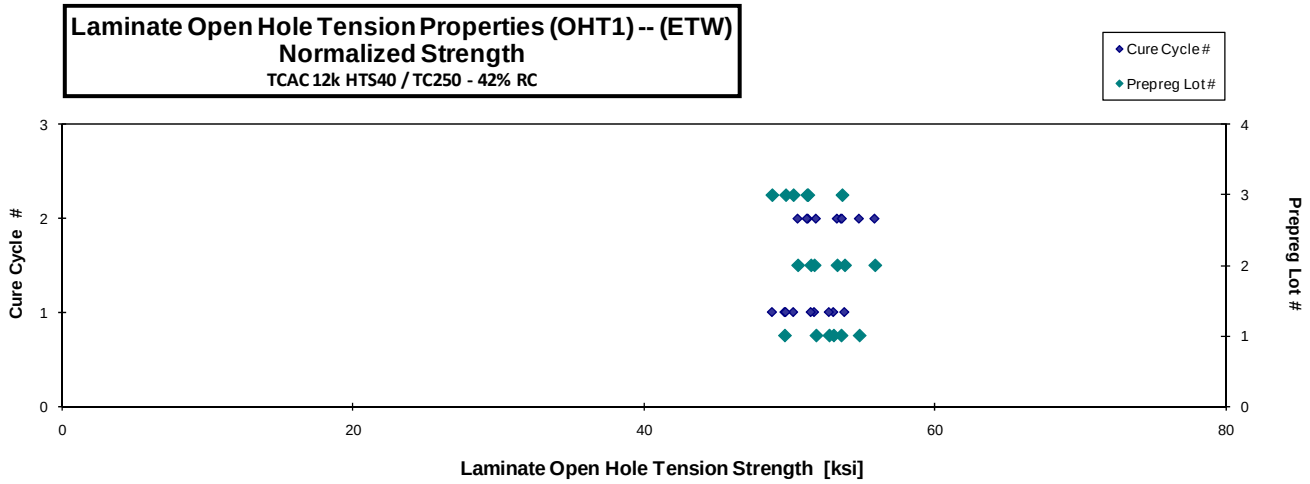
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGDA111F	A	C1	1	1	51.281	0.141	16	LGM	0.0088	53.041
TGDA112F	A	C1	1	1	50.790	0.141	16	LGM	0.0088	52.738
TGDA113F	A	C1	1	1	47.225	0.143	16	LGM	0.0089	49.696
TGDA211F	A	C2	1	2	52.894	0.141	16	LGM	0.0088	54.800
TGDA212F	A	C2	1	2	48.995	0.144	16	LGM	0.0090	51.847
TGDA213F	A	C2	1	2	50.660	0.144	16	LGM	0.0090	53.559
TGDB111F	B	C1	2	1	50.898	0.138	16	LGM	0.0086	51.722
TGDB112F	B	C1	2	1	51.768	0.141	16	LGM	0.0088	53.798
TGDB113F	B	C1	2	1	49.269	0.142	16	LGM	0.0089	51.497
TGDB211F	B	C2	2	2	51.546	0.141	16	LGM	0.0088	53.289
TGDB212F	B	C2	2	2	48.663	0.141	16	LGM	0.0088	50.595
TGDB213F	B	C2	2	2	53.695	0.142	16	LGM	0.0088	55.866
TGDC111F	C	C1	3	1	48.850	0.140	16	LGM	0.0088	50.292
TGDC112F	C	C1	3	1	47.319	0.140	16	LGM	0.0088	48.838
TGDC113F	C	C1	3	1	47.866	0.141	16	LGM	0.0088	49.772
TGDC212F	C	C2	3	2	49.251	0.142	16	LGM	0.0089	51.291
TGDC213F	C	C2	3	2	48.758	0.143	16	LGM	0.0089	51.225
TGDC214F	C	C2	3	2	50.708	0.144	16	LGM	0.0090	53.629

Average	**50.024**	
Standard Dev.	**1.843**	
Coeff. of Var. [%]	**3.684**	
Min.	**47.225**	
Max.	**53.695**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0089**	**52.083**
$Standard\ Dev._{norm}$		**1.892**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**3.634**
Min.	**0.0086**	**48.838**
Max.	**0.0090**	**55.866**
Number of Spec.		**18**


Laminate Open Hole Tension Properties (OHT1) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
20
40
60
80
0
1
2
3
4

4.15 Open Hole Tension 2 Properties

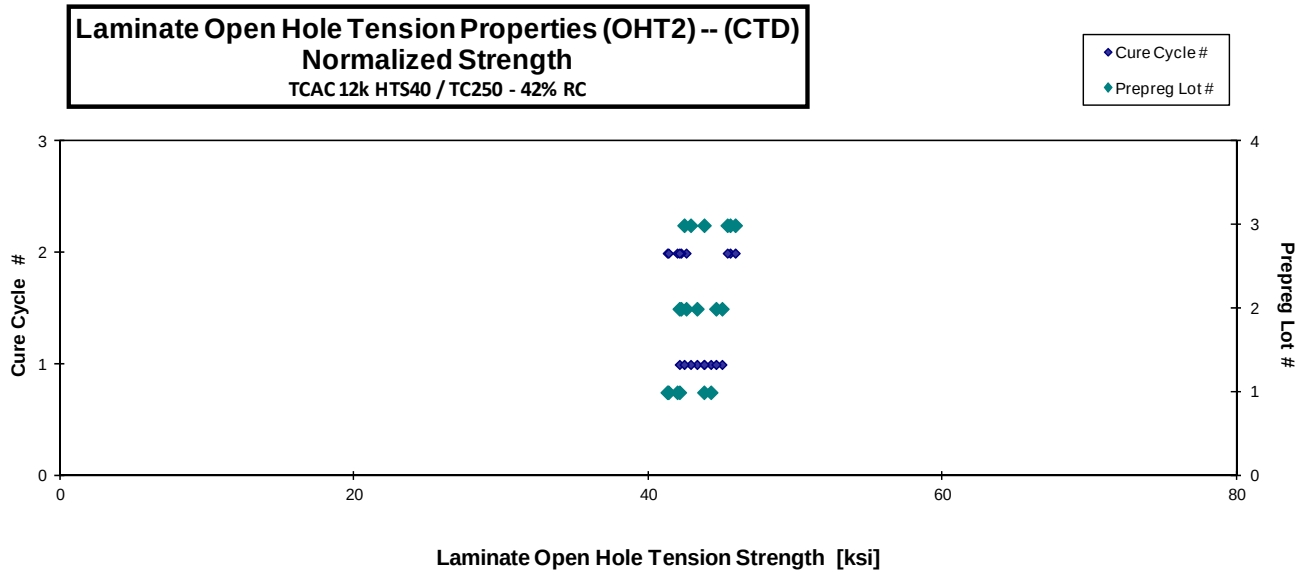
Laminate Open Hole Tension Properties (OHT2) -- (CTD)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGEA116B	A	C1	1	1	42.191	0.178	20	AGM	0.0089	44.242
TGEA117B	A	C1	1	1	40.423	0.177	20	AGM	0.0089	42.111
TGEA118B	A	C1	1	1	42.212	0.176	20	AGM	0.0088	43.780
TGEA217B	A	C2	1	2	38.990	0.180	20	AGM	0.0090	41.291
TGEA218B	A	C2	1	2	40.824	0.175	20	AGM	0.0087	41.961
TGEA219B	A	C2	1	2	40.280	0.175	20	AGM	0.0087	41.362
TGEB116B	B	C1	2	1	42.926	0.178	20	AGM	0.0089	45.005
TGEB117B	B	C1	2	1	43.176	0.176	20	AGM	0.0088	44.598
TGEB118B	B	C1	2	1	42.275	0.174	20	AGM	0.0087	43.303
TGEB216B	B	C2	2	2	41.242	0.175	20	AGM	0.0088	42.568
TGEB217B	B	C2	2	2	41.054	0.175	20	AGM	0.0087	42.217
TGEB218B	B	C2	2	2	41.157	0.174	20	AGM	0.0087	42.109
TGEC117B	C	C1	3	1	41.668	0.175	20	AGM	0.0087	42.873
TGEC118B	C	C1	3	1	42.130	0.171	20	AGM	0.0086	42.432
TGEC119B	C	C1	3	1	42.052	0.177	20	AGM	0.0089	43.787
TGEC215B	C	C2	3	2	43.059	0.180	20	AGM	0.0090	45.554
TGEC216B	C	C2	3	2	43.336	0.178	20	AGM	0.0089	45.367
TGEC217B	C	C2	3	2	44.455	0.176	20	AGM	0.0088	45.906

Average	41.858	
Standard Dev.	1.310	
Coeff. of Var. [%]	3.129	
Min.	38.990	
Max.	44.455	
Number of Spec.	18	

$Average_{norm}$	0.0088	43.359
$Standard\ Dev._{norm}$		1.477
$Coeff.\ of\ Var.\ [\%]_{norm}$		3.407
Min.	0.0086	41.291
Max.	0.0090	45.906
Number of Spec.		18


Laminate Open Hole Tension Properties (OHT2) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Tension Strength [ksi]

Laminate Open Hole Tension Properties (OHT2) -- (RTD) Strength

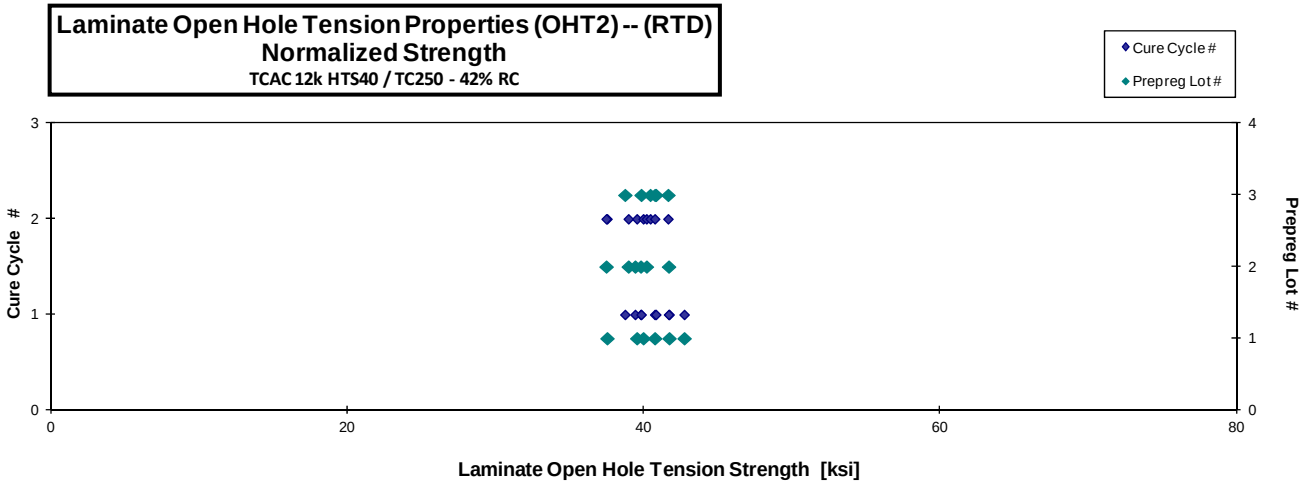
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGEA111A	A	C1	1	1	39.646	0.179	20	AGM	0.0090	41.769
TGEA112A	A	C1	1	1	38.983	0.178	20	AGM	0.0089	40.798
TGEA113A	A	C1	1	1	40.585	0.179	20	AGM	0.0090	42.786
TGEA21CA	A	C2	1	2	36.095	0.177	20	AGM	0.0089	37.581
TGEA21DA	A	C2	1	2	38.036	0.177	20	AGM	0.0088	39.591
TGEA21EA	A	C2	1	2	38.435	0.177	20	AGM	0.0089	40.018
TGEB111A	B	C1	2	1	39.065	0.173	20	AGM	0.0087	39.850
TGEB112A	B	C1	2	1	38.233	0.176	20	AGM	0.0088	39.470
TGEB113A	B	C1	2	1	40.095	0.177	20	AGM	0.0088	41.734
TGEB215A	B	C2	2	2	36.122	0.177	20	AGM	0.0088	37.521
TGEB21DA	B	C2	2	2	37.255	0.178	20	AGM	0.0089	39.019
TGEB21EA	B	C2	2	2	38.772	0.176	20	AGM	0.0088	40.240
TGEC111A	C	C1	3	1	39.172	0.177	20	AGM	0.0089	40.877
TGEC112A	C	C1	3	1	37.193	0.177	20	AGM	0.0089	38.786
TGEC114A	C	C1	3	1	38.161	0.178	20	AGM	0.0089	39.882
TGEC214A	C	C2	3	2	38.555	0.179	20	AGM	0.0089	40.491
TGEC21CA	C	C2	3	2	40.156	0.177	20	AGM	0.0088	41.696
TGEC21EA	C	C2	3	2	39.350	0.176	20	AGM	0.0088	40.800

Average	38.551	
Standard Dev.	1.279	
Coeff. of Var. [%]	3.318	
Min.	36.095	
Max.	40.585	
Number of Spec.	18	

$Average_{norm}$	0.0089	40.162
$Standard\ Dev._{norm}$		1.405
$Coeff.\ of\ Var.\ [\%]_{norm}$		3.498
Min.	0.0087	37.521
Max.	0.0090	42.786
Number of Spec.		18


Laminate Open Hole Tension Properties (OHT2) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Tension Strength [ksi]

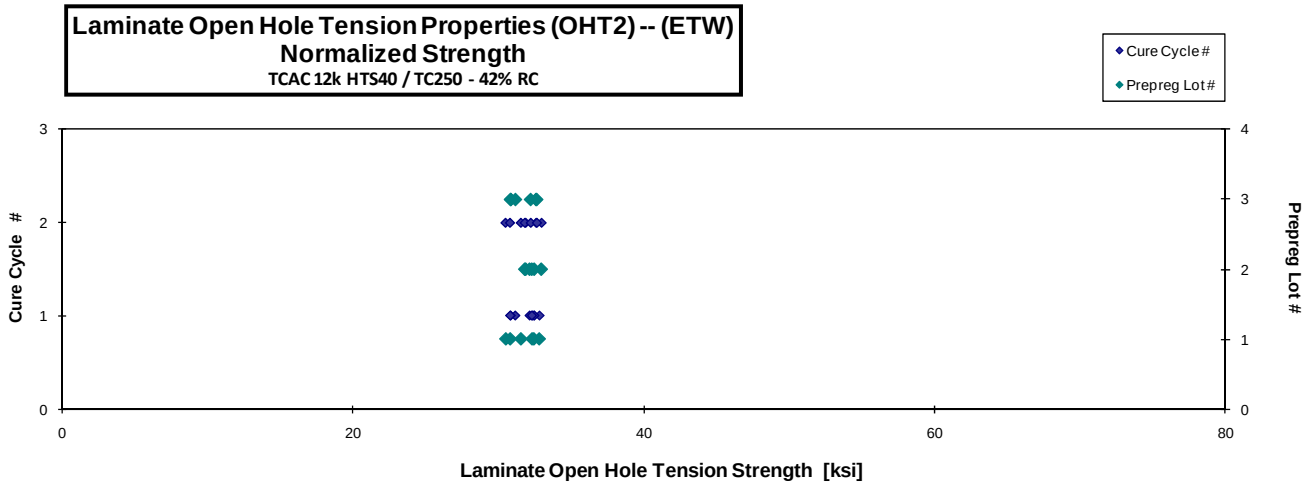
Laminate Open Hole Tension Properties (OHT2) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGEA11BF	A	C1	1	1	30.931	0.178	20	AGM	0.0089	32.338
TGEA11CF	A	C1	1	1	31.208	0.179	20	AGM	0.0089	32.830
TGEA11EF	A	C1	1	1	30.956	0.178	20	AGM	0.0089	32.458
TGEA211F	A	C2	1	2	29.780	0.174	20	AGM	0.0087	30.521
TGEA212F	A	C2	1	2	30.646	0.175	20	AGM	0.0088	31.566
TGEA213F	A	C2	1	2	29.613	0.177	20	AGM	0.0088	30.824
TGEB11AF	B	C1	2	1	31.524	0.175	20	AGM	0.0088	32.479
TGEB11CF	B	C1	2	1	30.680	0.178	20	AGM	0.0089	32.163
TGEB11DF	B	C1	2	1	30.920	0.178	20	AGM	0.0089	32.312
TGEB211F	B	C2	2	2	31.240	0.174	20	AGM	0.0087	31.890
TGEB212F	B	C2	2	2	32.070	0.175	20	AGM	0.0087	32.973
TGEB213F	B	C2	2	2	30.613	0.177	20	AGM	0.0088	31.832
TGEC11BF	C	C1	3	1	29.771	0.178	20	AGM	0.0089	31.183
TGEC11CF	C	C1	3	1	29.282	0.179	20	AGM	0.0090	30.873
TGEC11DF	C	C1	3	1	29.266	0.179	20	AGM	0.0090	30.844
TGEC211F	C	C2	3	2	31.401	0.177	20	AGM	0.0088	32.602
TGEC212F	C	C2	3	2	30.917	0.177	20	AGM	0.0089	32.235
TGEC213F	C	C2	3	2	31.069	0.179	20	AGM	0.0089	32.656

Average	**30.661**	
Standard Dev.	**0.800**	
Coeff. of Var. [%]	**2.610**	
Min.	**29.266**	
Max.	**32.070**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0089**	**31.921**
Standard $Dev._{norm}$		**0.772**
Coeff. of $Var.[\%]_{norm}$		**2.417**
Min.	**0.0087**	**30.521**
Max.	**0.0090**	**32.973**
Number of Spec.		**18**


Laminate Open Hole Tension Properties (OHT2) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Tension Strength [ksi]

4.16 Open Hole Tension 3 Properties

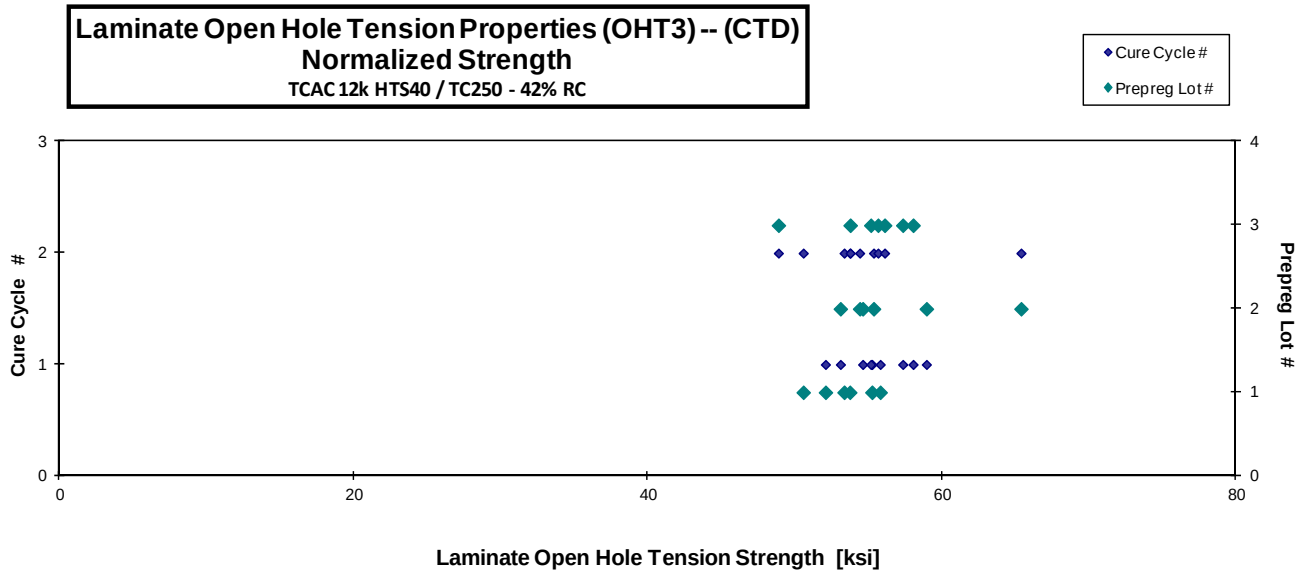
Laminate Open Hole Tension Properties (OHT3) -- (CTD)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGFA117B	A	C1	1	1	49.791	0.133	15	LGM	0.0089	52.043
TGFA118B	A	C1	1	1	53.473	0.133	15	LGM	0.0089	55.766
TGFA119B	A	C1	1	1	54.253	0.130	15	LGM	0.0086	55.203
TGFA217B	A	C2	1	2	47.584	0.135	15	LGM	0.0090	50.532
TGFA218B	A	C2	1	2	50.962	0.134	15	LGM	0.0090	53.700
TGFA219B	A	C2	1	2	51.696	0.131	15	LGM	0.0088	53.311
TGFB117B	B	C1	2	1	56.991	0.132	15	LGM	0.0088	58.906
TGFB118B	B	C1	2	1	52.078	0.130	15	LGM	0.0087	53.058
TGFB119B	B	C1	2	1	53.737	0.129	15	LGM	0.0086	54.573
TGFB217B	B	C2	2	2	53.649	0.131	15	LGM	0.0088	55.312
TGFB218B	B	C2	2	2	53.475	0.130	15	LGM	0.0086	54.370
TGFB219B	B	C2	2	2	64.569	0.129	15	LGM	0.0086	65.337
TGFB21AB	B	C2	3	2	52.429	0.131	15	LGM	0.0087	53.725
TGFC117B	C	C1	3	1	53.448	0.132	15	LGM	0.0088	55.125
TGFC118B	C	C1	3	1	56.131	0.130	15	LGM	0.0087	57.298
TGFC119B	C	C1	3	1	56.485	0.131	15	LGM	0.0087	57.999
TGFC216B	C	C2	3	2	56.793	0.125	15	LGM	0.0083	55.613
TGFC217B	C	C2	3	2	58.060	0.123	15	LGM	0.0082	56.064
TGFC219B	C	C2	3	2	51.413	0.121	15	LGM	0.0081	48.845

Average	**54.054**	
Standard Dev.	**3.674**	
Coeff. of Var. [%]	**6.797**	
Min.	**47.584**	
Max.	**64.569**	
Number of Spec.	**19**	

$Average_{norm}$	**0.0087**	**55.094**
Standard $Dev._{norm}$		**3.461**
Coeff. of Var. $[\%]_{norm}$		**6.281**
Min.	**0.0081**	**48.845**
Max.	**0.0090**	**65.337**
Number of Spec.		**19**


Laminate Open Hole Tension Properties (OHT3) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Tension Strength [ksi]

Laminate Open Hole Tension Properties (OHT3) -- (RTD) Strength

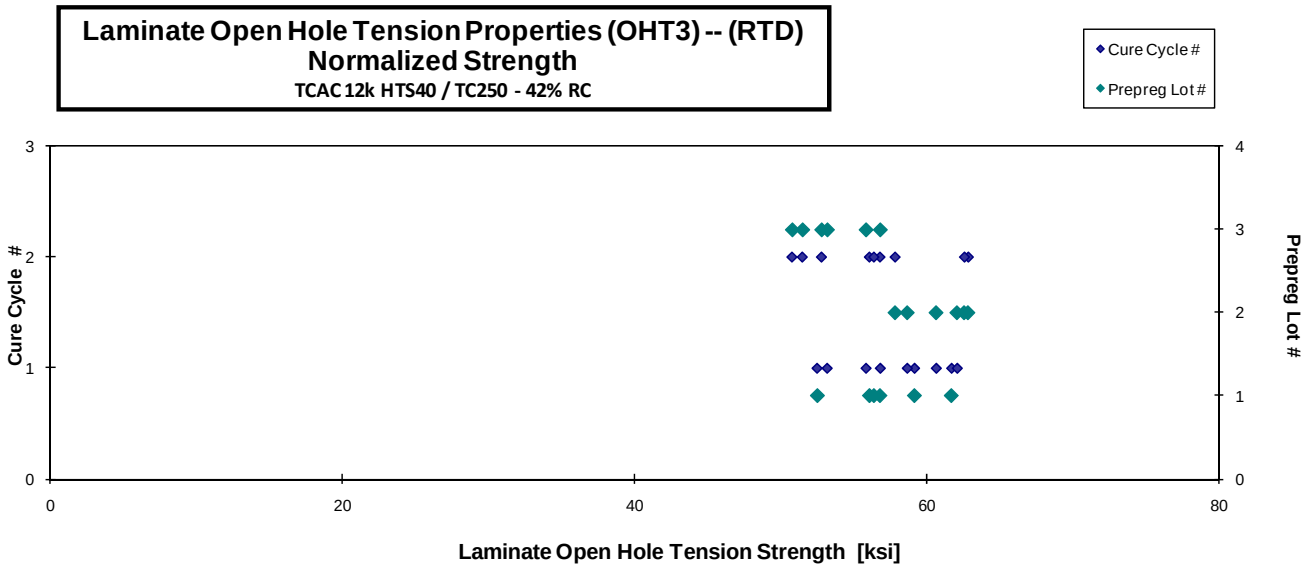
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGFA11CA	A	C1	1	1	59.229	0.133	15	LGM	0.0089	61.683
TGFA11DA	A	C1	1	1	56.783	0.133	15	LGM	0.0089	59.151
TGFA11EA	A	C1	1	1	50.446	0.133	15	LGM	0.0088	52.497
TGFA21CA	A	C2	1	2	52.134	0.139	15	LGM	0.0093	56.788
TGFA21DA	A	C2	1	2	52.218	0.137	15	LGM	0.0091	56.068
TGFA21EA	A	C2	1	2	52.638	0.137	15	LGM	0.0091	56.375
TGFB11CA	B	C1	2	1	59.883	0.132	15	LGM	0.0088	62.067
TGFB11DA	B	C1	2	1	58.114	0.133	15	LGM	0.0089	60.636
TGFB11EA	B	C1	2	1	56.259	0.133	15	LGM	0.0089	58.656
TGFB21CA	B	C2	2	2	60.465	0.132	15	LGM	0.0088	62.821
TGFB21DA	B	C2	2	2	59.761	0.133	15	LGM	0.0089	62.558
TGFB21EA	B	C2	2	2	55.677	0.132	15	LGM/AGM	0.0088	57.824
TGFC11CA	C	C1	3	1	53.817	0.135	15	LGM	0.0090	56.814
TGFC11DA	C	C1	3	1	50.770	0.134	15	LGM	0.0089	53.186
TGFC11EA	C	C1	3	1	53.666	0.133	15	LGM	0.0088	55.840
TGFC211A	C	C2	3	2	52.755	0.123	15	LGM	0.0082	50.782
TGFC212A	C	C2	3	2	54.148	0.124	15	LGM	0.0083	52.796
TGFC213A	C	C2	3	2	52.183	0.126	15	LGM	0.0084	51.487

	Strength [ksi]
Average	55.052
Standard Dev.	3.309
Coeff. of Var. [%]	6.011
Min.	50.446
Max.	60.465
Number of Spec.	18

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
Average	0.0088	57.113
Standard Dev.		3.893
Coeff. of Var. [%]		6.816
Min.	0.0082	50.782
Max.	0.0093	62.821
Number of Spec.		18


Laminate Open Hole Tension Properties (OHT3) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Tension Strength [ksi]

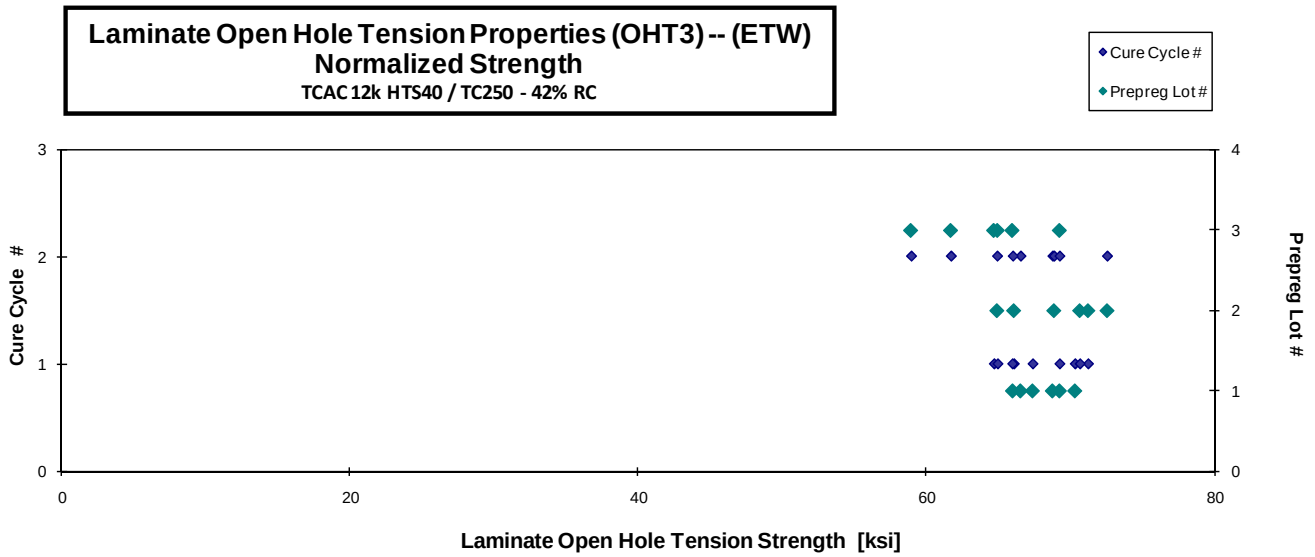
Laminate Open Hole Tension Properties (OHT3) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGFA111F	A	C1	1	1	68.844	0.130	15	LGM	0.0087	70.319
TGFA112F	A	C1	1	1	65.183	0.132	15	LGM	0.0088	67.381
TGFA113F	A	C1	1	1	66.121	0.134	15	LGM	0.0089	69.249
TGFA211F	A	C2	1	2	64.291	0.132	15	LGM	0.0088	66.543
TGFA212F	A	C2	1	2	63.425	0.133	15	LGM	0.0088	66.003
TGFA213F	A	C2	1	2	64.751	0.135	15	LGM	0.0090	68.763
TGFB111F	B	C1	2	1	68.983	0.132	15	LGM	0.0088	71.229
TGFB112F	B	C1	2	1	68.716	0.131	15	LGM	0.0087	70.656
TGFB113F	B	C1	2	1	65.229	0.129	15	LGM	0.0086	66.082
TGFB211F	B	C2	2	2	63.157	0.131	15	LGM	0.0087	64.916
TGFB212F	B	C2	2	2	70.382	0.131	15	LGM	0.0088	72.553
TGFB213F	B	C2	2	2	66.342	0.132	15	LGM	0.0088	68.866
TGFC111F	C	C1	3	1	63.167	0.131	15	LGM	0.0087	64.695
TGFC112F	C	C1	3	1	64.001	0.131	15	LGM	0.0088	65.968
TGFC113F	C	C1	3	1	61.817	0.134	15	LGM	0.0089	64.944
TGFC21BF	C	C2	3	2	71.011	0.124	15	LGM	0.0083	69.248
TGFC21CF	C	C2	3	2	63.033	0.125	15	LGM	0.0083	61.707
TGFC21DF	C	C2	3	2	60.516	0.124	15	LGM	0.0083	58.942

Average	**65.498**	
Standard Dev.	**3.001**	
Coeff. of Var. [%]	**4.582**	
Min.	**60.516**	
Max.	**71.011**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0087**	**67.115**
Standard $Dev._{norm}$		**3.427**
Coeff. of $Var.[\%]_{norm}$		**5.106**
Min.	**0.0083**	**58.942**
Max.	**0.0090**	**72.553**
Number of Spec.		**18**


Laminate Open Hole Tension Properties (OHT3) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
20
40
60
80
0
1
2
3
4

4.17 Filled-Hole Tension 1 Properties

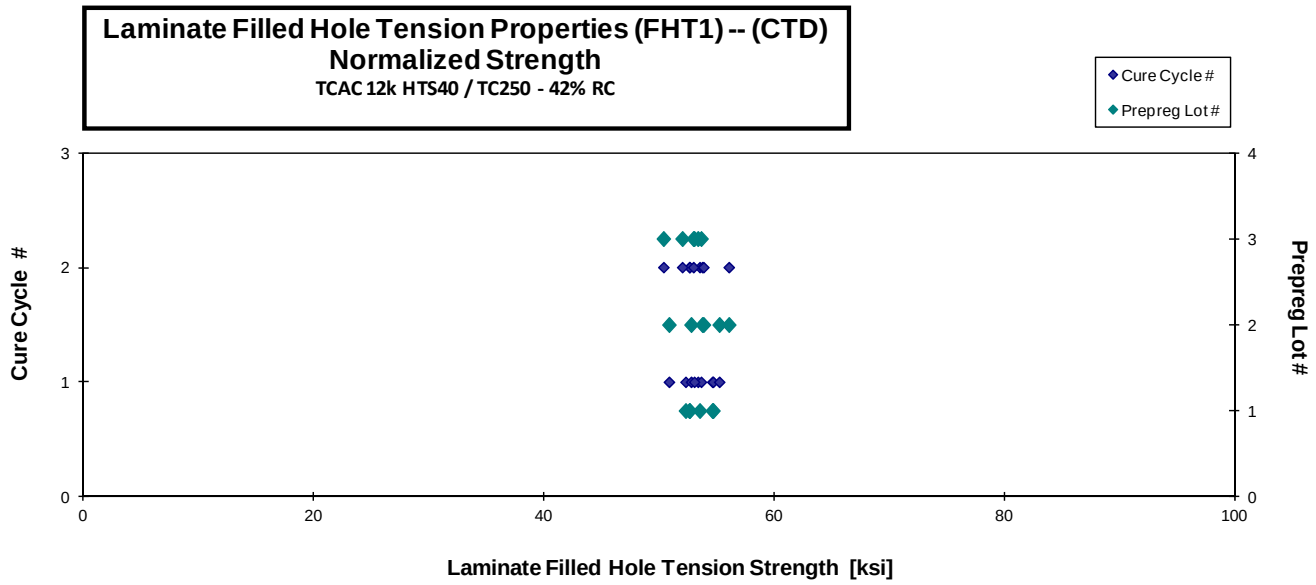
Laminate Filled Hole Tension Properties (FHT1) -- (CTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG4A117B	A	C1	1	1	52.443	0.142	16	LGM	0.0089	54.622
TG4A118B	A	C1	1	1	52.902	0.141	16	LGM	0.0088	54.678
TG4A119B	A	C1	1	1	51.865	0.137	16	LGM	0.0086	52.297
TG4A217B	A	C2	1	2	50.703	0.141	16	LGM	0.0088	52.629
TG4A218B	A	C2	1	2	51.529	0.139	16	LGM	0.0087	52.641
TG4A219B	A	C2	1	2	51.688	0.141	16	LGM	0.0088	53.519
TG4B116B	B	C1	2	1	48.828	0.142	16	LGM	0.0089	50.857
TG4B117B	B	C1	2	1	53.568	0.140	16	LGM	0.0088	55.223
TG4B119B	B	C1	2	1	52.184	0.138	16	LGM	0.0086	52.779
TG4B217B	B	C2	2	2	54.497	0.140	16	LGM	0.0087	56.053
TG4B218B	B	C2	2	2	52.741	0.139	16	LGM	0.0087	53.749
TG4B219B	B	C2	2	2	52.651	0.139	16	LGM	0.0087	53.851
TG4C117B	C	C1	3	1	51.601	0.141	16	LGM	0.0088	53.365
TG4C118B	C	C1	3	1	51.707	0.141	16	LGM	0.0088	53.646
TG4C119B	C	C1	3	1	51.834	0.139	16	LGM	0.0087	53.047
TG4C21BB	C	C2	3	2	50.570	0.142	16	LGM	0.0089	52.968
TG4C21DB	C	C2	3	2	48.544	0.141	16	LGM	0.0088	50.376
TG4C21EB	C	C2	3	2	50.009	0.141	16	LGM	0.0088	52.007

Average	**51.659**	
Standard Dev.	**1.513**	
Coeff. of Var. [%]	**2.929**	
Min.	**48.544**	
Max.	**54.497**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**53.239**
$Standard\ Dev._{norm}$		**1.416**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**2.659**
Min.	**0.0086**	**50.376**
Max.	**0.0089**	**56.053**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT1) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Tension Strength [ksi]
0
20
40
60
80
100
0
1
2
3
4

Laminate Filled Hole Tension Properties (FHT1) -- (RTD) Strength

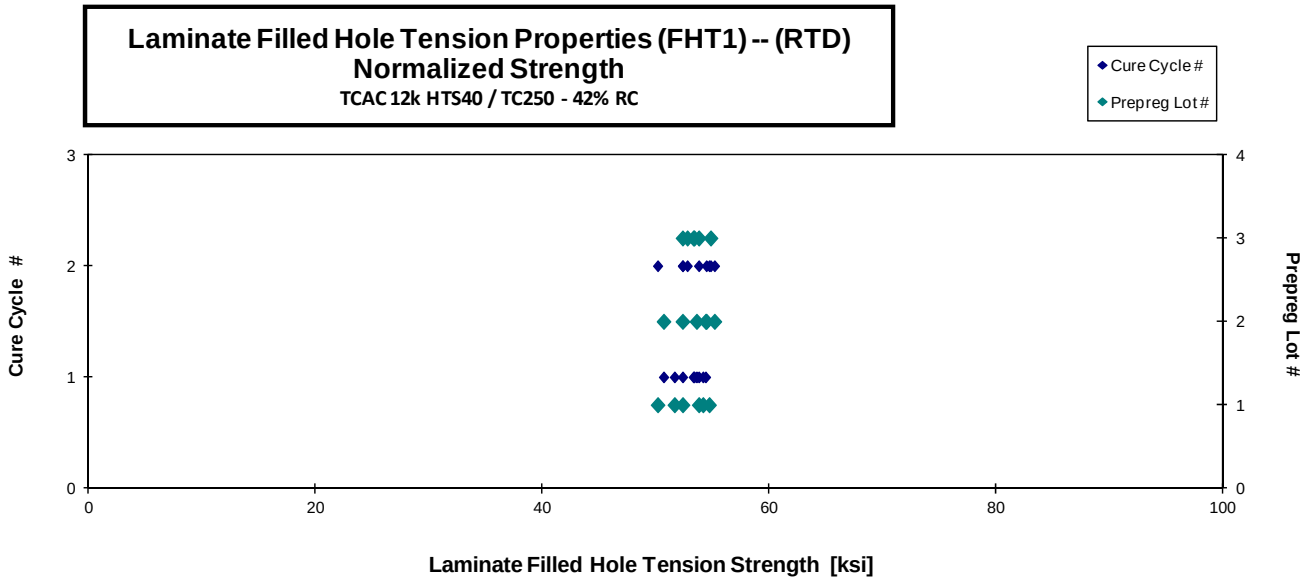
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG4A11CA	A	C1	1	1	51.777	0.142	16	LGM	0.0089	54.188
TG4A11DA	A	C1	1	1	49.321	0.143	16	LGM	0.0089	51.678
TG4A11EA	A	C1	1	1	51.735	0.141	16	LGM	0.0088	53.821
TG4A21CA	A	C2	1	2	52.075	0.143	16	LGM	0.0089	54.736
TG4A21DA	A	C2	1	2	49.320	0.144	16	LGM	0.0090	52.397
TG4A21EA	A	C2	1	2	47.611	0.143	16	LGM	0.0090	50.196
TG4B111A	B	C1	2	1	52.921	0.138	16	LGM	0.0086	53.621
TG4B112A	B	C1	2	1	49.324	0.140	16	LGM	0.0087	50.720
TG4B113A	B	C1	2	1	52.132	0.142	16	LGM	0.0089	54.420
TG4B21CA	B	C2	2	2	52.807	0.142	16	LGM	0.0089	55.208
TG4B21DA	B	C2	2	2	52.108	0.142	16	LGM	0.0089	54.490
TG4B21EA	B	C2	2	2	50.442	0.141	16	LGM	0.0088	52.389
TG4C11CA	C	C1	3	1	50.564	0.144	16	LGM	0.0090	53.414
TG4C11DA	C	C1	3	1	50.693	0.143	16	LGM	0.0089	53.345
TG4C11EA	C	C1	3	1	49.872	0.143	16	LGM	0.0089	52.390
TG4C211A	C	C2	3	2	51.948	0.141	16	LGM	0.0088	53.820
TG4C215A	C	C2	3	2	52.560	0.142	16	LGM	0.0089	54.866
TG4C218A	C	C2	3	2	51.314	0.140	16	LGM	0.0087	52.804

Average	**51.029**	
Standard Dev.	**1.475**	
Coeff. of Var. [%]	**2.890**	
Min.	**47.611**	
Max.	**52.921**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0089**	**53.250**
$Standard\ Dev._{norm}$		**1.412**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**2.651**
Min.	**0.0086**	**50.196**
Max.	**0.0090**	**55.208**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT1) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Tension Strength [ksi]

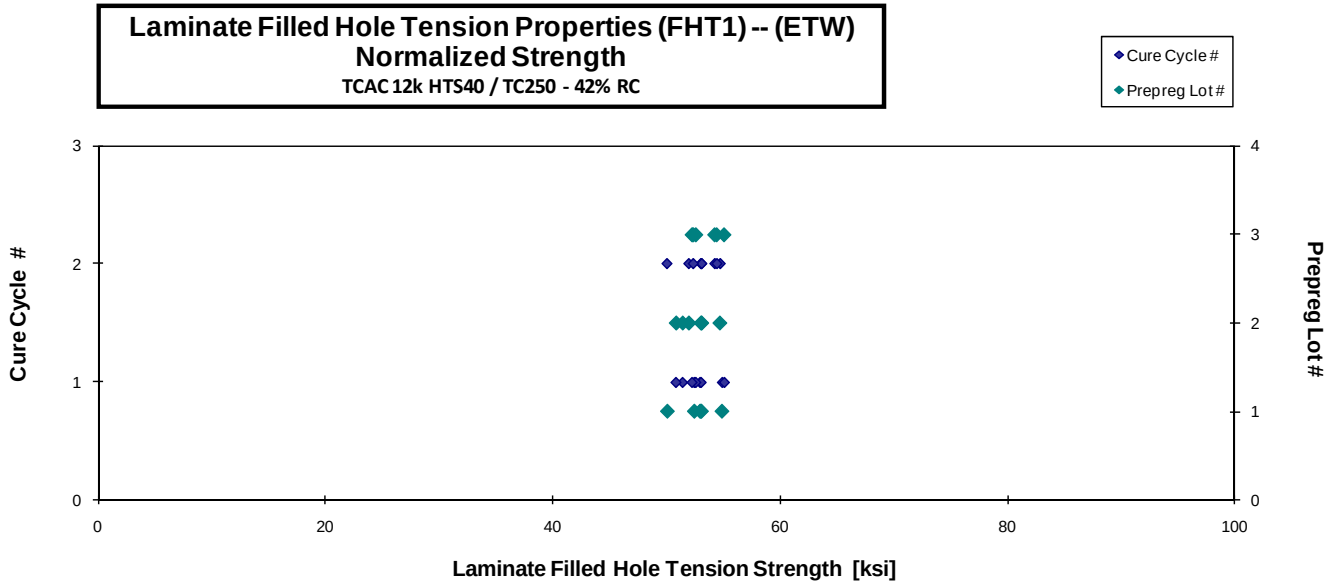
Laminate Filled Hole Tension Properties (FHT1) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG4A113F	A	C1	1	1	50.054	0.143	16	LGM	0.0089	52.452
TG4A114F	A	C1	1	1	50.469	0.143	16	LGM	0.0089	52.961
TG4A115F	A	C1	1	1	52.283	0.143	16	LGM	0.0089	54.910
TG4A214F	A	C2	1	2	51.239	0.141	16	LGM	0.0088	53.085
TG4A215F	A	C2	1	2	47.677	0.143	16	LGM	0.0089	50.049
TG4A216F	A	C2	1	2	50.490	0.143	16	LGM	0.0089	53.027
TG4B11BF	B	C1	2	1	51.401	0.140	16	LGM	0.0088	53.051
TG4B11CF	B	C1	2	1	49.671	0.141	16	LGM	0.0088	51.418
TG4B11DF	B	C1	2	1	48.965	0.141	16	LGM	0.0088	50.838
TG4B211F	B	C2	2	2	51.321	0.141	16	LGM	0.0088	53.107
TG4B212F	B	C2	2	2	52.982	0.140	16	LGM	0.0088	54.729
TG4B213F	B	C2	2	2	49.855	0.142	16	LGM	0.0089	51.969
TG4C111F	C	C1	3	1	51.600	0.139	16	LGM	0.0087	52.580
TG4C112F	C	C1	3	1	53.255	0.141	16	LGM	0.0088	55.096
TG4C113F	C	C1	3	1	49.286	0.144	16	LGM	0.0090	52.252
TG4C212F	C	C2	3	2	51.713	0.143	16	LGM	0.0089	54.255
TG4C213F	C	C2	3	2	51.717	0.143	16	LGM	0.0089	54.443
TG4C214F	C	C2	3	2	50.136	0.142	16	LGM	0.0089	52.354

Average	**50.784**	
Standard Dev.	**1.433**	
Coeff. of Var. [%]	**2.822**	
Min.	**47.677**	
Max.	**53.255**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0089**	**52.921**
$Standard\ Dev._{norm}$		**1.393**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**2.633**
Min.	**0.0087**	**50.049**
Max.	**0.0090**	**55.096**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT1) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Tension Strength [ksi]

4.18 Filled-Hole Tension 2 Properties

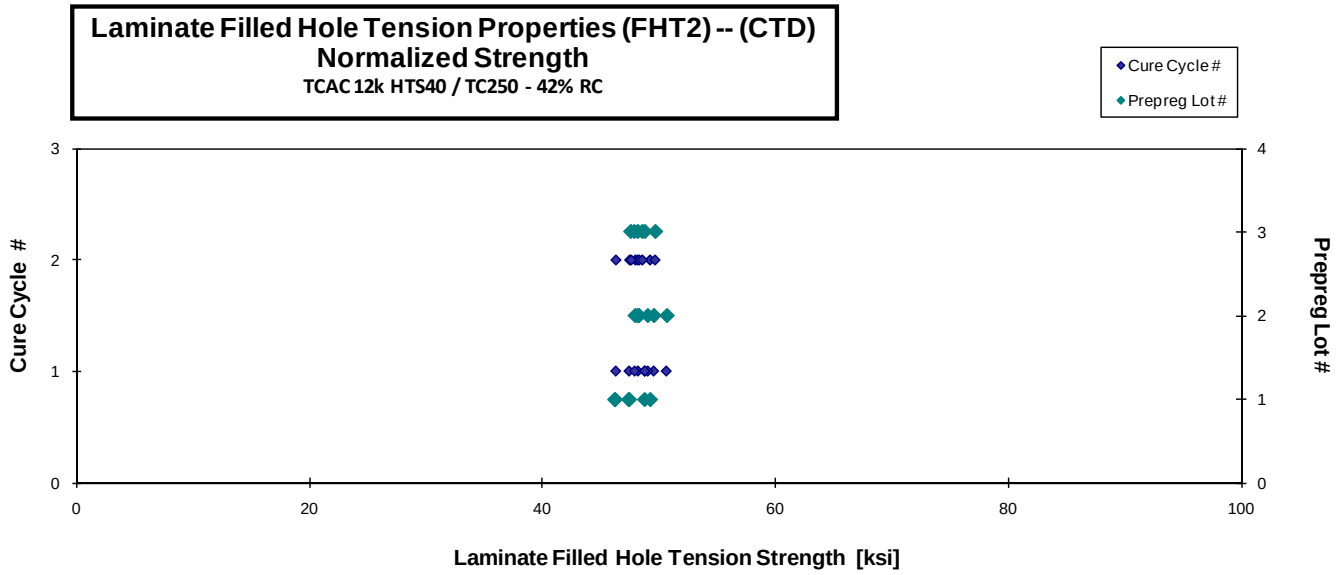
Laminate Filled Hole Tension Properties (FHT2) -- (CTD)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG5A116B	A	C1	1	1	45.054	0.179	20	MGM	0.0089	47.435
TG5A117B	A	C1	1	1	43.554	0.181	20	MGM	0.0090	46.270
TG5A119B	A	C1	1	1	47.424	0.175	20	MGM	0.0087	48.782
TG5A217B	A	C2	1	2	45.571	0.177	20	MGM	0.0089	47.483
TG5A218B	A	C2	1	2	48.040	0.174	20	AGM	0.0087	49.259
TG5A219B	A	C2	1	2	44.784	0.176	20	MGM	0.0088	46.286
TG5B117B	B	C1	2	1	48.841	0.176	20	AGM	0.0088	50.671
TG5B118B	B	C1	2	1	48.832	0.173	20	AGM	0.0086	49.570
TG5B119B	B	C1	2	1	47.857	0.174	20	AGM	0.0087	49.053
TG5B217B	B	C2	2	2	46.387	0.176	20	AGM	0.0088	47.983
TG5B218B	B	C2	2	2	46.780	0.175	20	AGM	0.0088	48.188
TG5B21BB	B	C2	2	2	46.064	0.178	20	AGM	0.0089	48.317
TG5C117B	C	C1	3	1	45.965	0.178	20	LGM	0.0089	48.205
TG5C118B	C	C1	3	1	47.560	0.174	20	LGM	0.0087	48.800
TG5C119B	C	C1	3	1	46.861	0.174	20	LGM	0.0087	47.913
TG5C216B	C	C2	3	2	46.324	0.178	20	LGM	0.0089	48.586
TG5C217B	C	C2	3	2	48.118	0.176	20	LGM	0.0088	49.694
TG5C218B	C	C2	3	2	46.258	0.175	20	LGM	0.0087	47.614

Average	**46.682**	
Standard Dev.	**1.425**	
Coeff. of Var. [%]	**3.052**	
Min.	**43.554**	
Max.	**48.841**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**48.339**
Standard $Dev._{norm}$		**1.126**
Coeff. of Var. $[\%]_{norm}$		**2.328**
Min.	**0.0086**	**46.270**
Max.	**0.0090**	**50.671**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT2) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Tension Strength [ksi]

Laminate Filled Hole Tension Properties (FHT2) -- (RTD) Strength

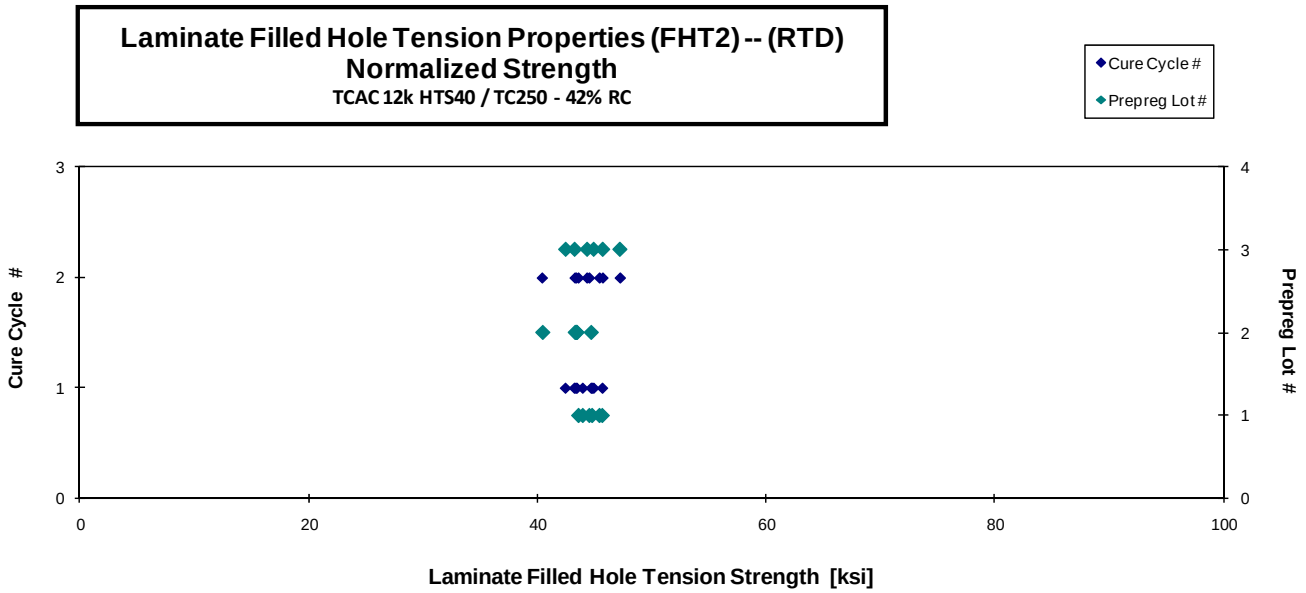
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG5A11CA	A	C1	1	1	42.380	0.180	20	AGM	0.0090	44.786
TG5A11DA	A	C1	1	1	41.458	0.180	20	AGM	0.0090	43.962
TG5A11EA	A	C1	1	1	43.104	0.180	20	LGM	0.0090	45.669
TG5A21CA	A	C2	1	2	43.397	0.178	20	LGM	0.0089	45.423
TG5A21DA	A	C2	1	2	41.583	0.178	20	AGM	0.0089	43.597
TG5A21EA	A	C2	1	2	42.568	0.178	20	LGM	0.0089	44.538
TG5B11CA	B	C1	2	1	41.725	0.177	20	LGM	0.0089	43.467
TG5B11DA	B	C1	2	1	42.759	0.178	20	LGM	0.0089	44.704
TG5B11EA	B	C1	2	1	41.471	0.178	20	LGM	0.0089	43.378
TG5B21CA	B	C2	2	2	38.450	0.179	20	LGM	0.0089	40.470
TG5B21DA	B	C2	2	2	41.392	0.178	20	LGM	0.0089	43.413
TG5B21EA	B	C2	2	2	41.078	0.179	20	LGM	0.0090	43.301
TG5C11CA	C	C1	3	1	42.888	0.178	20	AGM	0.0089	44.919
TG5C11DA	C	C1	3	1	41.361	0.178	20	AGM/LGM	0.0089	43.251
TG5C11EA	C	C1	3	1	40.696	0.177	20	AGM	0.0089	42.467
TG5C21CA	C	C2	3	2	43.173	0.180	20	AGM/LGM	0.0090	45.704
TG5C21DA	C	C2	3	2	44.743	0.179	20	AGM/LGM	0.0090	47.204
TG5C21EA	C	C2	3	2	42.325	0.178	20	AGM/LGM	0.0089	44.345

Average	**42.031**	
Standard Dev.	**1.345**	
Coeff. of Var. [%]	**3.200**	
Min.	**38.450**	
Max.	**44.743**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0089**	**44.144**
Standard $Dev._{norm}$		**1.475**
Coeff. of Var. $[\%]_{norm}$		**3.342**
Min.	**0.0089**	**40.470**
Max.	**0.0090**	**47.204**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT2) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Tension Strength [ksi]

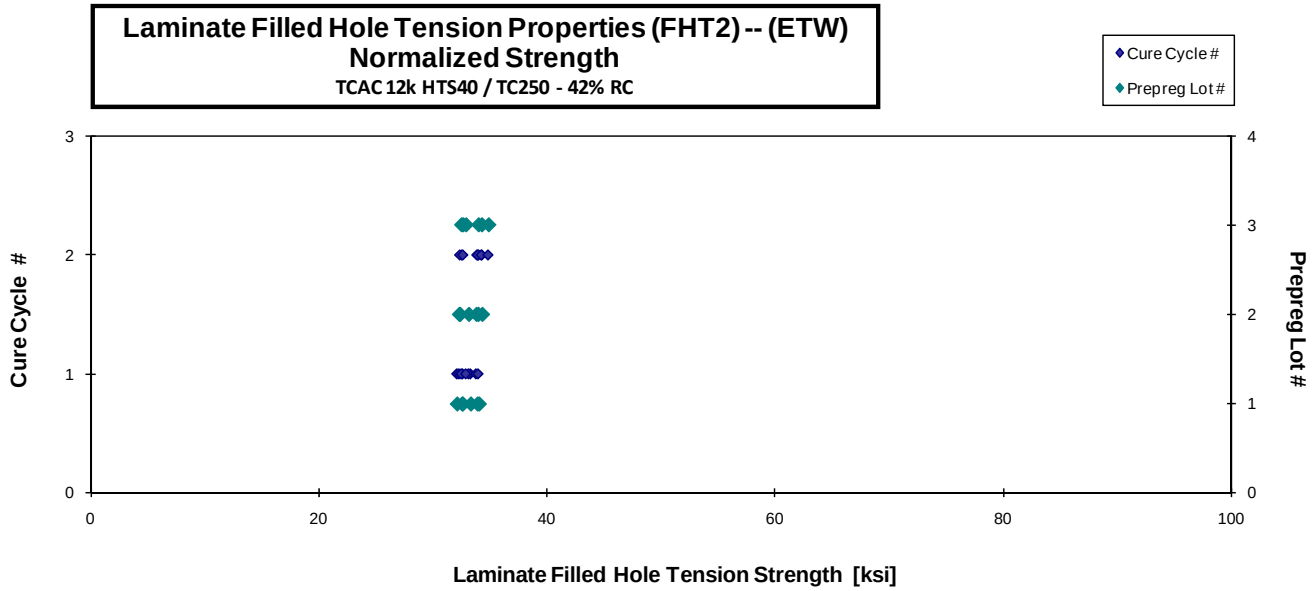
Laminate Filled Hole Tension Properties (FHT2) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG5A111F	A	C1	1	1	30.906	0.179	20	AGM	0.0090	32.618
TG5A112F	A	C1	1	1	30.833	0.177	20	AGM	0.0089	32.118
TG5A113F	A	C1	1	1	31.994	0.177	20	AGM	0.0088	33.302
TG5A211F	A	C2	1	2	32.982	0.175	20	AGM	0.0088	34.030
TG5A212F	A	C2	1	2	32.605	0.177	20	AGM	0.0088	33.881
TG5A216F	A	C2	1	2	31.068	0.178	20	AGM	0.0089	32.551
TG5B112F	B	C1	2	1	31.874	0.177	20	AGM	0.0088	33.137
TG5B113F	B	C1	2	1	31.260	0.176	20	AGM	0.0088	32.299
TG5B114F	B	C1	2	1	32.586	0.176	20	AGM	0.0088	33.794
TG5B211F	B	C2	2	2	33.584	0.174	20	AGM	0.0087	34.305
TG5B212F	B	C2	2	2	31.353	0.176	20	AGM	0.0088	32.373
TG5B216F	B	C2	2	2	32.674	0.177	20	AGM	0.0088	33.956
TG5C114F	C	C1	3	1	32.077	0.180	20	AGM	0.0090	33.980
TG5C115F	C	C1	3	1	31.031	0.178	20	AGM	0.0089	32.501
TG5C116F	C	C1	3	1	31.416	0.178	20	AGM	0.0089	32.895
TG5C212F	C	C2	3	2	31.340	0.177	20	AGM	0.0089	32.643
TG5C213F	C	C2	3	2	32.573	0.179	20	LGM	0.0089	34.265
TG5C214F	C	C2	3	2	32.896	0.180	20	AGM	0.0090	34.854

Average	**31.947**	
Standard Dev.	**0.835**	
Coeff. of Var. [%]	**2.613**	
Min.	**30.833**	
Max.	**33.584**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0089**	**33.306**
$Standard\ Dev._{norm}$		**0.837**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**2.513**
Min.	**0.0087**	**32.118**
Max.	**0.0090**	**34.854**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT2) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Tension Strength [ksi]
0
20
40
60
80
100
0
1
2
3
4

4.19 Filled-Hole Tension 3 Properties

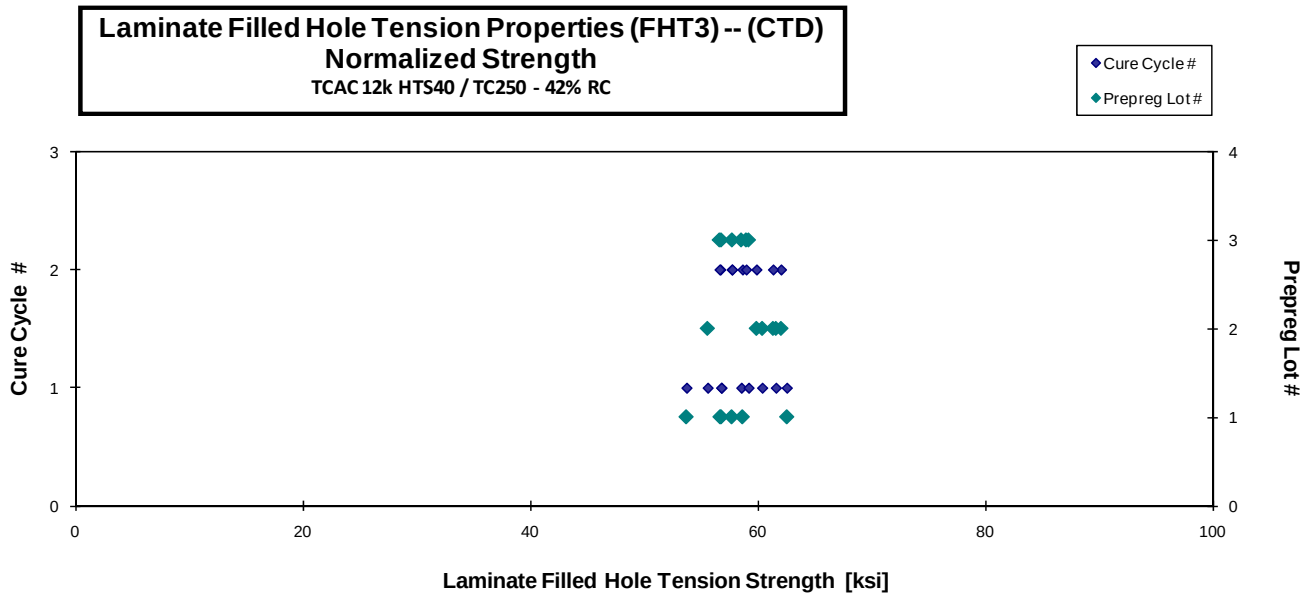
Laminate Filled Hole Tension Properties (FHT3) -- (CTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG6A117B	A	C1	1	1	52.812	0.130	15	LGM	0.0087	53.751
TG6A118B	A	C1	1	1	61.839	0.129	15	LGM	0.0086	62.534
TG6A119B	A	C1	1	1	55.852	0.130	15	LGM	0.0086	56.801
TG6A217B	A	C2	1	2	56.794	0.132	15	LGM	0.0088	58.650
TG6A218B	A	C2	1	2	56.666	0.130	15	LGM	0.0087	57.718
TG6A219B	A	C2	1	2	55.358	0.131	15	LGM	0.0087	56.711
TG6B117B	B	C1	2	1	54.696	0.130	15	LGM	0.0086	55.604
TG6B118B	B	C1	2	1	59.934	0.131	15	LGM	0.0087	61.580
TG6B119B	B	C1	2	1	57.854	0.133	15	LGM	0.0089	60.380
TG6B217B	B	C2	2	2	59.905	0.132	15	LGM	0.0088	62.027
TG6B218B	B	C2	2	2	59.834	0.131	15	LGM	0.0087	61.328
TG6B219B	B	C2	2	2	59.917	0.127	15	LGM	0.0085	59.878
TG6C116B	C	C1	3	1	53.675	0.135	15	LGM	0.0090	56.798
TG6C117B	C	C1	3	1	55.243	0.135	15	LGM	0.0090	58.550
TG6C119B	C	C1	3	1	58.433	0.129	15	LGM	0.0086	59.189
TG6C219B	C	C2	3	2	55.759	0.130	15	LGM	0.0086	56.648
TG6C21AB	C	C2	3	2	56.772	0.132	15	LGM	0.0088	58.976
TG6C21BB	C	C2	3	2	54.934	0.134	15	LGM	0.0089	57.742

Average	**57.015**	
Standard Dev.	**2.506**	
Coeff. of Var. [%]	**4.396**	
Min.	**52.812**	
Max.	**61.839**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0087**	**58.604**
$Standard\ Dev._{norm}$		**2.385**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**4.070**
Min.	**0.0085**	**53.751**
Max.	**0.0090**	**62.534**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT3) -- (CTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Tension Strength [ksi]
0
20
40
60
80
100
0
1
2
3
4

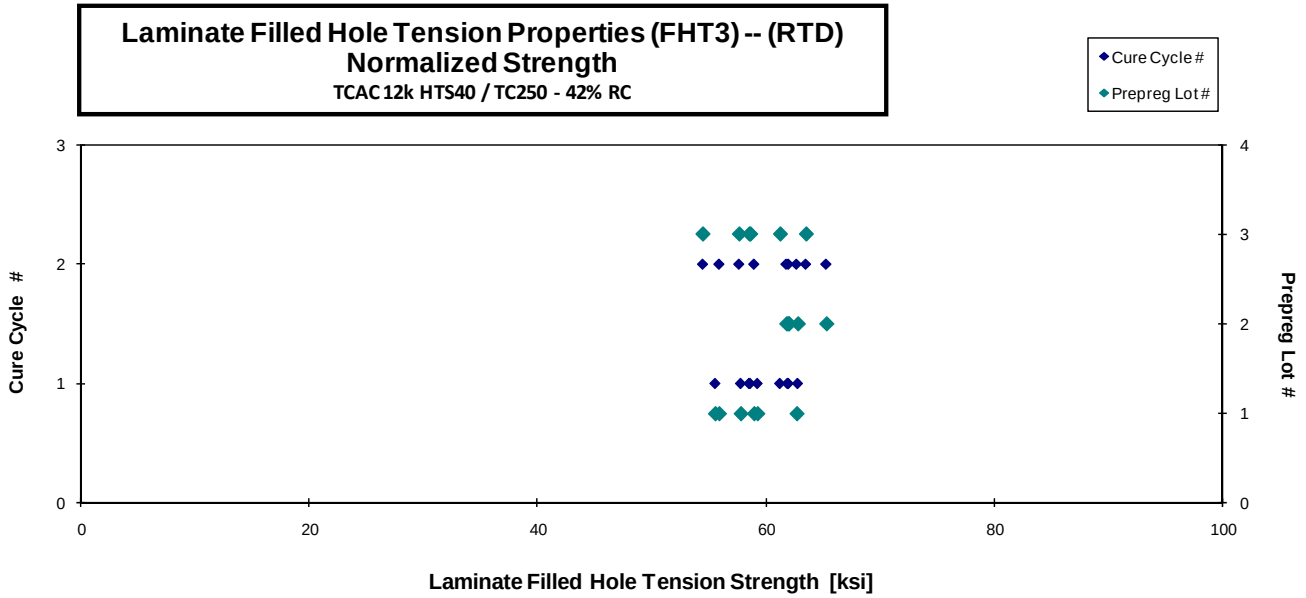
Laminate Filled Hole Tension Properties (FHT3) -- (RTD) Strength

TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG6A11CA	A	C1	1	1	52.484	0.135	15	LGM	0.0090	55.537
TG6A11DA	A	C1	1	1	56.489	0.134	15	LGM	0.0089	59.251
TG6A11EA	A	C1	1	1	55.804	0.132	15	LGM	0.0088	57.781
TG6A21CA	A	C2	1	2	56.454	0.133	15	LGM	0.0089	58.948
TG6A21DA	A	C2	1	2	53.066	0.134	15	LGM	0.0090	55.883
TG6A21EA	A	C2	1	2	58.604	0.136	15	LGM	0.0091	62.687
TG6B11CA	B	C1	2	1	59.402	0.133	15	LGM	0.0089	61.980
TG6B11DA	B	C1	2	1	60.062	0.131	15	LGM	0.0088	61.899
TG6B11EA	B	C1	2	1	62.157	0.129	15	LGM	0.0086	62.790
TG6B21CA	B	C2	2	2	62.645	0.133	15	LGM	0.0089	65.290
TG6B21DA	B	C2	2	2	59.296	0.133	15	LGM	0.0089	61.784
TG6B21EA	B	C2	2	2	59.587	0.133	15	LGM	0.0088	61.978
TG6C111A	C	C1	3	1	59.761	0.131	15	LGM	0.0087	61.230
TG6C112A	C	C1	3	1	56.333	0.133	15	LGM	0.0088	58.616
TG6C113A	C	C1	3	1	55.644	0.134	15	LGM	0.0089	58.525
TG6C211A	C	C2	3	2	61.862	0.131	15	LGM	0.0087	63.504
TG6C212A	C	C2	3	2	54.763	0.134	15	LGM	0.0089	57.633
TG6C213A	C	C2	3	2	51.718	0.134	15	LGM	0.0089	54.443

Average	**57.563**		**$Average_{norm}$**	**0.0089**	**59.987**
Standard Dev.	**3.314**		**$Standard\ Dev._{norm}$**		**3.024**
Coeff. of Var. [%]	**5.758**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.041**
Min.	**51.718**		**Min.**	**0.0086**	**54.443**
Max.	**62.645**		**Max.**	**0.0091**	**65.290**
Number of Spec.	**18**		**Number of Spec.**		**18**


Laminate Filled Hole Tension Properties (FHT3) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Tension Strength [ksi]
0
20
40
60
80
100
0
1
2
3
4

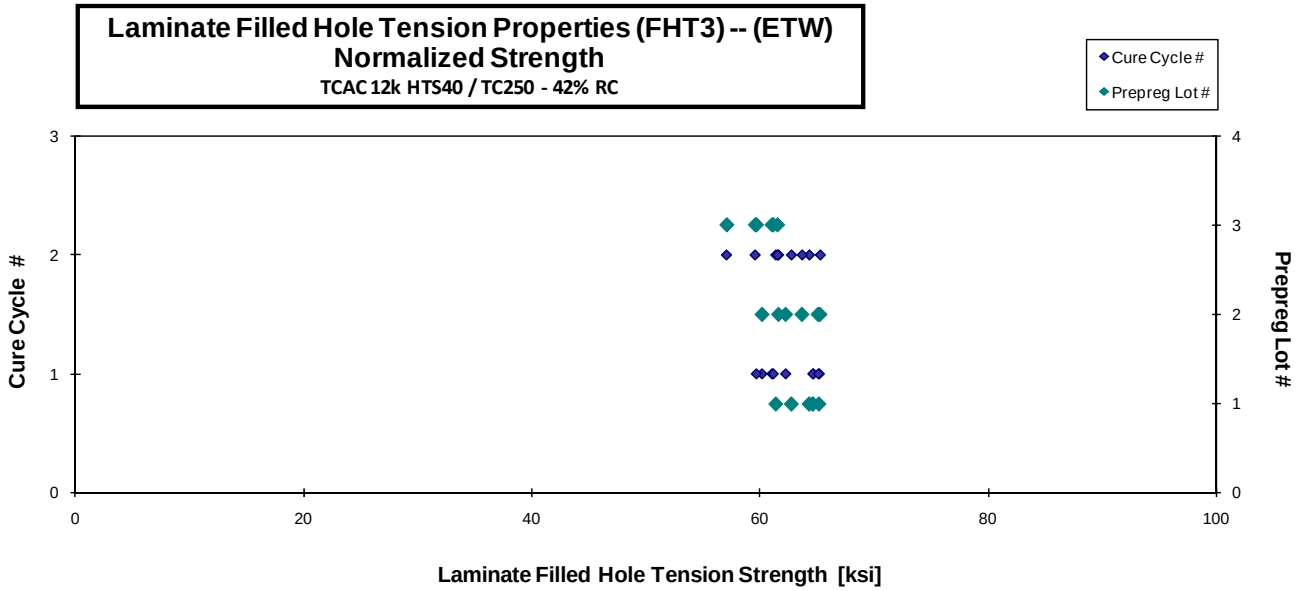
Laminate Filled Hole Tension Properties (FHT3) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG6A111F	A	C1	1	1	63.535	0.130	15	LGM	0.0087	64.657
TG6A112F	A	C1	1	1	63.060	0.132	15	LGM	0.0088	65.170
TG6A115F	A	C1	1	1	61.925	0.133	15	LGM	0.0089	64.613
TG6A211F	A	C2	1	2	61.222	0.131	15	LGM	0.0087	62.743
TG6A212F	A	C2	1	2	62.886	0.130	15	LGM	0.0087	64.308
TG6A213F	A	C2	1	2	59.601	0.131	15	LGM	0.0088	61.370
TG6B111F	B	C1	2	1	64.251	0.129	15	LGM	0.0086	65.099
TG6B112F	B	C1	2	1	59.902	0.132	15	LGM	0.0088	62.236
TG6B113F	B	C1	2	1	57.594	0.133	15	LGM	0.0089	60.161
TG6B211F	B	C2	2	2	60.565	0.130	15	LGM	0.0086	61.610
TG6B212F	B	C2	2	2	61.829	0.131	15	LGM	0.0088	63.679
TG6B213F	B	C2	2	2	62.732	0.133	15	LGM	0.0088	65.265
TG6C11BF	C	C1	3	1	57.260	0.133	15	LGM	0.0089	59.670
TG6C11CF	C	C1	3	1	58.847	0.132	15	LGM	0.0088	61.040
TG6C11DF	C	C1	3	1	58.330	0.134	15	LGM	0.0089	61.151
TG6C21CF	C	C2	3	2	54.180	0.134	15	LGM	0.0090	57.055
TG6C21DF	C	C2	3	2	58.259	0.135	15	LGM	0.0090	61.526
TG6C21EF	C	C2	3	2	56.794	0.134	15	LGM	0.0089	59.563

Average	**60.154**	
Standard Dev.	**2.754**	
Coeff. of Var. [%]	**4.578**	
Min.	**54.180**	
Max.	**64.251**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**62.273**
$Standard\ Dev._{norm}$		**2.342**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**3.760**
Min.	**0.0086**	**57.055**
Max.	**0.0090**	**65.265**
Number of Spec.		**18**


Laminate Filled Hole Tension Properties (FHT3) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Tension Strength [ksi]

4.20 Open Hole Compression 1 Properties

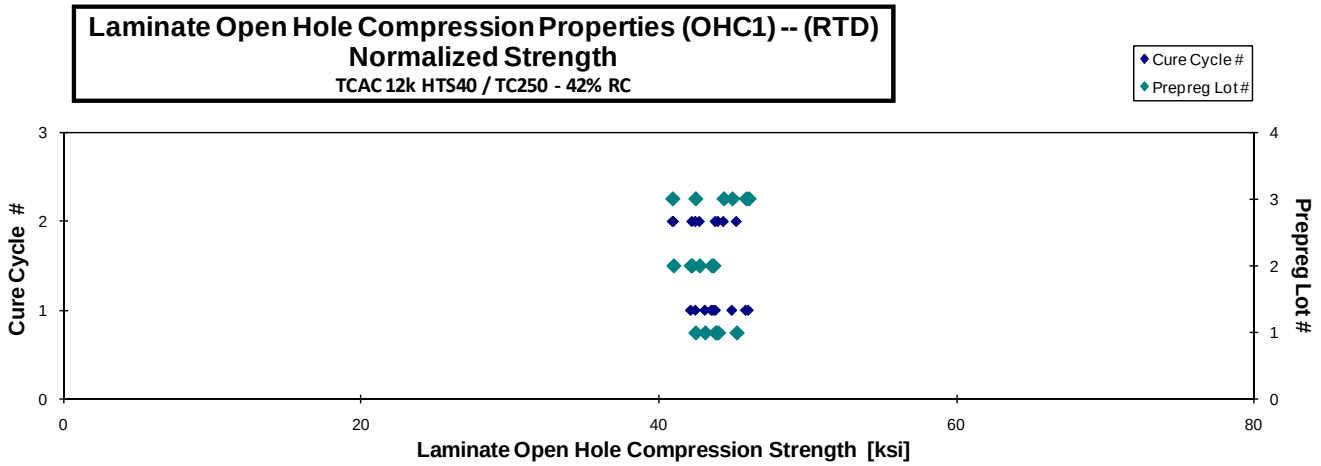
Laminate Open Hole Compression Properties (OHC1) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGGA116A	A	C1	1	1	41.920	0.178	20	LGM	0.0089	43.835
TGGA117A	A	C1	1	1	41.172	0.175	20	LGM	0.0088	42.492
TGGA118A	A	C1	1	1	42.759	0.171	20	LGM	0.0086	43.128
TGGA216A	A	C2	1	2	42.188	0.177	20	LGM	0.0088	43.826
TGGA217A	A	C2	1	2	43.743	0.176	20	LGM	0.0088	45.235
TGGA218A	A	C2	1	2	43.134	0.173	20	LGM	0.0087	43.997
TGGB116A	B	C1	2	1	41.657	0.178	20	LGM	0.0089	43.565
TGGB117A	B	C1	2	1	41.107	0.174	20	LGM	0.0087	42.179
TGGB118A	B	C1	2	1	43.964	0.169	20	LGM	0.0084	43.684
TGGB216A	B	C2	2	2	40.325	0.178	20	LGM	0.0089	42.259
TGGB217A	B	C2	2	2	39.831	0.175	20	LGM	0.0088	41.022
TGGB218A	B	C2	2	2	42.015	0.173	20	LGM	0.0087	42.756
TGGC115A	C	C1	3	1	43.005	0.182	20	LGM	0.0091	46.033
TGGC116A	C	C1	3	1	43.333	0.180	20	LGM	0.0090	45.861
TGGC117A	C	C1	3	1	43.222	0.177	20	LGM	0.0088	44.938
TGGC215A	C	C2	3	2	38.632	0.180	20	LGM	0.0090	40.954
TGGC216A	C	C2	3	2	42.354	0.178	20	LGM	0.0089	44.368
TGGC217A	C	C2	3	2	41.245	0.175	20	LGM	0.0088	42.486

	Strength [ksi]
Average	41.978
Standard Dev.	1.419
Coeff. of Var. [%]	3.380
Min.	38.632
Max.	43.964
Number of Spec.	18

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	0.0088	43.479
$Standard\ Dev._{norm}$		1.474
$Coeff.\ of\ Var.\ [\%]_{norm}$		3.391
Min.	0.0084	40.954
Max.	0.0091	46.033
Number of Spec.		18


Laminate Open Hole Compression Properties (OHC1) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Compression Strength [ksi]

Laminate Open Hole Compression Properties (OHC1) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

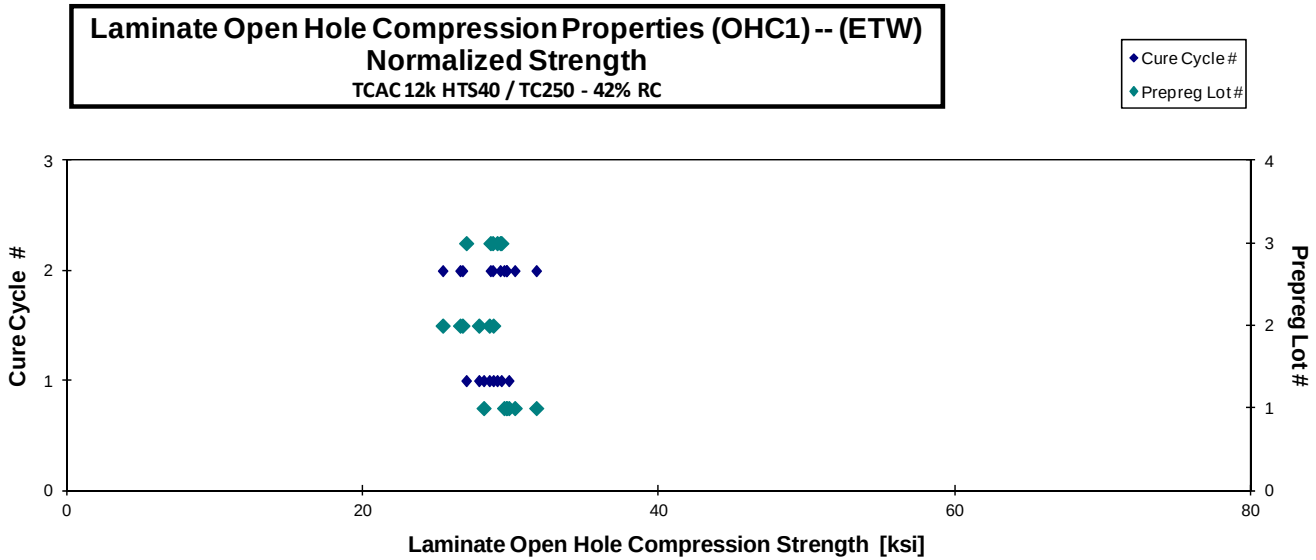
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGGA111F	A	C1	1	1	30.414	0.167	20	LGM	0.0083	29.830
TGGA112F*	A	C1	1	1	*	0.171	20	LGM	0.0086	
TGGA114F*	A	C1	1	1	*	0.178	20	LGM	0.0089	
TGGA115F	A	C1	1	1	26.772	0.179	20	LGM	0.0089	28.131
TGGA211F	A	C2	1	2	29.945	0.172	20	LGM	0.0086	30.233
TGGA212F	A	C2	1	2	30.971	0.174	20	LGM	0.0087	31.687
TGGA213F	A	C2	1	2	28.732	0.176	20	LGM	0.0088	29.664
TGGA214F	A	C2	1	2	28.660	0.176	20	LGM	0.0088	29.677
TGGA215F	A	C2	1	2	28.264	0.177	20	LGM	0.0089	29.509
TGGB111F	B	C1	2	1	28.166	0.172	20	LGM	0.0086	28.514
TGGB112F	B	C1	2	1	27.232	0.174	20	LGM	0.0087	27.811
TGGB113F	B	C1	2	1	27.896	0.175	20	LGM	0.0088	28.780
TGGB211F	B	C2	2	2	25.311	0.170	20	LGM	0.0085	25.366
TGGB212F	B	C2	2	2	25.996	0.174	20	LGM	0.0087	26.541
TGGB213F	B	C2	2	2	25.843	0.176	20	LGM	0.0088	26.699
TGGC111F	C	C1	3	1	28.804	0.171	20	LGM	0.0086	29.041
TGGC112F	C	C1	3	1	26.302	0.174	20	LGM	0.0087	26.955
TGGC113F	C	C1	3	1	28.156	0.177	20	LGM	0.0089	29.326
TGGC211F	C	C2	3	2	28.210	0.172	20	LGM	0.0086	28.592
TGGC212F	C	C2	3	2	28.053	0.174	20	LGM	0.0087	28.744
TGGC213F	C	C2	3	2	27.947	0.178	20	LGM	0.0089	29.251

*Data point has beencensored by engineering judgment.

Average	**27.983**	
Standard Dev.	**1.511**	
Coeff. of Var. [%]	**5.401**	
Min.	**25.311**	
Max.	**30.971**	
Number of Spec.	**19**	

$Average_{norm}$	**0.0087**	**28.650**
$Standard\ Dev._{norm}$		**1.488**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.193**
Min.	**0.0083**	**25.366**
Max.	**0.0089**	**31.687**
Number of Spec.		**19**


Laminate Open Hole Compression Properties (OHC1) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
20
40
60
80
0
1
2
3
4

4.21 Open Hole Compression 2 Properties

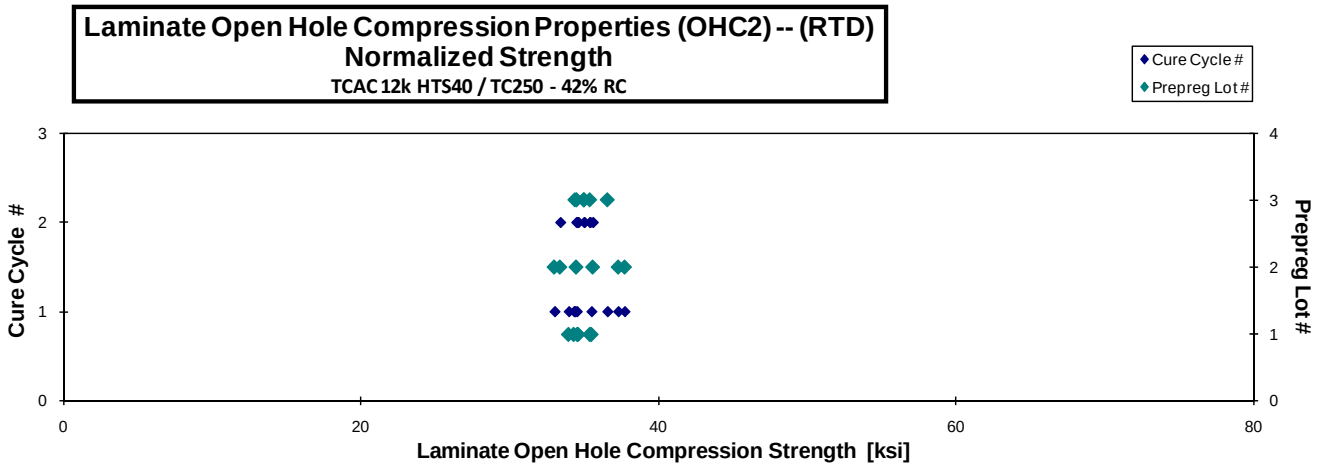
Laminate Open Hole Compression Properties (OHC2) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGHA115A	A	C1	1	1	32.210	0.179	20	LGM	0.0090	33.972
TGHA116A	A	C1	1	1	34.078	0.177	20	LGM	0.0089	35.505
TGHA117A	A	C1	1	1	33.329	0.175	20	LGM	0.0088	34.323
TGHA216A	A	C2	1	2	33.343	0.176	20	LGM/AGM	0.0088	34.569
TGHA217A	A	C2	1	2	33.709	0.175	20	LGM/AGM	0.0087	34.621
TGHA218A	A	C2	1	2	34.765	0.173	20	LGM/AGM	0.0087	35.406
TGHB116A	B	C1	2	1	36.056	0.178	20	LGM	0.0089	37.749
TGHB117A	B	C1	2	1	36.194	0.175	20	LGM	0.0088	37.316
TGHB118A	B	C1	2	1	32.862	0.171	20	LGM	0.0085	33.013
TGHB216A	B	C2	2	2	34.783	0.174	20	LGM	0.0087	35.598
TGHB217A	B	C2	2	2	34.336	0.171	20	LGM	0.0085	34.484
TGHB218A	B	C2	2	2	34.120	0.166	20	LGM	0.0083	33.394
TGHC115A	C	C1	3	1	34.690	0.179	20	LGM	0.0090	36.585
TGHC116A	C	C1	3	1	32.834	0.178	20	AGM	0.0089	34.405
TGHC117A	C	C1	3	1	33.492	0.175	20	AGM	0.0088	34.517
TGHC215A	C	C2	3	2	33.040	0.180	20	LGM	0.0090	35.012
TGHC216A	C	C2	3	2	33.337	0.179	20	LGM	0.0089	35.010
TGHC217A	C	C2	3	2	34.340	0.175	20	AGM	0.0088	35.404

Average	**33.973**	
Standard Dev.	**1.068**	
Coeff. of Var. [%]	**3.144**	
Min.	**32.210**	
Max.	**36.194**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**35.049**
$Standard\ Dev._{norm}$		**1.226**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**3.498**
Min.	**0.0083**	**33.013**
Max.	**0.0090**	**37.749**
Number of Spec.		**18**


Laminate Open Hole Compression Properties (OHC2) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Compression Strength [ksi]

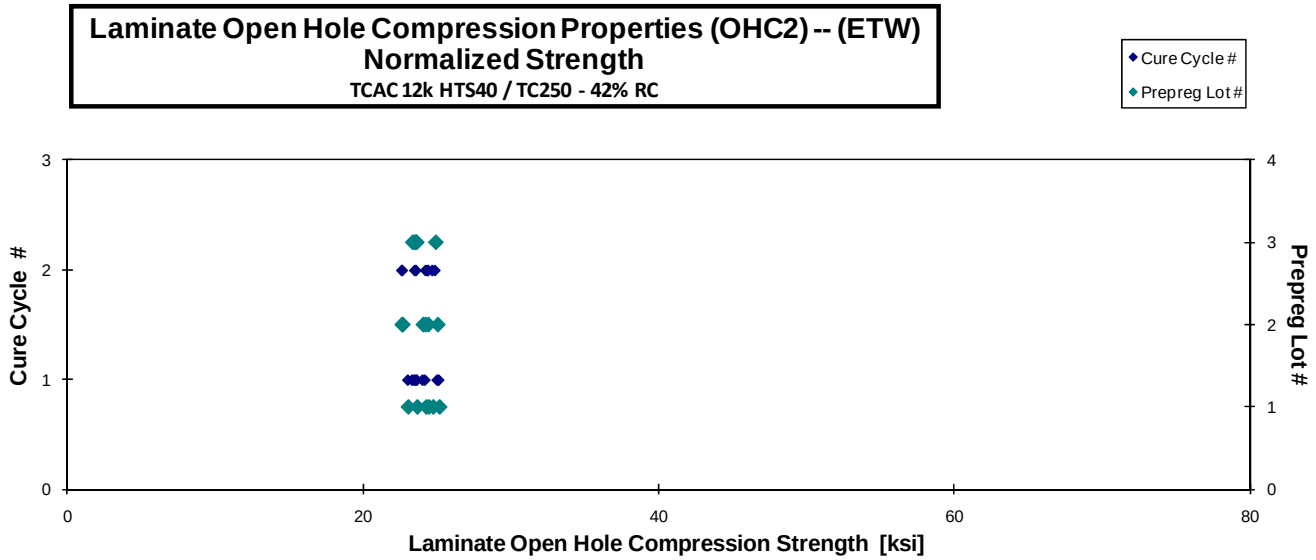
Laminate Open Hole Compression Properties (OHC2) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGHA111F	A	C1	1	1	23.083	0.170	20	LGM/AGM	0.0085	23.028
TGHA112F	A	C1	1	1	23.031	0.175	20	LGM/AGM	0.0087	23.643
TGHA113F	A	C1	1	1	23.776	0.180	20	LGM/AGM	0.0090	25.147
TGHA211F	A	C2	1	2	24.233	0.171	20	LGM	0.0086	24.423
TGHA212F	A	C2	1	2	23.735	0.174	20	LGM	0.0087	24.249
TGHA213F	A	C2	1	2	23.851	0.176	20	LGM	0.0088	24.711
TGHB111F	B	C1	2	1	24.987	0.170	20	LGM	0.0085	25.034
TGHB112F	B	C1	2	1	23.708	0.174	20	LGM	0.0087	24.201
TGHB113F	B	C1	2	1	23.116	0.177	20	LGM	0.0088	24.038
TGHB211F	B	C2	2	2	24.547	0.169	20	LGM	0.0084	24.391
TGHB212F	B	C2	2	2	22.371	0.172	20	LGM	0.0086	22.653
TGHB213F	B	C2	2	2	22.019	0.175	20	LGM	0.0087	22.613
TGHC111F	C	C1	3	1	23.448	0.170	20	MGM	0.0085	23.459
TGHC112F	C	C1	3	1	22.854	0.173	20	MGM	0.0087	23.323
TGHC113F	C	C1	3	1	22.656	0.177	20	MGM	0.0088	23.575
TGHC211F	C	C2	3	2	23.285	0.172	20	MGM	0.0086	23.501
TGHC212F	C	C2	3	2	22.968	0.175	20	MGM	0.0087	23.589
TGHC213F	C	C2	3	2	23.805	0.178	20	MGM	0.0089	24.892

	Strength [ksi]
Average	23.415
Standard Dev.	0.751
Coeff. of Var. [%]	3.206
Min.	22.019
Max.	24.987
Number of Spec.	18

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	0.0087	23.915
$Standard\ Dev._{norm}$		0.773
$Coeff.\ of\ Var.\ [\%]_{norm}$		3.231
Min.	0.0084	22.613
Max.	0.0090	25.147
Number of Spec.		18


Laminate Open Hole Compression Properties (OHC2) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
20
40
60
80
0
1
2
3
4

4.22 Open Hole Compression 3 Properties

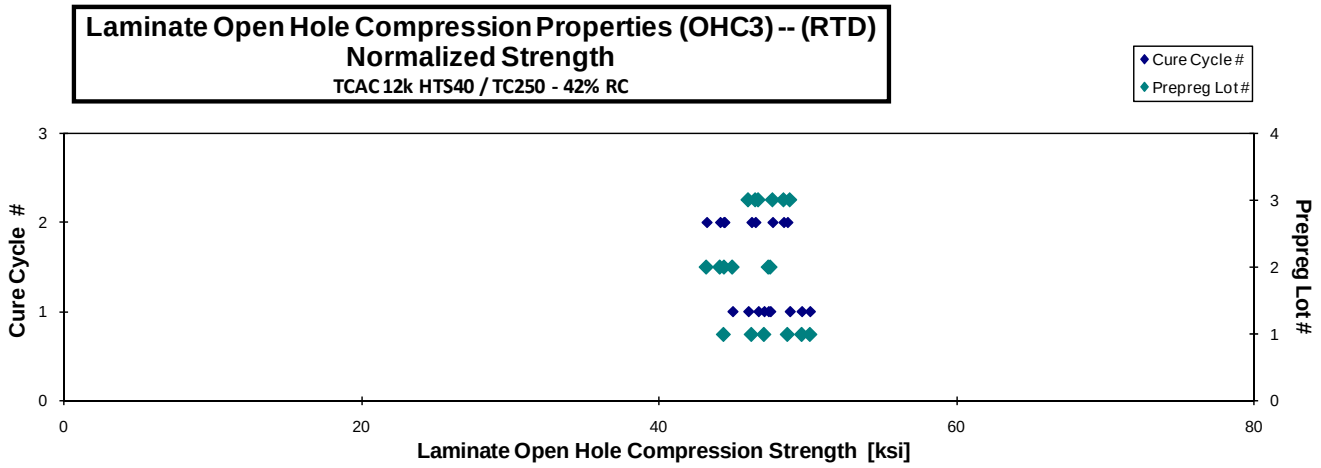
Laminate Open Hole Compression Properties (OHC3) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGIA115A	A	C1	1	1	47.624	0.179	20	LGM	0.0089	50.122
TGIA116A	A	C1	1	1	47.456	0.178	20	LGM	0.0089	49.568
TGIA117A	A	C1	1	1	45.693	0.175	20	LGM	0.0088	47.041
TGIA216A	A	C2	1	2	46.836	0.176	20	LGM	0.0088	48.613
TGIA217A	A	C2	1	2	45.107	0.174	20	LGM	0.0087	46.199
TGIA218A	A	C2	1	2	44.324	0.170	20	LGM	0.0085	44.337
TGIB116A	B	C1	2	1	43.286	0.176	20	LGM	0.0088	44.924
TGIB117A	B	C1	2	1	46.645	0.173	20	LGM	0.0086	47.464
TGIB118A	B	C1	2	1	46.985	0.171	20	LGM	0.0086	47.335
TGIB216A	B	C2	2	2	41.979	0.179	20	LGM	0.0089	44.086
TGIB217A	B	C2	2	2	41.568	0.177	20	LGM	0.0088	43.182
TGIB218A	B	C2	2	2	43.279	0.174	20	LGM	0.0087	44.374
TGIC115A	C	C1	3	1	43.716	0.181	20	LGM	0.0091	46.656
TGIC116A	C	C1	3	1	43.683	0.179	20	LGM	0.0089	45.982
TGIC117A	C	C1	3	1	47.167	0.176	20	LGM	0.0088	48.772
TGIC215A	C	C2	3	2	45.931	0.179	20	LGM	0.0089	48.354
TGIC216A	C	C2	3	2	44.397	0.178	20	LGM	0.0089	46.460
TGIC217A	C	C2	3	2	46.474	0.174	20	LGM	0.0087	47.613

Average	**45.119**	
Standard Dev.	**1.908**	
Coeff. of Var. [%]	**4.230**	
Min.	**41.568**	
Max.	**47.624**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**46.727**
$Standard\ Dev._{norm}$		**1.981**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**4.240**
Min.	**0.0085**	**43.182**
Max.	**0.0091**	**50.122**
Number of Spec.		**18**


Laminate Open Hole Compression Properties (OHC3) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
Laminate Open Hole Compression Strength [ksi]

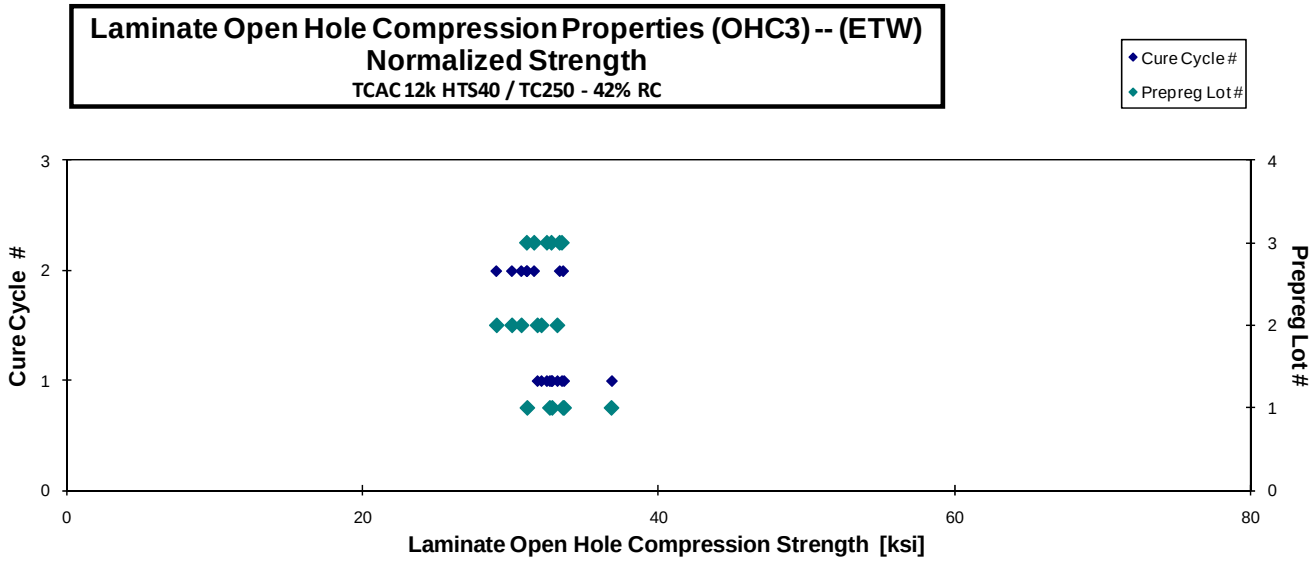
Laminate Open Hole Compression Properties (OHC3) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGIA111F	A	C1	1	1	36.755	0.171	20	LGM	0.0085	36.871
TGIA112F	A	C1	1	1	32.987	0.173	20	LGM	0.0087	33.650
TGIA113F	A	C1	1	1	31.625	0.177	20	LGM	0.0088	32.846
TGIA212F	A	C2	1	1	32.191	0.173	20	LGM	0.0086	32.684
TGIA213F	A	C2	1	2	30.055	0.176	20	LGM	0.0088	31.154
TGIA214F	A	C2	1	2	32.160	0.178	20	LGM	0.0089	33.582
TGIB111F	B	C1	2	1	31.878	0.170	20	LGM	0.0085	31.850
TGIB112F	B	C1	2	1	32.576	0.173	20	LGM	0.0087	33.199
TGIB113F	B	C1	2	1	31.017	0.176	20	LGM	0.0088	32.121
TGIB211F	B	C2	2	2	30.042	0.170	20	LGM	0.0085	30.121
TGIB212F	B	C2	2	2	28.357	0.174	20	LGM	0.0087	29.071
TGIB213F	B	C2	2	2	29.469	0.177	20	LGM	0.0089	30.757
TGIC111F	C	C1	3	1	33.160	0.172	20	LGM	0.0086	33.505
TGIC112F	C	C1	3	1	31.312	0.176	20	LGM	0.0088	32.485
TGIC113F	C	C1	3	1	30.907	0.180	20	LGM	0.0090	32.792
TGIC211F	C	C2	3	2	33.527	0.169	20	LGM	0.0085	33.349
TGIC212F	C	C2	3	2	30.508	0.173	20	LGM	0.0087	31.118
TGIC213F	C	C2	3	2	30.163	0.178	20	LGM	0.0089	31.621

Average	**31.594**
Standard Dev.	**1.885**
Coeff. of Var. [%]	**5.965**
Min.	**28.357**
Max.	**36.755**
Number of Spec.	**18**

$Average_{norm}$	**0.0087**	**32.376**
$Standard\ Dev._{norm}$		**1.703**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.259**
Min.	**0.0085**	**29.071**
Max.	**0.0090**	**36.871**
Number of Spec.		**18**


Laminate Open Hole Compression Properties (OHC3) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
20
40
60
80
0
1
2
3
4

4.23 Filled-Hole Compression 1 Properties

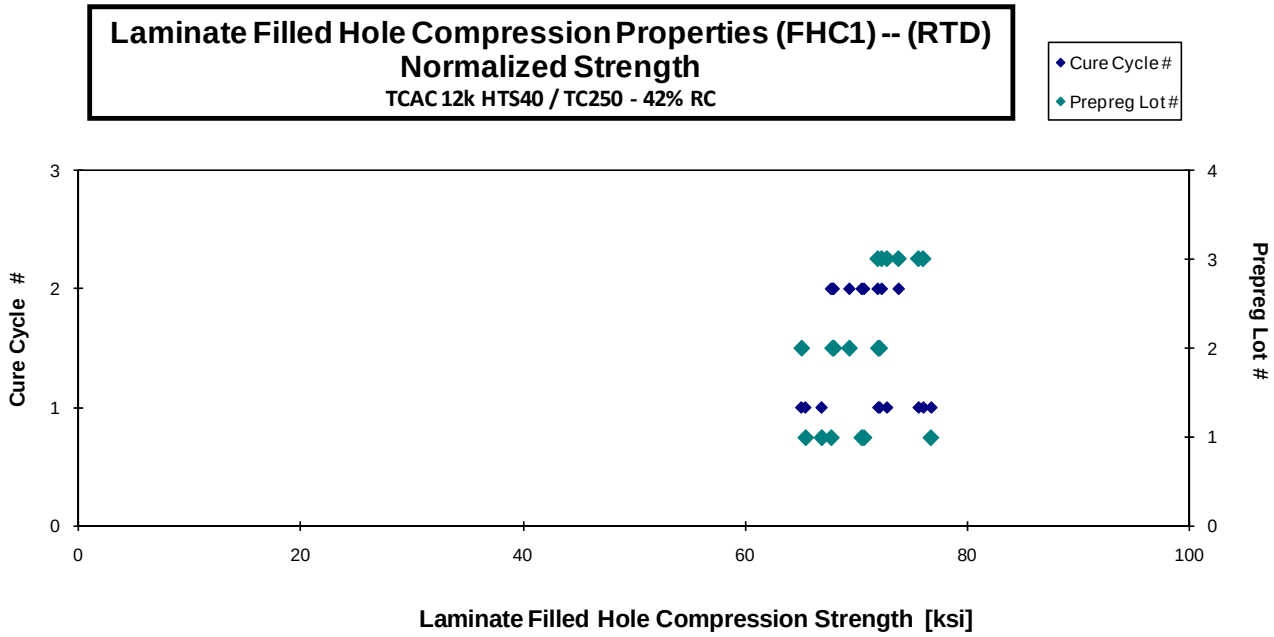
Laminate Filled Hole Compression Properties (FHC1) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG7A115A	A	C1	1	1	64.309	0.177	20	LGO	0.0088	66.875
TG7A116A	A	C1	1	1	63.317	0.176	20	LGF	0.0088	65.415
TG7A117A	A	C1	1	1	75.644	0.173	20	LGF	0.0086	76.756
TG7A215A	A	C2	1	2	64.773	0.178	20	LGF	0.0089	67.732
TG7A216A	A	C2	1	2	68.471	0.176	20	LGF	0.0088	70.699
TG7A217A	A	C2	1	2	68.983	0.174	20	LGF	0.0087	70.491
TG7B116A	B	C1	2	1	69.245	0.177	20	LGF	0.0089	72.110
TG7B117A	B	C1	2	1	69.698	0.176	20	LGF	0.0088	71.994
TG7B118A	B	C1	2	1	63.817	0.173	20	LGF	0.0087	65.050
TG7B215A	B	C2	2	2	64.499	0.179	20	LGF	0.0090	67.964
TG7B216A	B	C2	2	2	64.568	0.179	20	LGF	0.0089	67.854
TG7B217A	B	C2	2	2	66.625	0.177	20	LGF	0.0089	69.382
TG7C115A	C	C1	3	1	67.794	0.182	20	LGF	0.0091	72.766
TG7C116A	C	C1	3	1	71.418	0.181	20	LGF	0.0091	76.047
TG7C117A	C	C1	3	1	72.284	0.178	20	LGF	0.0089	75.621
TG7C215A	C	C2	3	2	69.009	0.182	20	MGF	0.0091	73.819
TG7C216A	C	C2	3	2	68.407	0.180	20	LGF	0.0090	72.297
TG7C217A	C	C2	3	2	68.614	0.178	20	LGF	0.0089	71.937

Average	67.860	
Standard Dev.	3.296	
Coeff. of Var. [%]	4.858	
Min.	63.317	
Max.	75.644	
Number of Spec.	18	

$Average_{norm}$	0.0089	70.823
$Standard\ Dev._{norm}$		3.528
$Coeff.\ of\ Var.\ [\%]_{norm}$		4.982
Min.	0.0086	65.050
Max.	0.0091	76.756
Number of Spec.		18


Laminate Filled Hole Compression Properties (FHC1) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Compression Strength [ksi]

Laminate Filled Hole Compression Properties (FHC1) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

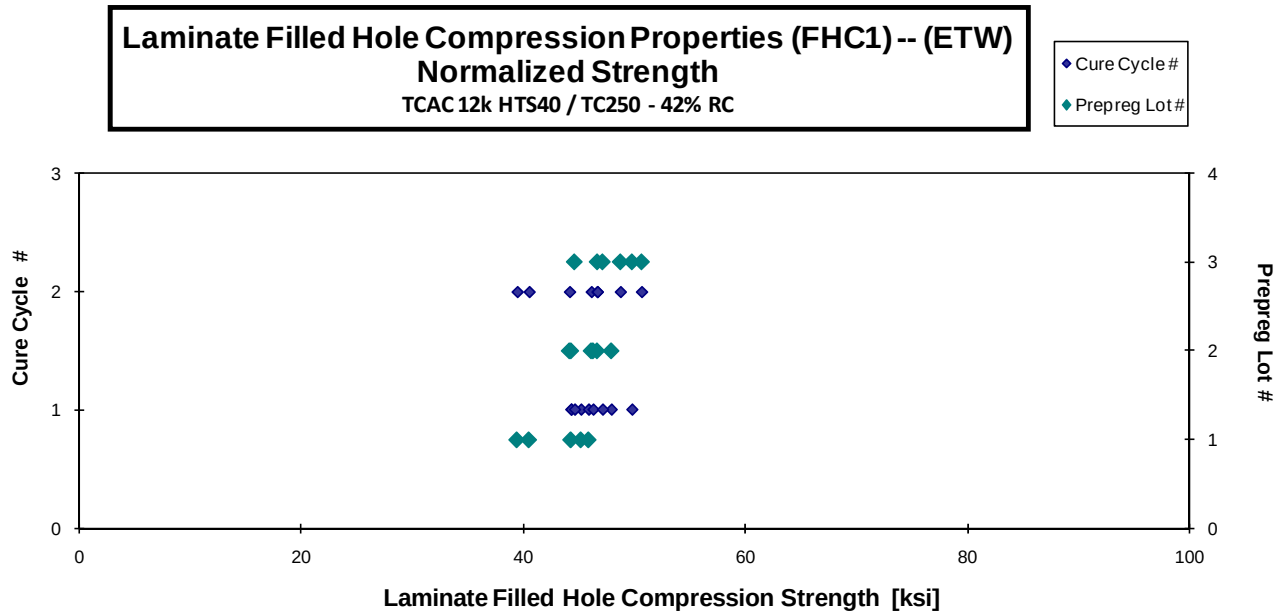
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG7A112F	A	C1	1	1	44.359	0.173	20	LGF	0.0087	45.211
TG7A113F	A	C1	1	1	43.884	0.178	20	LGF	0.0089	45.898
TG7A114F	A	C1	1	1	42.190	0.179	20	LGF	0.0089	44.304
TG7A212F	A	C2	1	2	39.891	0.173	20	LGF	0.0086	40.512
TG7A213F	A	C2	1	2	38.123	0.176	20	LGF	0.0088	39.427
TG7A214F*	A	C2	1	2		0.178	20	FAILED AT TAB	0.0089	
TG7B111F	B	C1	2	1	47.233	0.173	20	LGF	0.0086	47.960
TG7B112F	B	C1	2	1	43.411	0.174	20	LGF	0.0087	44.322
TG7B113F	B	C1	2	1	44.815	0.176	20	LGF	0.0088	46.313
TG7B211F	B	C2	2	2	45.758	0.171	20	LGO/MGM	0.0086	46.153
TG7B212F	B	C2	2	2	44.915	0.177	20	LGF	0.0088	46.681
TG7B213F	B	C2	2	2	41.941	0.179	20	LGM/LGO	0.0090	44.178
TG7C111F	C	C1	3	1	44.333	0.171	20	LGM	0.0086	44.633
TG7C112F	C	C1	3	1	48.426	0.175	20	LGM	0.0087	49.832
TG7C113F	C	C1	3	1	44.735	0.179	20	LGM	0.0090	47.169
TG7C211F	C	C2	3	2	45.467	0.175	20	LGM	0.0087	46.697
TG7C212F	C	C2	3	2	48.867	0.176	20	LGM	0.0088	50.707
TG7C213F	C	C2	3	2	45.979	0.180	20	LGM	0.0090	48.787

*** Strength removed due to bad failure observed**

Average	**44.372**	
Standard Dev.	**2.763**	
Coeff. of Var. [%]	**6.226**	
Min.	**38.123**	
Max.	**48.867**	
Number of Spec.	**17**	

$Average_{norm}$	**0.0088**	**45.811**
$Standard\ Dev._{norm}$		**2.906**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**6.343**
Min.	**0.0086**	**39.427**
Max.	**0.0090**	**50.707**
Number of Spec.		**17**


Laminate Filled Hole Compression Properties (FHC1) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Compression Strength [ksi]
0
20
40
60
80
100
0
1
2
3
4

4.24 Filled-Hole Compression 2 Properties

Laminate Filled Hole Compression Properties (FHC2) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

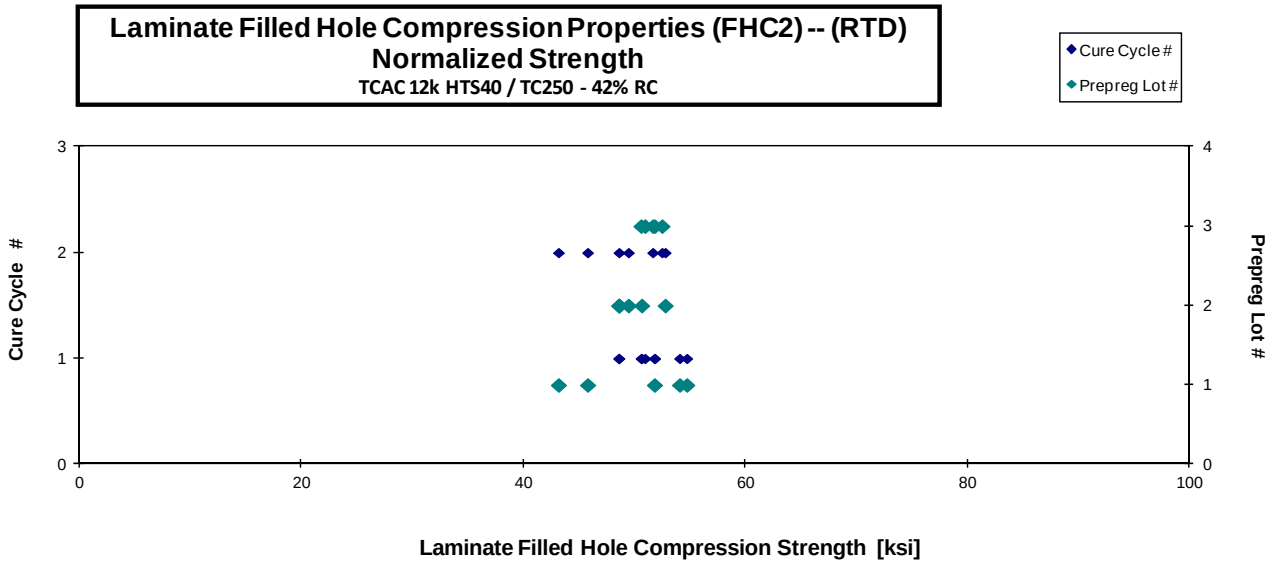
normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG8A116A	A	C1	1	1	52.783	0.176	20	LGF	0.0088	54.771
TG8A117A	A	C1	1	1	52.589	0.175	20	LGF	0.0087	54.120
TG8A118A	A	C1	1	1	51.066	0.173	20	LGF	0.0086	51.862
TG8A216A	A	C2	1	2	40.373	0.182	20	LGF	0.0091	43.211
TG8A217A	A	C2	1	2	43.893	0.178	20	LGF	0.0089	45.838
TG8A218A*	A	C2	1	2		0.173	20	BAD FAILURE	0.0087	
TG8B115A	B	C1	2	1	46.733	0.177	20	LGF	0.0089	48.662
TG8B117A	B	C1	2	1	48.122	0.179	20	LGF	0.0090	50.708
TG8B118A	B	C1	2	1	47.739	0.173	20	LGF	0.0087	48.637
TG8B216A	B	C2	2	2	50.432	0.178	20	LGF	0.0089	52.830
TG8B217A	B	C2	2	2	47.981	0.175	20	LGF	0.0088	49.514
TG8B218A	B	C2	2	2	48.175	0.172	20	LGF	0.0086	48.666
TG8C116A	C	C1	3	1	48.996	0.180	20	MGF	0.0090	51.868
TG8C117A	C	C1	3	1	49.035	0.177	20	MGF	0.0088	51.001
TG8C118A	C	C1	3	1	49.570	0.174	20	MGF / LGF	0.0087	50.649
TG8C216A*	C	C2	3	2		0.180	20	LIB	0.0090	
TG8C217A	C	C2	3	2	50.640	0.176	20	LGM	0.0088	52.537
TG8C218A	C	C2	3	2	50.805	0.173	20	LGF	0.0086	51.696

*** Strength removed due to bad failure mode observed**

Average	**48.683**	
Standard Dev.	**3.140**	
Coeff. of Var. [%]	**6.450**	
Min.	**40.373**	
Max.	**52.783**	
Number of Spec.	**16**	

$Average_{norm}$	**0.0088**	**50.411**
$Standard\ Dev._{norm}$		**2.970**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.891**
Min.	**0.0086**	**43.211**
Max.	**0.0091**	**54.771**
Number of Spec.		**16**


Laminate Filled Hole Compression Properties (FHC2) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Compression Strength [ksi]

Laminate Filled Hole Compression Properties (FHC2) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

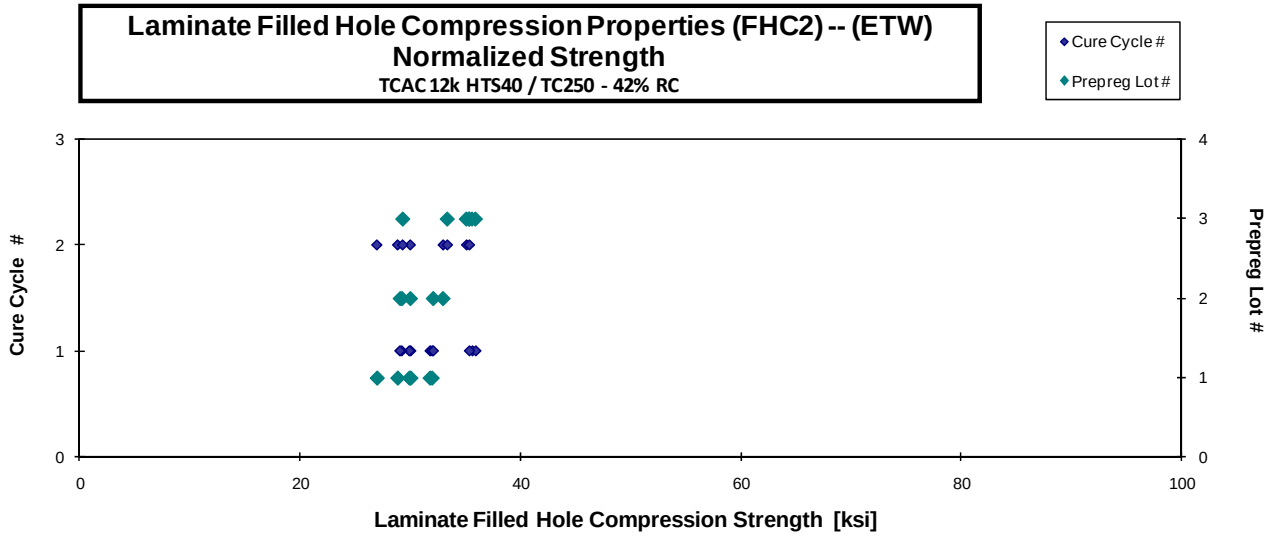
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG8A111F	A	C1	1	1	31.478	0.172	20	LGF	0.0086	31.802
TG8A112F	A	C1	1	1	29.637	0.172	20	LGF	0.0086	30.049
TG8A113F	A	C1	1	1	29.109	0.175	20	LGF	0.0087	29.929
TG8A114F	A	C1	1	1	30.674	0.177	20	LGF	0.0089	31.988
TG8A211F*	A	C2	1	2		0.175	20	FAILED AT TAB	0.0088	
TG8A212F	A	C2	1	2	27.280	0.180	20	LGO	0.0090	28.866
TG8A213F	A	C2	1	2	25.055	0.183	20	LGF	0.0092	26.993
TG8B112F	B	C1	2	1	31.730	0.172	20	LGF	0.0086	32.085
TG8B113F	B	C1	2	1	28.611	0.174	20	LGF	0.0087	29.247
TG8B114F	B	C1	2	1	28.072	0.176	20	LGF	0.0088	29.079
TG8B211F	B	C2	2	2	32.774	0.171	20	LGF	0.0086	32.973
TG8B212F	B	C2	2	2	29.147	0.175	20	LGF	0.0088	30.008
TG8B213F	B	C2	3	2	28.145	0.177	20	LGF	0.0089	29.315
TG8C111F	C	C1	3	1	34.445	0.176	20	LGF	0.0088	35.614
TG8C112F	C	C1	3	1	34.434	0.177	20	LGF	0.0089	35.916
TG8C113F**	C	C1	3	1		0.178	20		0.0089	
TG8C114F	C	C1	3	1	33.262	0.181	20	LGF	0.0090	35.346
TG8C211F**	C	C2	3	2		0.172	20		0.0086	
TG8C212F	C	C2	3	2	34.197	0.174	20	LGF	0.0087	35.089
TG8C213F	C	C2	3	2	33.910	0.177	20	LGF	0.0089	35.343
TG8C214F	C	C2	3	2	31.595	0.179	20	LGF	0.0090	33.354

*** Strength removed due to bad failure mode observed**

**** Strength is not reported as unacceptable failure modes was observed**

Average	**30.753**	
Standard Dev.	**2.778**	
Coeff. of Var. [%]	**9.034**	
Min.	**25.055**	
Max.	**34.445**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**31.833**
$Standard\ Dev._{norm}$		**2.796**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**8.784**
Min.	**0.0086**	**26.993**
Max.	**0.0092**	**35.916**
Number of Spec.		**18**


Laminate Filled Hole Compression Properties (FHC2) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Compression Strength [ksi]

4.25 Filled-Hole Compression 3 Properties

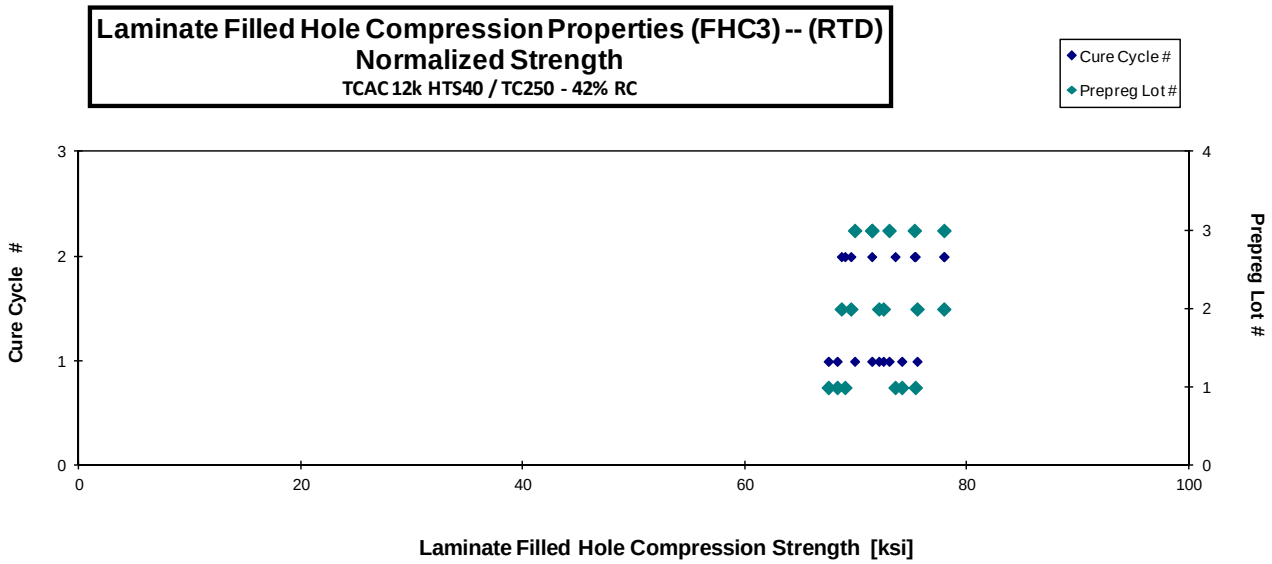
Laminate Filled Hole Compression Properties (FHC3) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]
0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG9A116A	A	C1	1	1	70.869	0.178	20	LGF	0.0089	74.114
TG9A117A	A	C1	1	1	66.665	0.174	20	LGF	0.0087	68.292
TG9A118A	A	C1	1	1	66.905	0.172	20	LGF	0.0086	67.496
TG9A216A	A	C2	1	2	69.309	0.180	20	LGF	0.0090	73.515
TG9A217A	A	C2	1	2	66.706	0.176	20	LGF	0.0088	68.989
TG9A218A	A	C2	1	2	75.304	0.170	20	LGF	0.0085	75.333
TG9B116A	B	C1	2	1	69.195	0.177	20	LGF	0.0089	72.045
TG9B117A	B	C1	2	1	72.194	0.178	20	LGF	0.0089	75.492
TG9B118A	B	C1	2	1	70.777	0.174	20	LGF	0.0087	72.449
TG9B216A	B	C2	2	2	66.569	0.178	20	LGF	0.0089	69.525
TG9B217A	B	C2	2	2	66.706	0.175	20	LGF	0.0088	68.674
TG9B218A	B	C2	2	2	77.209	0.172	20	LGF	0.0086	77.905
TG9C116A	C	C1	3	1	66.874	0.178	20	LGF	0.0089	69.870
TG9C117A	C	C1	3	1	69.081	0.176	20	LGF	0.0088	71.417
TG9C118A	C	C1	3	1	70.981	0.175	20	LGF	0.0087	72.971
TG9C216A	C	C2	3	2	74.461	0.178	20	LGF	0.0089	77.914
TG9C217A	C	C2	3	2	72.584	0.176	20	LGF	0.0088	75.246
TG9C218A	C	C2	3	2	70.042	0.173	20	LGF	0.0087	71.408

Average	**70.135**	
Standard Dev.	**3.249**	
Coeff. of Var. [%]	**4.632**	
Min.	**66.569**	
Max.	**77.209**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**72.370**
$Standard\ Dev._{norm}$		**3.205**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**4.429**
Min.	**0.0085**	**67.496**
Max.	**0.0090**	**77.914**
Number of Spec.		**18**


Laminate Filled Hole Compression Properties (FHC3) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Compression Strength [ksi]

Laminate Filled Hole Compression Properties (FHC3) -- (ETW)
Strength
TCAC 12k HTS40 / TC250 - 42% RC

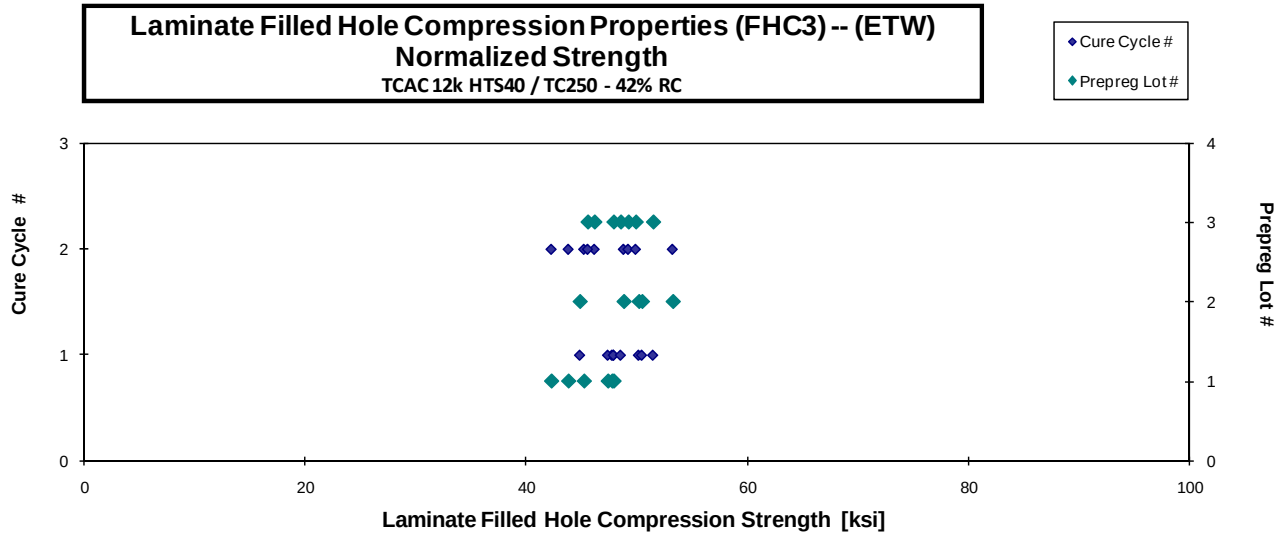
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TG9A111F	A	C1	1	1	46.310	0.175	20	LGM	0.0088	47.781
TG9A112F*	A	C1	1	1		0.178	20	FAILED AT TAB	0.0089	
TG9A113F	A	C1	1	1	45.164	0.180	20	LGM	0.0090	47.923
TG9A114F	A	C1	1	1	44.642	0.181	20	LGM	0.0090	47.404
TG9A211F	A	C2	1	2	44.971	0.171	20	LGO/LGM	0.0086	45.245
TG9A212F	A	C2	1	2	41.123	0.175	20	LGM	0.0087	42.292
TG9A213F	A	C2	1	2	41.827	0.178	20	LGF	0.0089	43.832
TG9B111F	B	C1	2	1	49.374	0.173	20	LGF	0.0086	50.192
TG9B112F	B	C1	2	1	48.141	0.178	20	LGF	0.0089	50.482
TG9B113F	B	C1	2	1	43.280	0.176	20	LGF	0.0088	44.871
TG9B211F	B	C2	2	2	52.516	0.172	20	LGM	0.0086	53.263
TG9B212F	B	C2	2	2	48.133	0.172	20	LGF	0.0086	48.831
TG9B213F	B	C2	3	2	44.634	0.176	20	LGO	0.0088	46.187
TG9C113F	C	C1	3	1	49.436	0.177	20	LGM	0.0089	51.486
TG9C114F	C	C1	3	1	45.775	0.178	20	LGM	0.0089	47.916
TG9C115F	C	C1	3	1	46.330	0.178	20	LGM	0.0089	48.560
TG9C213F	C	C2	3	2	47.296	0.177	20	LGM	0.0089	49.248
TG9C214F	C	C2	3	2	43.385	0.179	20	LGM	0.0089	45.584
TG9C215F	C	C2	3	2	47.080	0.180	20	LGM	0.0090	49.923

*** Strength removed due to bad failure mode observed**

Average	**46.079**	
Standard Dev.	**2.856**	
Coeff. of Var. [%]	**6.199**	
Min.	**41.123**	
Max.	**52.516**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0088**	**47.834**
$Standard\ Dev._{norm}$		**2.802**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.858**
Min.	**0.0086**	**42.292**
Max.	**0.0090**	**53.263**
Number of Spec.		**18**


Laminate Filled Hole Compression Properties (FHC3) -- (ETW)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
Laminate Filled Hole Compression Strength [ksi]

4.26 Single Shear Bearing 1 Properties

Laminate Single Shear Bearing Properties (SSB1) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

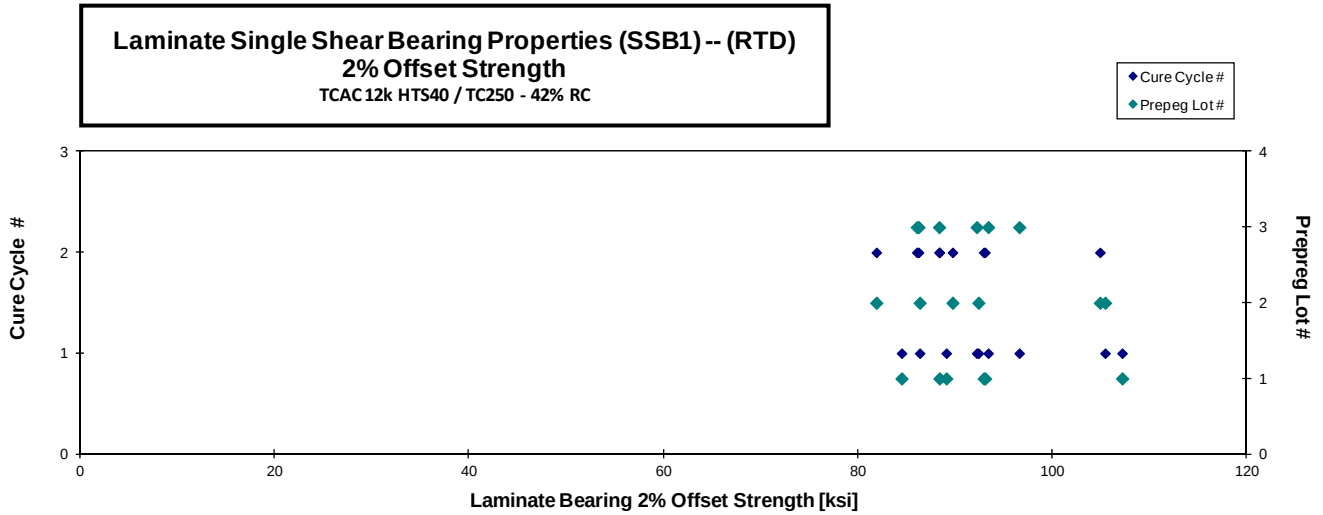
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
TG1A117A	A	C1	1	1	106.363		0.069	8	B1I / 2% OFFSET FOR UBS	0.0086	107.17	
TG1A118A	A	C1	1	1	88.863		0.065	8	B1I / 2% OFFSET FOR UBS	0.0081	84.49	
TG1A11AA	A	C1	1	1	91.023		0.067	8	B1I / 2% OFFSET FOR UBS	0.0083	89.08	
TG1A217A	A	C2	1	2	87.331		0.069	8	B1I / 2% OFFSET FOR UBS	0.0086	88.38	
TG1A218A	A	C2	1	2	97.872		0.065	8	B1I / 2% OFFSET FOR UBS	0.0081	92.93	
TG1A219A	A	C2	1	2	94.436		0.067	8	B1I / 2% OFFSET FOR UBS	0.0084	93.07	
TG1B118A	B	C1	2	1	86.011		0.068	8	B1I / 2% OFFSET FOR UBS	0.0085	86.35	
TG1B119A	B	C1	2	1	90.699		0.069	8	B1I / 2% OFFSET FOR UBS	0.0087	92.39	
TG1B11AA	B	C1	2	1	99.579		0.072	8	B1I / 2% OFFSET FOR UBS	0.0090	105.41	
TG1B217A	B	C2	2	2	104.526		0.068	8	B1I / 2% OFFSET FOR UBS	0.0085	104.89	
TG1B218A	B	C2	2	2	86.957		0.064	8	B1I / 2% OFFSET FOR UBS	0.0080	81.88	
TG1B219A	B	C2	2	2	89.876		0.068	8	B1I / 2% OFFSET FOR UBS	0.0085	89.72	
TG1C117A	C	C1	3	1	96.419	127.097	0.066	8	B1I	0.0082	93.39	123.11
TG1C118A	C	C1	3	1	96.709	115.148	0.068	8	B1I	0.0085	96.59	115.01
TG1C119A	C	C1	3	1	90.787	105.690	0.069	8	B1I	0.0086	92.21	107.35
TG1C217A	C	C2	3	2	92.026	113.691	0.064	8	B1I	0.0080	86.23	106.53
TG1C219A	C	C2	3	2	90.378	122.222	0.065	8	B1I	0.0081	86.06	116.38
TG1C21BA	C	C2	3	2	89.374	117.438	0.067	8	B1I	0.0084	88.34	116.09

Batch A and B RTD tests were stopped soon after 2% offset was obtained.

Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)

Average	**93.290**	**116.881**	**0.067**	**Average**	**0.0084**	**92.144**	**114.077**
Standard Dev.	**5.861**	**7.370**		**Standard Dev.**		**7.278**	**6.229**
Coeff. of Var. [%]	**6.282**	**6.306**		**Coeff. of Var. [%]**		**7.898**	**5.461**
Min.	**86.011**	**105.690**	**0.064**	**Min.**	**0.0080**	**81.884**	**106.530**
Max.	**106.363**	**127.097**	**0.072**	**Max.**	**0.0090**	**107.171**	**123.110**
Number of Spec.	**18**	**6**	**18**	**Number of Spec.**	**18**	**18**	**6**


Laminate Single Shear Bearing Properties (SSB1) -- (RTD)
2% Offset Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepeg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Bearing 2% Offset Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4

Laminate Single Shear Bearing Properties (SSB1) -- (ETW) Strength

TCAC 12k HTS40 / TC250 - 42% RC

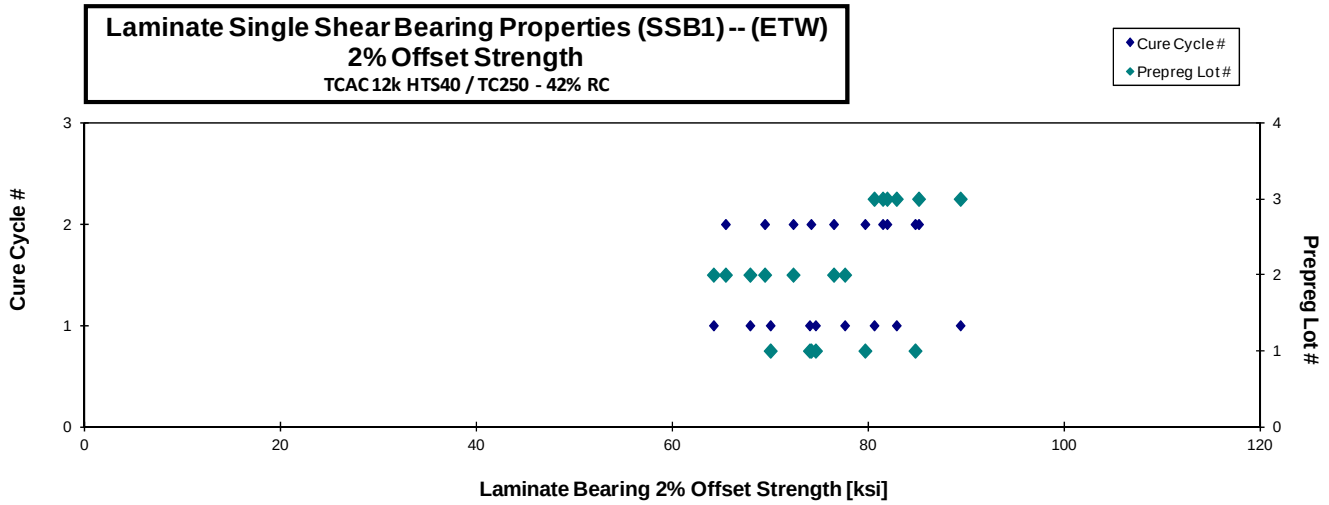
normalizing t_{ply} [in]: 0.0085

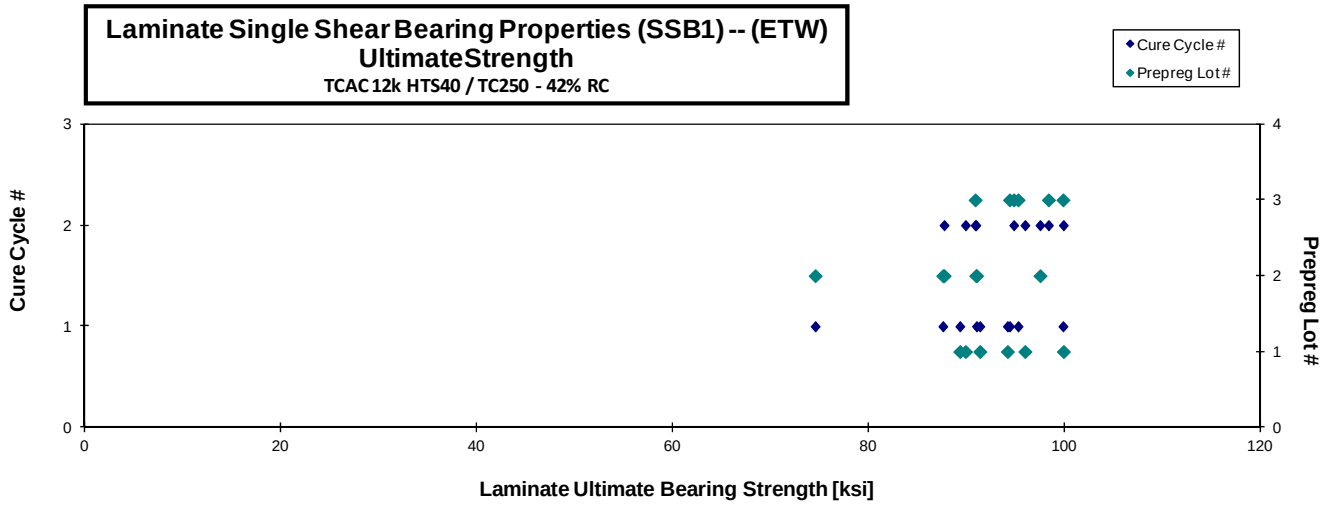
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
TG1A111F	A	C1	1	1	71.677	86.561	0.070	8	B1I	0.0088	73.91	89.26
TG1A112F	A	C1	1	1	66.228	86.502	0.072	8	B1I	0.0090	69.90	91.29
TG1A113F	A	C1	1	1	69.078	87.243	0.073	8	B1I	0.0092	74.51	94.11
TG1A211F	A	C2	1	2	88.814	100.580	0.065	8	B1I	0.0081	84.68	95.90
TG1A212F	A	C2	1	2	77.974	97.832	0.069	8	B1I	0.0087	79.56	99.82
TG1A213F	A	C2	1	2	69.552	84.363	0.072	8	B1I	0.0091	74.05	89.82
TG1B111F	B	C1	2	1	71.863	83.510	0.061	8	B1I	0.0076	64.10	74.48
TG1B112F	B	C1	2	1	76.690	90.001	0.069	8	B1I	0.0086	77.50	90.95
TG1B113F	B	C1	2	1	73.403	94.717	0.063	8	B1I	0.0079	67.83	87.52
TG1B211F	B	C2	2	2	76.307	97.368	0.068	8	B1I	0.0085	76.36	97.44
TG1B212F	B	C2	2	2	70.237	92.083	0.067	8	B1I	0.0084	69.32	90.89
TG1B213F*	B	C2	2	2	67.265		0.073	8		0.0091	72.23	
TG1B214F	B	C2	2	2	69.460	93.195	0.064	8	B1I	0.0080	65.32	87.64
TG1C111F	C	C1	3	1	82.047	98.905	0.069	8	B1I	0.0086	82.77	99.78
TG1C112F	C	C1	3	1	76.539	89.691	0.072	8	B1I	0.0089	80.50	94.33
TG1C113F	C	C1	3	1	84.000	89.551	0.072	8	B1I	0.0090	89.29	95.19
TG1C211F	C	C2	3	2	85.820	99.197	0.067	8	B1I	0.0084	85.04	98.30
TG1C212F	C	C2	3	2	81.449	90.905	0.068	8	B1I	0.0085	81.37	90.82
TG1C213F	C	C2	3	2	79.567	92.152	0.070	8	B1I	0.0087	81.81	94.75

Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)

* Failure mode unknown due to tester error while removing the specimen after testing. Therefore the ultimate bearing strength is omitted.

Average	**75.683**	**91.909**	**0.069**	**Average**	**0.0086**	**76.318**	**92.349**
Standard Dev.	**6.609**	**5.280**	**0.004**	**Standard Dev.**		**7.088**	**5.911**
Coeff. of Var. [%]	**8.733**	**5.745**	**5.209**	**Coeff. of Var. [%]**		**9.288**	**6.400**
Min.	**66.228**	**83.510**	**0.061**	**Min.**	**0.0076**	**64.096**	**74.483**
Max.	**88.814**	**100.580**	**0.073**	**Max.**	**0.0092**	**89.291**	**99.822**
Number of Spec.	**19**	**18**	**19**	**Number of Spec.**	**19**	**19**	**18**


Laminate Single Shear Bearing Properties (SSB1) -- (ETW)
2% Offset Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
Laminate Bearing 2% Offset Strength [ksi]


Laminate Single Shear Bearing Properties (SSB1) -- (ETW)
UltimateStrength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
Laminate Ultimate Bearing Strength [ksi]

4.27 Single Shear Bearing 2 Properties

Laminate Single Shear Bearing Properties (SSB2) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

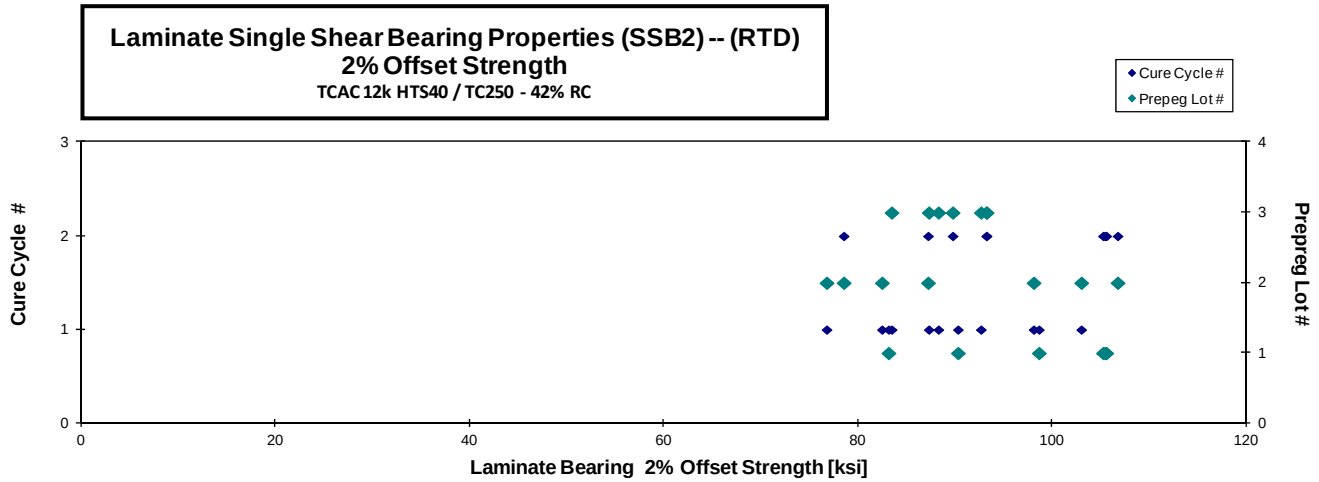
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
TG2A117A	A	C1	1	1	96.024		0.087	10	B1I / 2% OFFSET FOR UBS	0.0087	98.75	
TG2A118A	A	C1	1	1	88.450		0.080	10	B1I / 2% OFFSET FOR UBS	0.0080	83.26	
TG2A119A	A	C1	1	1	92.013		0.084	10	B1I / 2% OFFSET FOR UBS	0.0084	90.41	
TG2A217A	A	C2	1	2	113.717		0.079	10	B1I / 2% OFFSET FOR UBS	0.0079	105.36	
TG2A218A	A	C2	1	2	105.175		0.085	10	B1I / 2% OFFSET FOR UBS	0.0085	105.69	
TG2A219A	A	C2	1	2	99.228		0.090	10	B1I / 2% OFFSET FOR UBS	0.0090	105.53	
TG2B117A	B	C1	2	1	90.519		0.078	10	B1I / 2% OFFSET FOR UBS	0.0078	82.59	
TG2B118A	B	C1	2	1	97.844		0.085	10	B1I / 2% OFFSET FOR UBS	0.0085	98.21	
TG2B119A	B	C1	2	1	97.637		0.090	10	B1I / 2% OFFSET FOR UBS	0.0090	103.11	
TG2B11AA	B	C1	2	1	72.922		0.090	10	B1I / 2% OFFSET FOR UBS	0.0090	76.88	
TG2B217A	B	C2	2	2	85.965		0.086	10	B1I / 2% OFFSET FOR UBS	0.0086	87.33	
TG2B218A	B	C2	2	2	82.702		0.081	10	B1I / 2% OFFSET FOR UBS	0.0081	78.65	
TG2B21AA	B	C2	2	2	106.048		0.086	10	B1I / 2% OFFSET FOR UBS	0.0086	106.86	
TG2C117A	C	C1	3	1	94.326	123.643	0.075	10	B1I	0.0075	83.58	109.56
TG2C118A	C	C1	3	1	94.093	123.882	0.079	10	B1I	0.0079	87.41	115.09
TG2C119A	C	C1	3	1	91.536	122.735	0.082	10	B1I	0.0082	88.39	118.52
TG2C11AA	C	C1	3	1	93.860	116.539	0.084	10	B1I	0.0084	92.77	115.19
TG2C217A	C	C2	3	2	101.973	129.090	0.078	10	B1I	0.0078	93.33	118.16
TG2C218A	C	C2	3	2	96.957	120.434	0.079	10	B1I	0.0079	89.87	111.63
TG2C219A	C	C2	3	2	98.820	123.283	0.080	10	B1I	0.0080	93.36	116.47

Batch A and B RTD tests were stopped soon after 2% offset was obtained.

Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)

	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]
Average	**94.990**	**122.801**	**0.083**
Standard Dev.	**8.837**	**3.797**	**0.004**
Coeff. of Var. [%]	**9.303**	**3.092**	**5.423**
Min.	**72.922**	**116.539**	**0.075**
Max.	**113.717**	**129.090**	**0.090**
Number of Spec.	**20**	**7**	**20**

	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
Average	**0.008**	**92.568**	**114.944**
Standard Dev.	**0.000**	**9.405**	**3.305**
Coeff. of Var. [%]	**5.423**	**10.160**	**2.876**
Min.	**0.008**	**76.883**	**109.558**
Max.	**0.009**	**106.858**	**118.524**
Number of Spec.	**20**	**20**	**7**


Laminate Single Shear Bearing Properties (SSB2) -- (RTD)
2% Offset Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepeg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Bearing 2% Offset Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4

Laminate Single Shear Bearing Properties (SSB2) -- (ETW) Strength

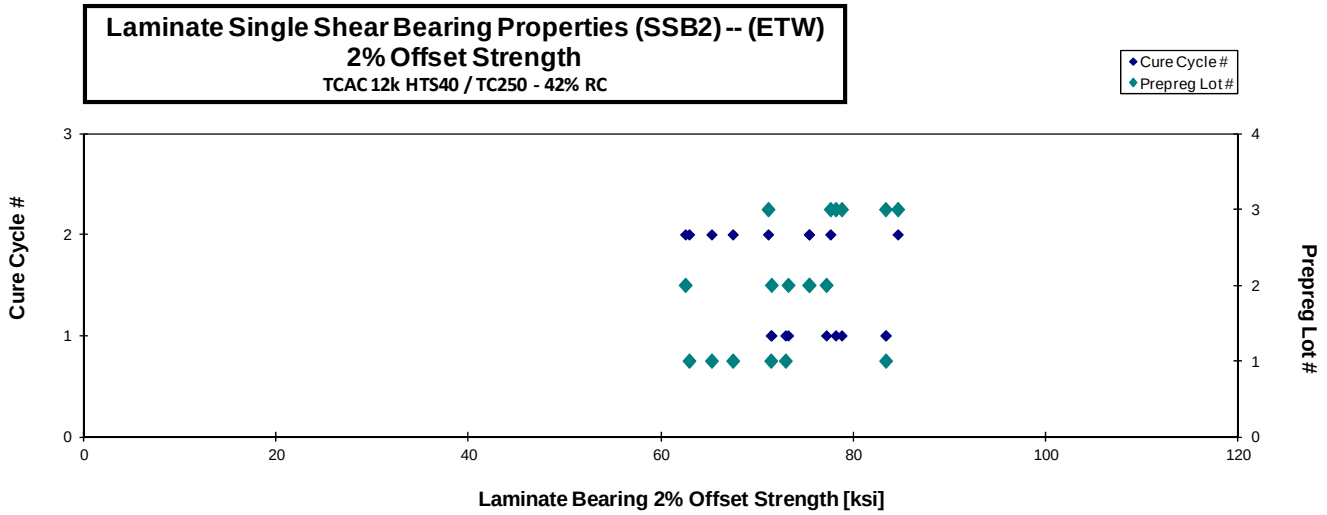
TCAC 12k HTS40 / TC250 - 42% RC

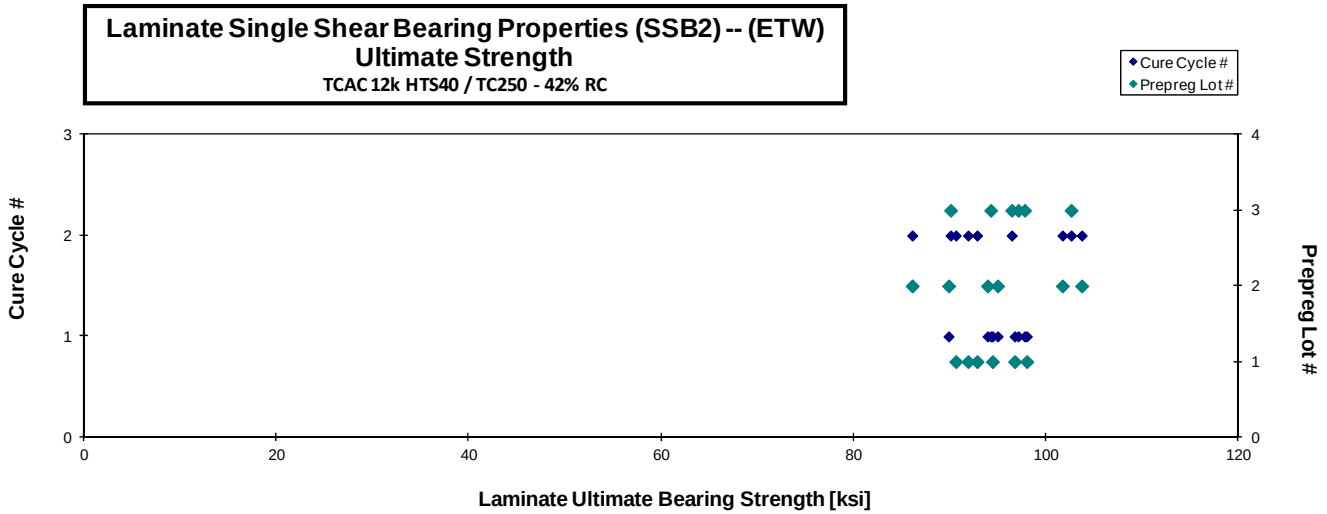
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
TG2A111F	A	C1	1	1	72.371	93.733	0.086	10	B1I	0.0086	72.95	94.49
TG2A112F	A	C1	1	1	67.153	90.987	0.090	10	B1I	0.0090	71.43	96.79
TG2A113F	A	C1	1	1	77.044	90.604	0.092	10	B1I	0.0092	83.37	98.05
TG2A211F	A	C2	1	2	65.610	94.522	0.082	10	B1I	0.0082	62.93	90.67
TG2A212F	A	C2	1	2	67.995	93.593	0.084	10	B1I	0.0084	67.48	92.88
TG2A213F	A	C2	1	2	66.454	93.610	0.083	10	B1I	0.0083	65.27	91.94
TG2B111F	B	C1	2	1	76.092	98.731	0.082	10	B1I	0.0082	73.23	95.01
TG2B112F	B	C1	2	1	76.206	92.768	0.086	10	B1I	0.0086	77.19	93.97
TG2B113F	B	C1	2	1	69.478	87.384	0.087	10	B1I	0.0087	71.49	89.92
TG2B211F	B	C2	2	2	64.342	88.625	0.083	10	B1I	0.0083	62.54	86.14
TG2B212F	B	C2	2	2	74.550	100.589	0.086	10	B1I	0.0086	75.41	101.75
TG2B213F	B	C2	2	2	72.255	99.430	0.089	10	B1I	0.0089	75.40	103.76
TG2C111F	C	C1	3	1	85.975	106.735	0.078	10	B1I	0.0078	78.79	97.82
TG2C112F	C	C1	3	1	85.484	99.635	0.083	10	B1I	0.0083	83.36	97.15
TG2C113F	C	C1	3	1	76.054	91.745	0.087	10	B1I	0.0087	78.17	94.30
TG2C211F	C	C2	3	2	77.578	96.428	0.085	10	B1I	0.0085	77.62	96.48
TG2C212F	C	C2	3	2	81.543	98.914	0.088	10	B1I	0.0088	84.63	102.66
TG2C213F	C	C2	3	2	67.199	85.123	0.090	10	B1I	0.0090	71.15	90.13

Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)

Average	**73.521**	**94.620**	**0.086**	**Average**	**0.0086**	**74.024**	**95.217**
Standard Dev.	**6.597**	**5.378**		**Standard Dev.**		**6.648**	**4.664**
Coeff. of Var. [%]	**8.973**	**5.684**		**Coeff. of Var. [%]**		**8.981**	**4.899**
Min.	**64.342**	**85.123**	**0.078**	**Min.**	**0.0078**	**62.538**	**86.140**
Max.	**85.975**	**106.735**	**0.092**	**Max.**	**0.0092**	**84.628**	**103.758**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**	**18**	**18**	**18**


Laminate Single Shear Bearing Properties (SSB2) -- (ETW)
2% Offset Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Bearing 2% Offset Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4


Laminate Single Shear Bearing Properties (SSB2) -- (ETW)
Ultimate Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Ultimate Bearing Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3
4

4.28 Single Shear Bearing 3 Properties

Laminate Single Shear Bearing Properties (SSB3) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

normalizing t_{ply} [in]: 0.0085

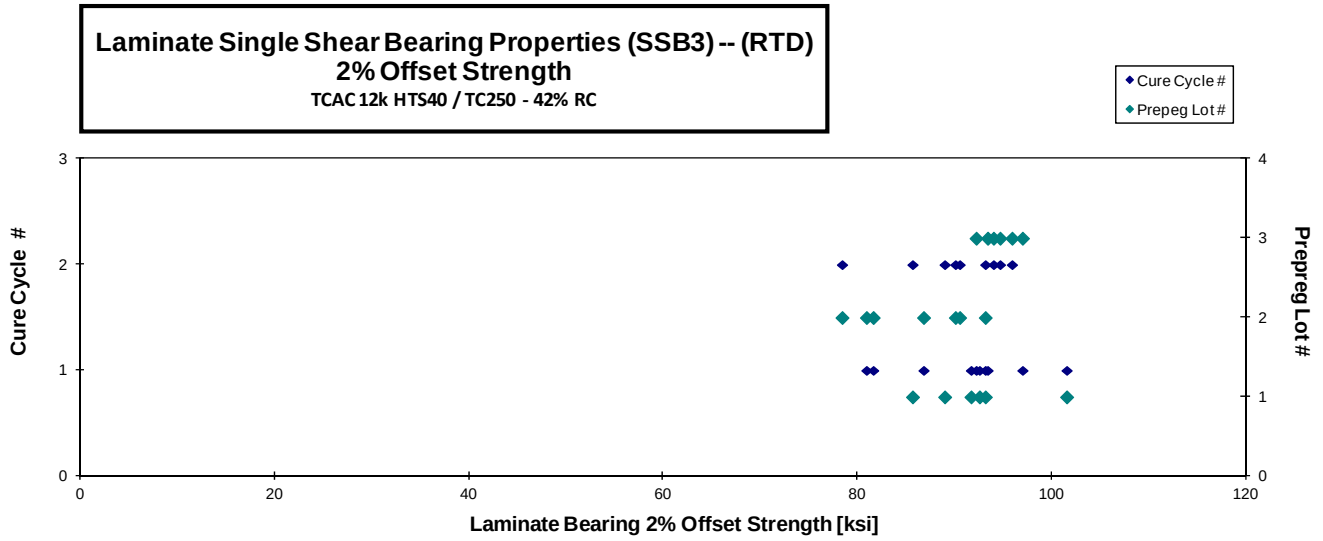
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
TG3A117A	A	C1	1	1	91.263		0.085	10	B1I / 2% OFFSET FOR UBS	0.0085	91.728	
TG3A118A	A	C1	1	1	105.589		0.082	10	B1I / 2% OFFSET FOR UBS	0.0082	101.572	
TG3A119A	A	C1	1	1	95.015		0.083	10	B1I / 2% OFFSET FOR UBS	0.0083	92.593	
TG3A217A	A	C2	1	2	97.703		0.081	10	B1I / 2% OFFSET FOR UBS	0.0081	93.201	
TG3A218A	A	C2	1	2	101.900		0.074	10	B1I / 2% OFFSET FOR UBS	0.0074	89.012	
TG3A219A	A	C2	1	2	84.937		0.086	10	B1I / 2% OFFSET FOR UBS	0.0086	85.703	
TG3B117A	B	C1	2	1	98.712		0.080	10	B1I / 2% OFFSET FOR UBS	0.0080	93.195	
TG3B118A	B	C1	2	1	87.701		0.078	10	B1I / 2% OFFSET FOR UBS	0.0078	80.960	
TG3B119A*	B	C1	2	1	90.088		0.082	10		0.0082	86.837	
TG3B11AA	B	C1	2	1	80.208		0.087	10	B1I / 2% OFFSET FOR UBS	0.0087	81.654	
TG3B217A	B	C2	2	2	82.937		0.080	10	B1I / 2% OFFSET FOR UBS	0.0080	78.448	
TG3B218A	B	C2	2	2	93.077		0.083	10	B1I / 2% OFFSET FOR UBS	0.0083	90.558	
TG3B219A	B	C2	2	2	90.578		0.085	10	B1I / 2% OFFSET FOR UBS	0.0085	90.116	
TG3C117A	C	C1	3	1	97.467	112.126	0.081	10	B1I	0.0081	93.434	107.487
TG3C118A	C	C1	3	1	92.306	111.476	0.085	10	B1I	0.0085	92.251	111.411
TG3C119A	C	C1	3	1	93.504	112.414	0.088	10	B1I	0.0088	97.024	116.646
TG3C21AA	C	C2	3	2	97.739	103.998	0.082	10	B1I	0.0082	94.711	100.776
TG3C21BA	C	C2	3	2	97.696	105.627	0.082	10	B1I	0.0082	94.037	101.671
TG3C21CA	C	C2	3	2	100.188	104.743	0.081	10	B1I	0.0081	95.944	100.306

Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)

Batch A and B RTD tests were stopped soon after 2% offset was obtained.

* Failure mode unknown due to the specimen was accidently broken while removing from fixture after the test

Average	**93.611**	**108.397**		**Average**	**0.0082**	**90.683**	**106.383**
Standard Dev.	**6.590**	**3.998**		**Standard Dev.**		**5.821**	**6.669**
Coeff. of Var. [%]	**7.040**	**3.688**		**Coeff. of Var. [%]**		**6.419**	**6.269**
Min.	**80.208**	**103.998**		**Min.**	**0.0074**	**78.448**	**100.306**
Max.	**105.589**	**112.414**		**Max.**	**0.0088**	**101.572**	**116.646**
Number of Spec.	**19**	**6**		**Number of Spec.**	**19**	**19**	**6**


Laminate Single Shear Bearing Properties (SSB3) -- (RTD)
2% Offset Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepeg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Bearing 2% Offset Strength [ksi]
0
20
40
60
80
100
120
1
2
3
4

Laminate Single Shear Bearing Properties (SSB3) -- (ETW) Strength

TCAC 12k HTS40 / TC250 - 42% RC

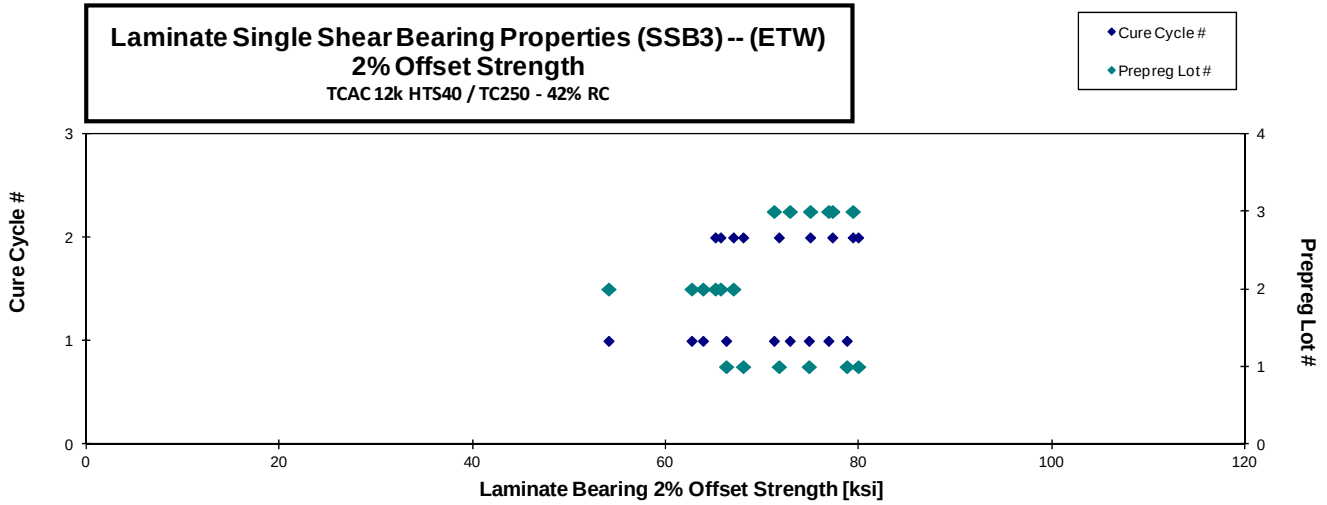
normalizing t_{ply} [in]: 0.0085

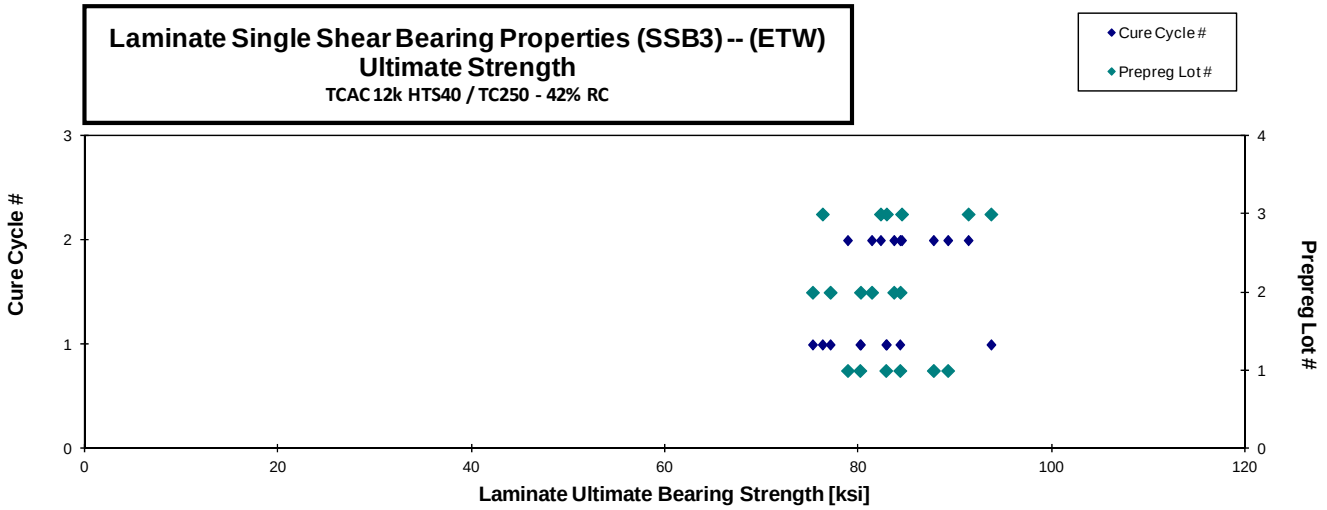
Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
TG3A111F	A	C1	1	1	72.947	80.614	0.087	10	B1I	0.0087	74.892	82.763
TG3A112F	A	C1	1	1	75.974	81.175	0.088	10	B1I	0.0088	78.819	84.215
TG3A113F	A	C1	1	1	62.652	75.644	0.090	10	B1I	0.0090	66.325	80.079
TG3A211F	A	C2	1	2	84.054	92.123	0.081	10	B1I	0.0081	80.000	87.679
TG3A212F	A	C2	1	2	69.002	90.370	0.084	10	B1I	0.0084	68.082	89.165
TG3A213F	A	C2	1	2	69.912	76.740	0.087	10	B1I	0.0087	71.790	78.801
TG3B111F	B	C1	2	1	69.186	81.374	0.079	10	B1I	0.0079	63.922	75.183
TG3B112F	B	C1	2	1	56.584	80.480	0.081	10	B1I	0.0081	54.143	77.008
TG3B113F	B	C1	2	1	63.345	80.907	0.084	10	B1I	0.0084	62.749	80.146
TG3B211F	B	C2	2	2	69.368	85.785	0.081	10	B1I	0.0081	65.736	81.294
TG3B212F	B	C2	2	2	64.341	83.131	0.086	10	B1I	0.0086	65.199	84.240
TG3B213F	B	C2	2	2	67.324	83.918	0.085	10	B1I	0.0085	67.060	83.589
TG3C111F	C	C1	3	1	73.960	84.012	0.084	10	B1I	0.0084	72.916	82.826
TG3C112F	C	C1	3	1	68.884	73.645	0.088	10	B1I	0.0088	71.275	76.201
TG3C113F	C	C1	3	1	71.535	87.077	0.091	10	B1I	0.0091	76.922	93.633
TG3C211F	C	C2	3	2	80.882	85.926	0.083	10	B1I	0.0083	79.439	84.393
TG3C212F	C	C2	3	2	75.981	89.694	0.087	10	B1I	0.0087	77.322	91.277
TG3C213F	C	C2	3	2	70.948	77.744	0.090	10	B1I	0.0090	75.024	82.211

Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)

	2% Offset Strength [ksi]	Ultimate Strength [ksi]
Average	70.382	82.798
Standard Dev.	6.567	5.129
Coeff. of Var. [%]	9.331	6.195
Min.	56.584	73.645
Max.	84.054	92.123
Number of Spec.	18	18

	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]	Ultimate Bearing $Strength_{norm}$ [ksi]
Average	0.009	70.645	83.039
Standard Dev.	0.000	6.993	5.017
Coeff. of Var. [%]	4.197	9.899	6.042
Min.	0.008	54.143	75.183
Max.	0.009	80.000	93.633
Number of Spec.	18	18	18


Laminate Single Shear Bearing Properties (SSB3) -- (ETW)
2% Offset Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Bearing 2% Offset Strength [ksi]
0
20
40
60
80
100
120


Laminate Single Shear Bearing Properties (SSB3) -- (ETW)
Ultimate Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Ultimate Bearing Strength [ksi]
0
20
40
60
80
100
120

4.29 Compression Strength After Impact 1 Properties

Laminate Compression After Impact Properties (CAI) -- (RTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

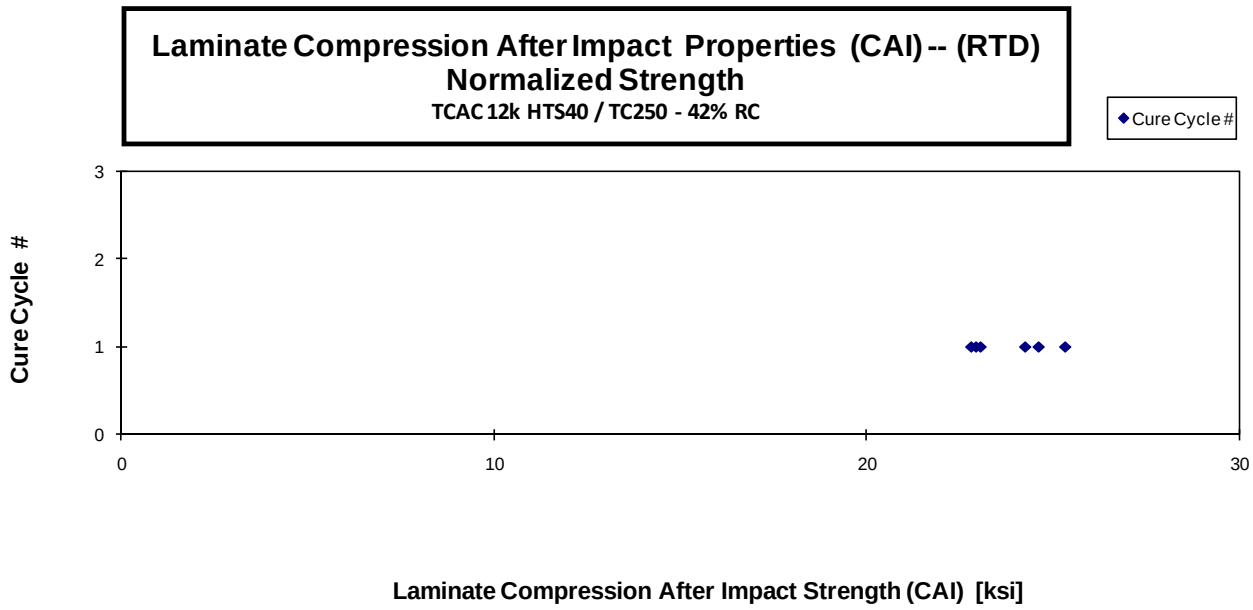
normalizing t_{ply} [in]: 0.0085

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Measured Impact Energy (in-lbf)	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
TGKA112A	A	C1	1	1	314.27	24.484	0.211	24	LDM	0.0088	25.324
TGKA113A	A	C1	1	1	313.67	22.481	0.209	24	LDM	0.0087	23.047
TGKA114A	A	C1	1	1	315.80	23.492	0.211	24	LDM	0.0088	24.248
TGKA115A	A	C1	1	1	319.30	23.611	0.213	24	LDM	0.0089	24.610
TGKA116A	A	C1	1	1	316.17	22.207	0.211	24	LDM	0.0088	22.925
TGKA117A	A	C1	1	1	315.95	22.083	0.211	24	LDM	0.0088	22.797

Average	23.060	
Standard Dev.	0.953	
Coeff. of Var. [%]	4.131	
Min.	22.083	
Max.	24.484	
Number of Spec.	6	

$Average_{norm}$	0.00878	23.825
$Standard\ Dev._{norm}$		1.050
$Coeff.\ of\ Var.\ [\%]_{norm}$		4.408
Min.	0.0087	22.797
Max.	0.0089	25.324
Number of Spec.		6

-


Laminate Compression After Impact Properties (CAI) -- (RTD)
Normalized Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Cure Cycle #
3
2
1
0
0
10
20
30
Laminate Compression After Impact Strength (CAI) [ksi]

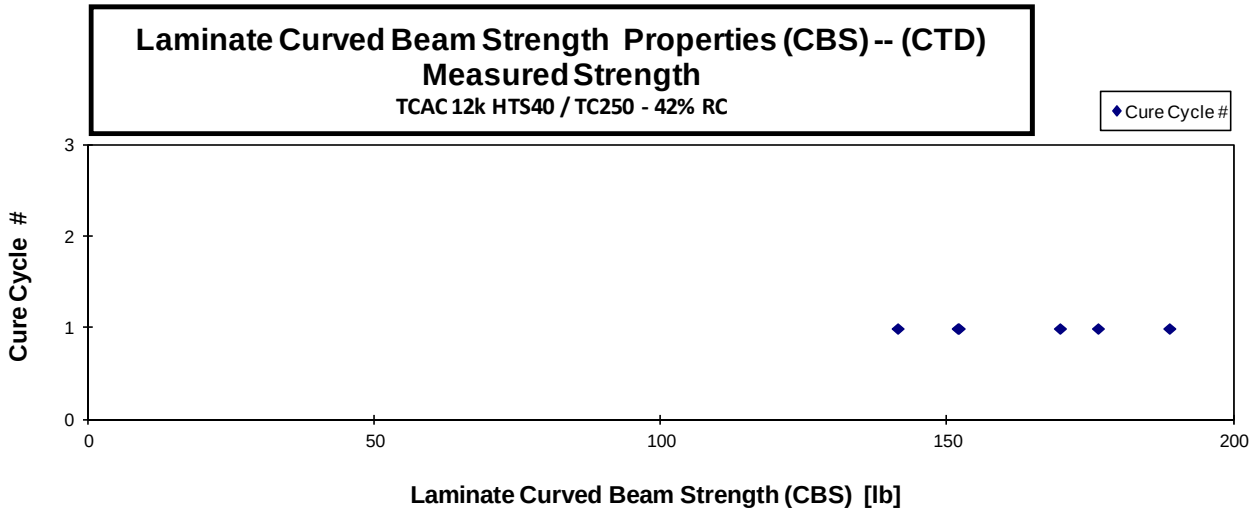
4.30 Interlaminar Tension Properties

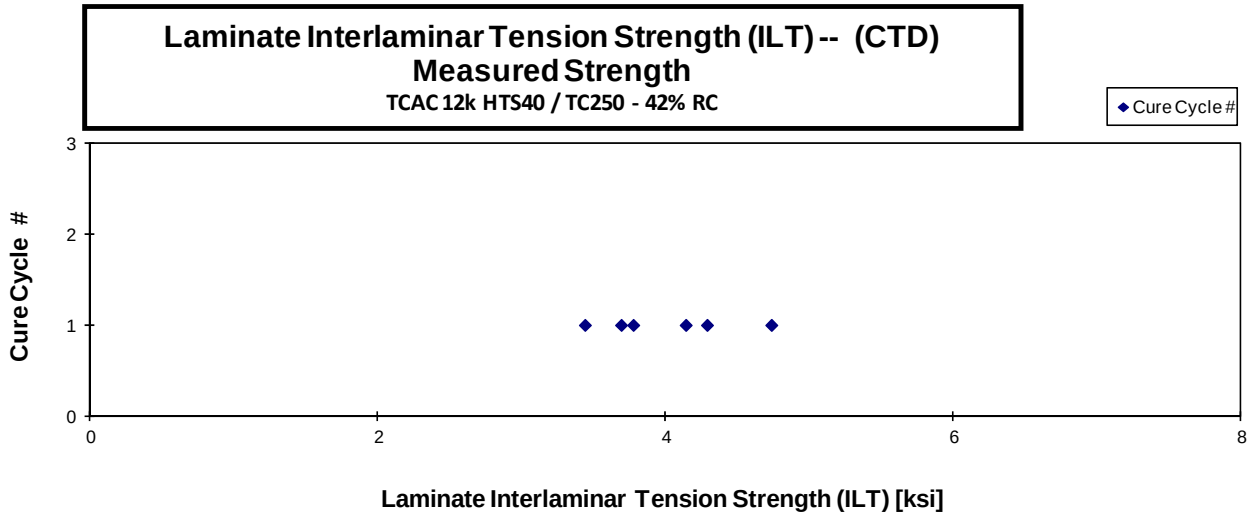
Laminate Interlaminar Tension Strength Properties (ILT) -- (CTD) Strength
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]
TGMA11AB	A	C1	1	1	169.734	4.138	0.186	21	0.0089
TGMA11BB	A	C1	1	1	151.893	3.773	0.183	21	0.0087
TGMA11CB	A	C1	1	1	188.847	4.733	0.182	21	0.0087
TGMA11DB	A	C1	1	1	176.380	4.286	0.187	21	0.0089
TGMA11EB	A	C1	1	1	152.054	3.689	0.187	21	0.0089
TGMA11FB	A	C1	1	1	141.397	3.437	0.187	21	0.0089

Basis values are not calcuated on ILT/CBS due to variation in processing

Average	**163.384**	**4.009**	**Average**	**0.0088**
Standard Dev.	**17.897**	**0.470**	**Standard Dev.**	
Coeff. of Var. [%]	**10.954**	**11.714**	**Coeff. of Var. [%]**	
Min.	**141.397**	**3.437**	**Min.**	**0.0087**
Max.	**188.847**	**4.733**	**Max.**	**0.0089**
Number of Spec.	**6**	**6**	**Number of Spec.**	**6**


Laminate Curved Beam Strength Properties (CBS) -- (CTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Cure Cycle #
0
1
2
3
0
50
100
150
200
Laminate Curved Beam Strength (CBS) [lb]


Laminate Interlaminar Tension Strength (ILT) -- (CTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Cure Cycle #
0
1
2
3
0
2
4
6
8
Laminate Interlaminar Tension Strength (ILT) [ksi]

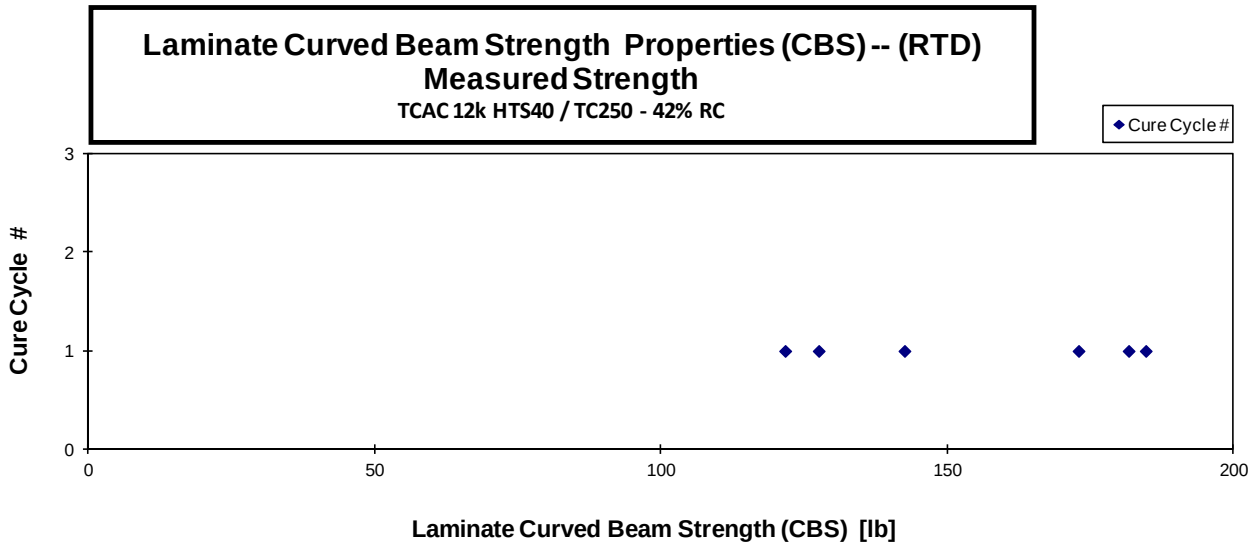
Laminate Interlaminar Tension Strength Properties (ILT) -- (RTD) Strength

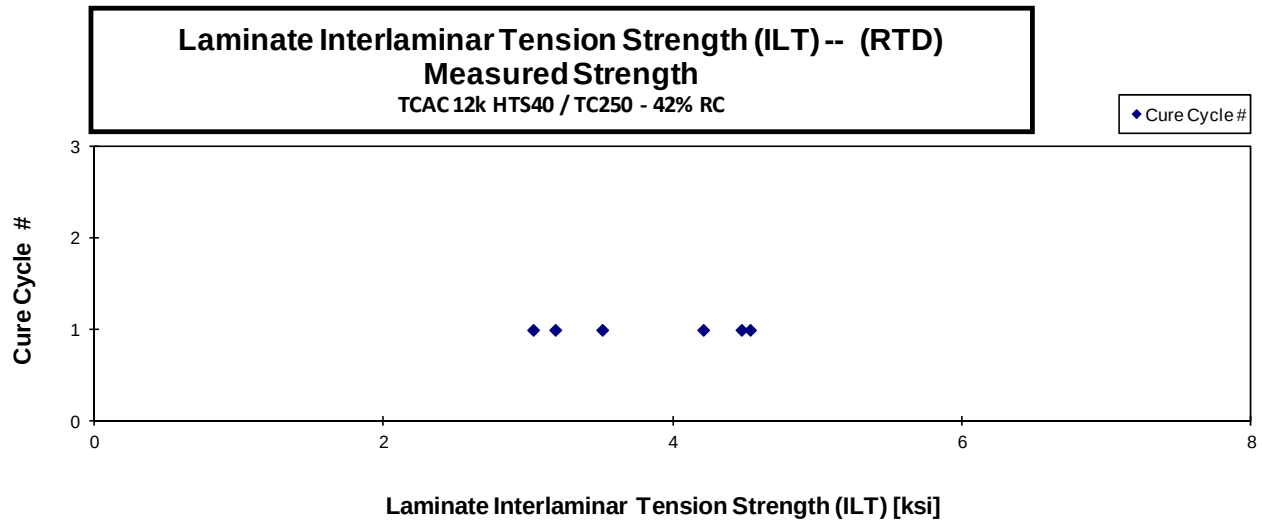
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]
TGMA11JA	A	C1	1	1	121.689	3.034	0.183	21	0.0087
TGMA11KA	A	C1	1	1	127.548	3.187	0.183	21	0.0087
TGMA11LA	A	C1	1	1	142.518	3.512	0.185	21	0.0088
TGMA11MA	A	C1	1	1	184.647	4.473	0.187	21	0.0089
TGMA11NA	A	C1	1	1	172.913	4.209	0.187	21	0.0089
TGMA11OA	A	C1	1	1	181.652	4.533	0.183	21	0.0087

Basis values are not calcuated on ILT/CBS due to variation in processing

Average	**155.161**	**3.825**	**Average**	**0.0088**
Standard Dev.	**28.032**	**0.663**	**Standard Dev.**	
Coeff. of Var. [%]	**18.067**	**17.348**	**Coeff. of Var. [%]**	
Min.	**121.689**	**3.034**	**Min.**	**0.0087**
Max.	**184.647**	**4.533**	**Max.**	**0.0089**
Number of Spec.	**6**	**6**	**Number of Spec.**	**6**


Laminate Curved Beam Strength Properties (CBS) -- (RTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Cure Cycle #
0
1
2
3
0
50
100
150
200
Laminate Curved Beam Strength (CBS) [lb]


Laminate Interlaminar Tension Strength (ILT) -- (RTD)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Cure Cycle #
0
1
2
3
0
2
4
6
8
Laminate Interlaminar Tension Strength (ILT) [ksi]

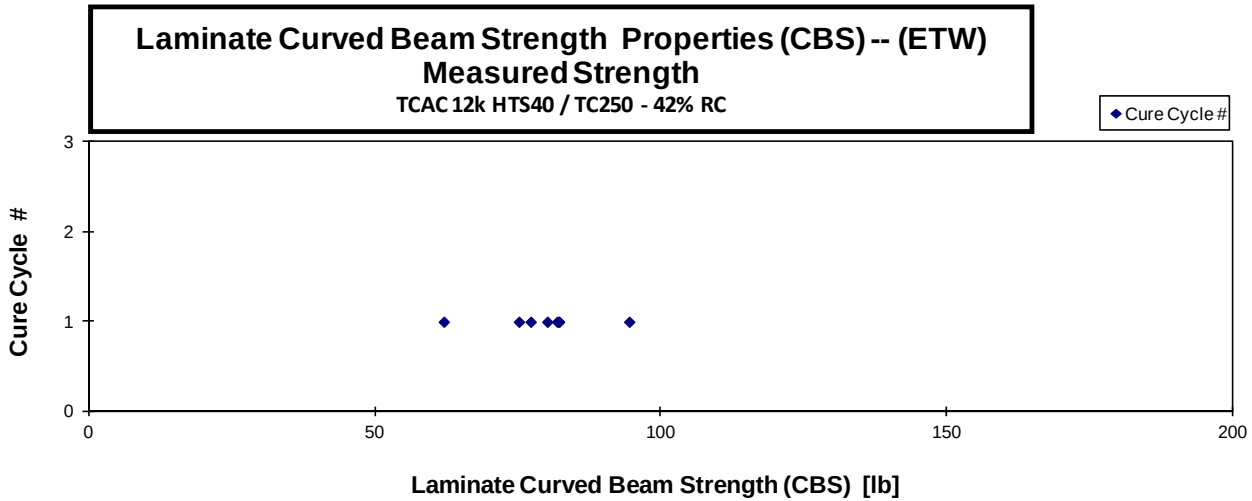
Laminate Interlaminar Tension Strength Properties (ILT) -- (ETW) Strength

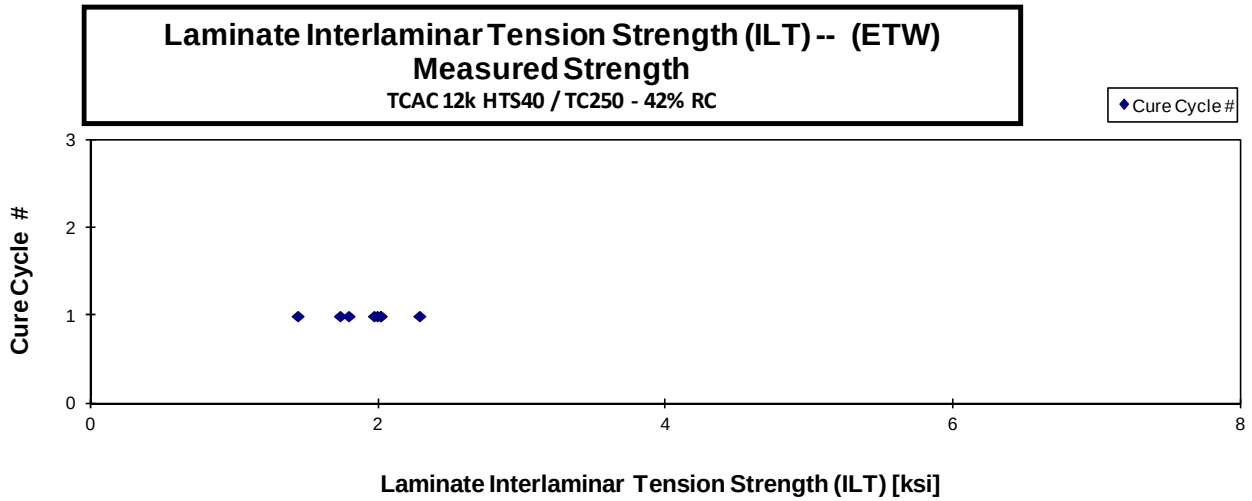
TCAC 12k HTS40 / TC250 - 42% RC

Specimen Number	TCAC Batch #	TCAC Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]
TGMA111F	A	C1	1	1	61.922	1.442	0.193	21	0.0092
TGMA112F	A	C1	1	1	77.104	1.796	0.193	21	0.0092
TGMA113F	A	C1	1	1	75.048	1.736	0.195	21	0.0093
TGMA114F	A	C1	1	1	82.063	1.994	0.187	21	0.0089
TGMA116F	A	C1	1	1	82.029	2.019	0.185	21	0.0088
TGMA117F	A	C1	1	1	94.315	2.288	0.187	21	0.0089
TGMA118F	A	C1	1	1	81.721	2.017	0.184	21	0.0088
TGMA119F	A	C1	1	1	80.008	1.973	0.185	21	0.0088

Basis values are not calcuated on ILT/CBS due to variation in processing

Average	**79.276**	**1.908**	**Average**	**0.0090**
Standard Dev.	**9.038**	**0.251**	**Standard Dev.**	
Coeff. of Var. [%]	**11.400**	**13.139**	**Coeff. of Var. [%]**	
Min.	**61.922**	**1.442**	**Min.**	**0.0088**
Max.	**94.315**	**2.288**	**Max.**	**0.0093**
Number of Spec.	**8**	**8**	**Number of Spec.**	**8**

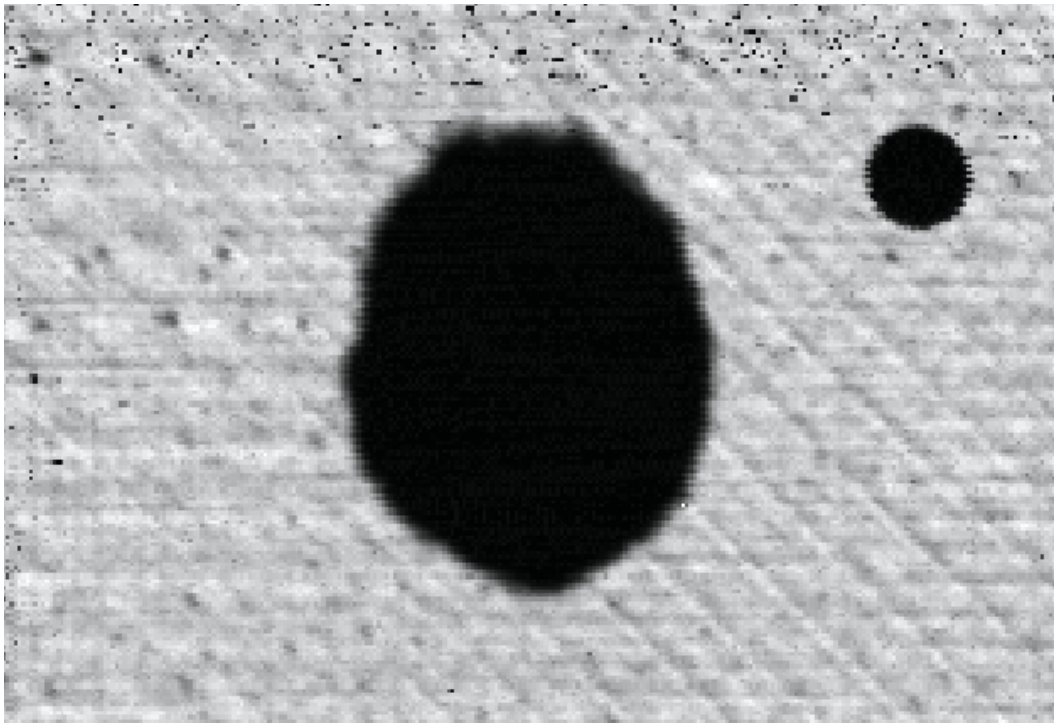

Laminate Curved Beam Strength Properties (CBS) -- (ETW)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Cure Cycle #
0
1
2
3
0
50
100
150
200
Laminate Curved Beam Strength (CBS) [lb]


Laminate Interlaminar Tension Strength (ILT) -- (ETW)
Measured Strength
TCAC 12k HTS40 / TC250 - 42% RC
Cure Cycle #
Cure Cycle #
0
1
2
3
0
2
4
6
8
Laminate Interlaminar Tension Strength (ILT) [ksi]

5 Additional Compression after Impact data

Impactor Diameter: 0.625”

Representative damage image:

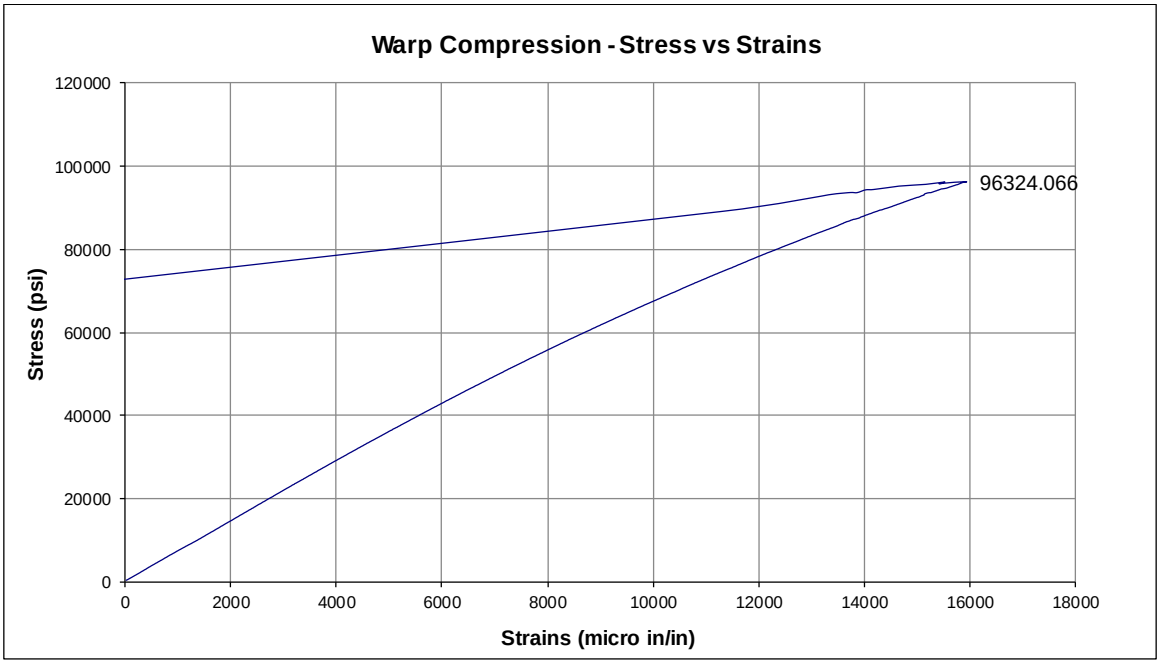


Damage Area and Dent Depth Summary:

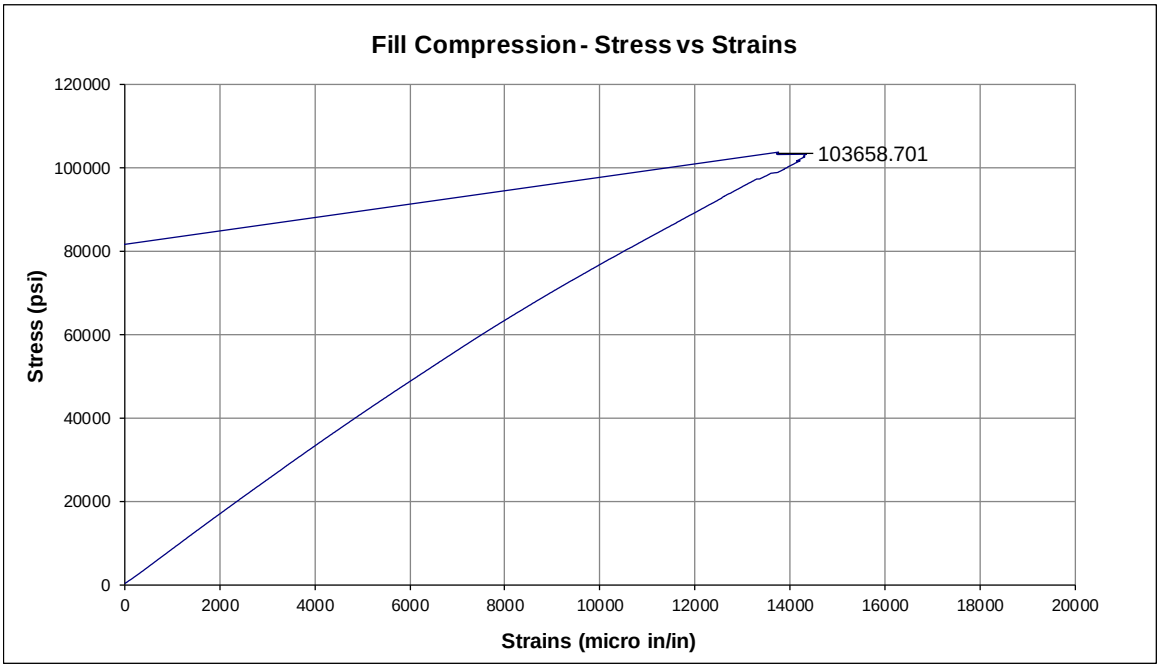
Specimen Number	Damage Area (inch^2)	Dent Depth (inch)
TGKA112A	2.558	0.0335
TGKA113A	4.073	0.0275
TGKA114A	2.61	0.034
TGKA115A	2.626	0.025
TGKA116A	2.594	0.034
TGKA117A	3.198	0.031
TGKA118A	2.731	0.0365
TGKA119A	3.559	0.028

6 Stress vs. Strain Curve

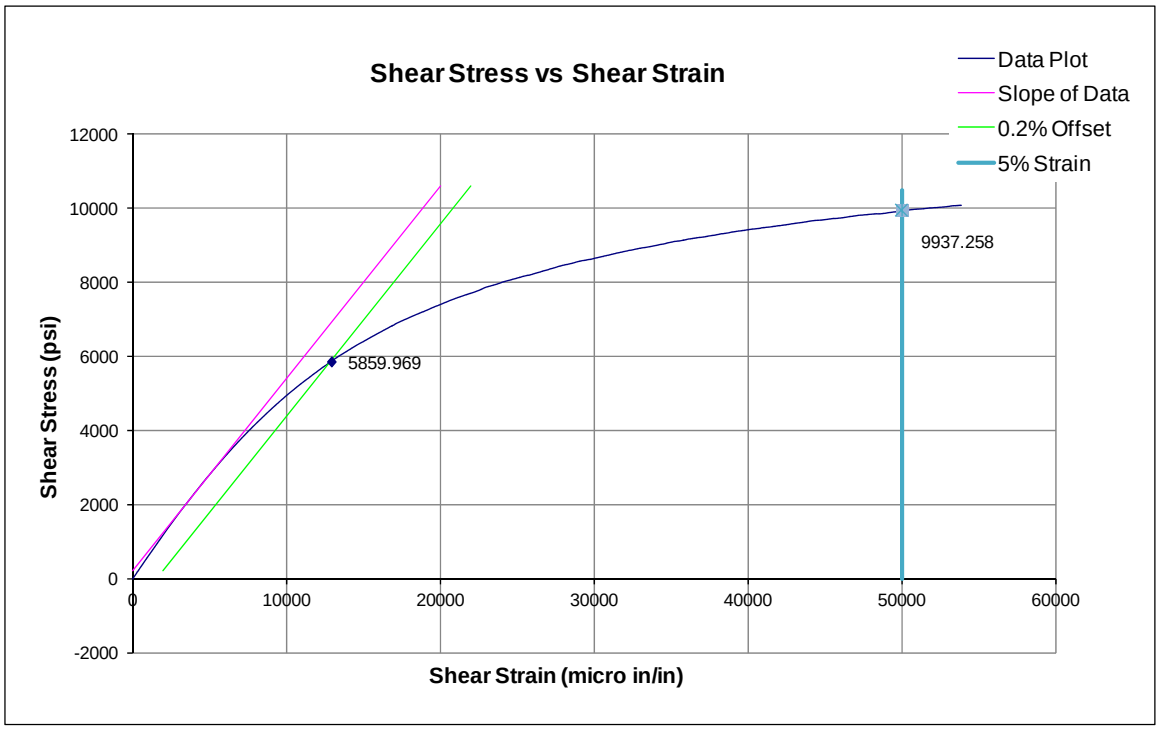
6.1 Warp Compression – RTD



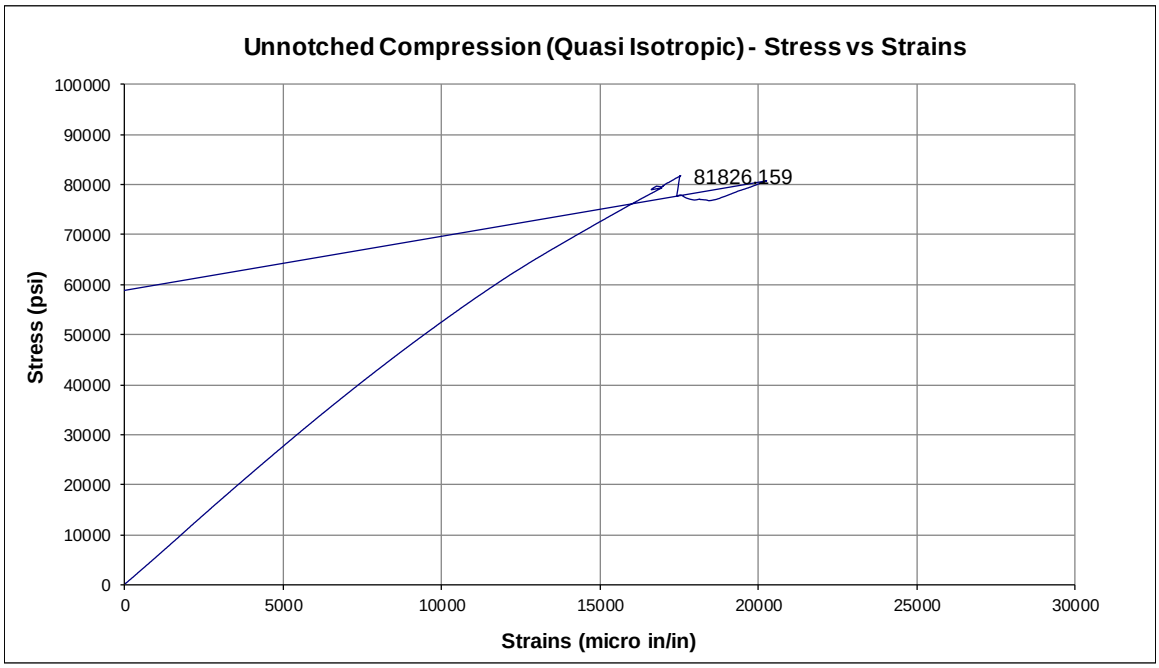
6.2 Fill Compression – RTD



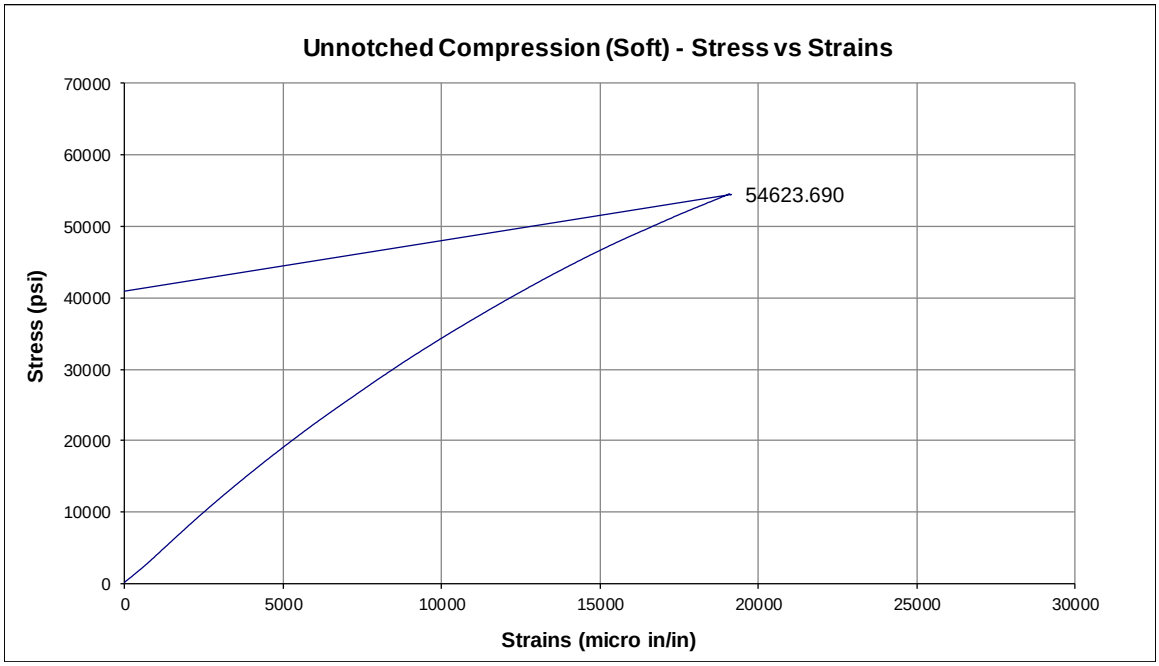
6.3 In-Plane Shear – RTD



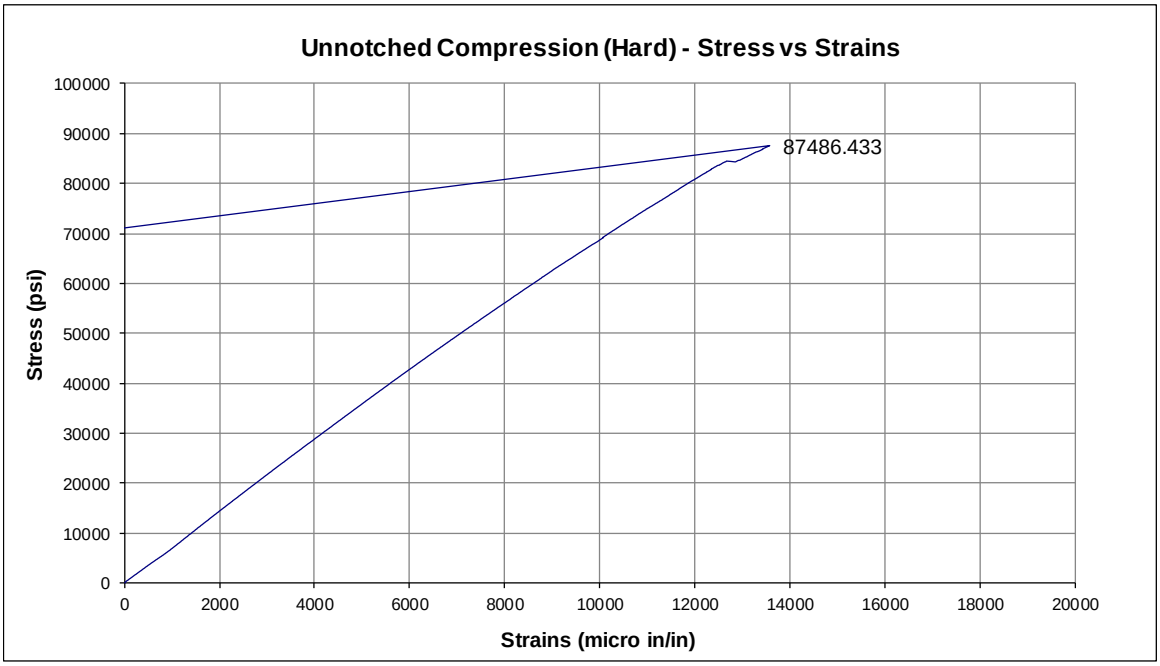
6.4 Unnotched Compression (Quasi Isotropic) – RTD



6.5 Unnotched Compression (Soft) – RTD



6.6 Unnotched Compression (Hard) – RTD



7 FLUID SENSITIVITY COMPARISON

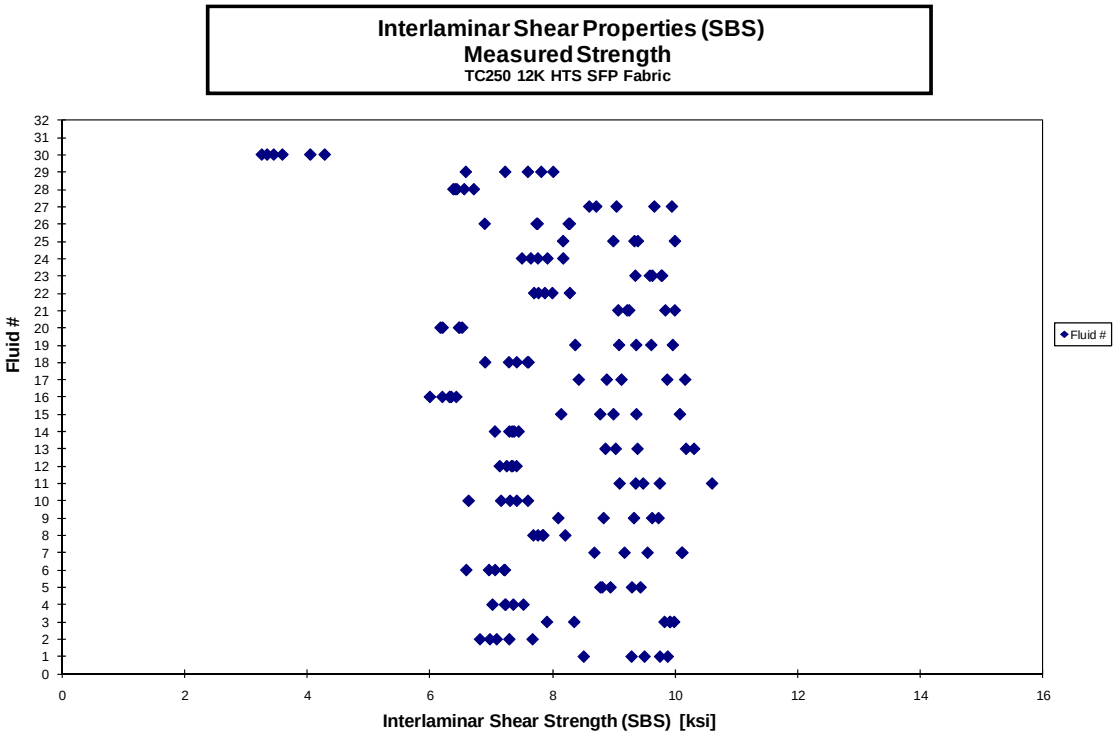
As indicated in the chart below, the worst case environment condition for Short Beam Strength was ETW. The 85% Relative Humidity condition as part of the fluid sensitivity screening, although similar in condition and time as ETW, were completed separately; which may have contributed to the difference between the two values.

Fluid	Average Short Beam Strength With Fluid (ksi)	Same Environment Short Beam Strength Without Fluid (ksi) (ETD)	Worst Case Environment Short Beam Strength (ksi) (ETW)	% Strength Reduction With Respect to ETD (no fluid)
1	7.173	6.771	4.364	-5.936
2	9.315	9.364	4.364	0.520
3	7.276	6.771	4.364	-7.452
4	9.051	9.364	4.364	3.338
5	7.013	6.771	4.364	-3.570
6	9.524	9.364	4.364	-1.706
7	7.870	6.771	4.364	-16.225
8	9.119	9.364	4.364	2.612
9	7.225	6.771	4.364	-6.702
10	9.653	9.364	4.364	-3.087
12	7.299	6.771	4.364	-7.800
13	9.550	9.364	4.364	-1.987
14	7.305	6.771	4.364	-7.884
15	9.070	9.364	4.364	3.144
16	6.264	6.771	4.364	7.487
17	9.292	9.364	4.364	0.773
18	7.363	6.771	4.364	-8.737
19	9.276	9.364	4.364	0.940
20	6.376	6.771	4.364	5.837
21	9.472	9.364	4.364	-1.153
22	7.925	6.771	4.364	-17.050
23	9.622	9.364	4.364	-2.758
24	7.801	6.771	4.364	-15.209
25	9.175	9.364	4.364	2.018
26	7.788	6.771	4.364	-15.014
27	9.190	9.364	4.364	1.857
28	6.505	6.771	4.364	3.927
29	7.449	9.364	4.364	20.450
30	3.672	6.771	4.364	45.770
31	3.672	9.364	4.364	60.787

Table 5-1: Fluid Sensitivity Comparison

Specimen Name	Test Condition	Fluid Type
TGQA 12XXX4	100LLAF @ RT (FS11RT)	100 Low Lead Aviation Fuel (ASTM D910)
TGQA 12XXX5	100LLAF @ 180F (FS11ET)	
TGQA 13XXX6	SAE2629 @ RT (FS12RT)	SAE AMS 2629 Jet Reference Fluid
TGQA 13XXX7	SAE2629 @ 180F (FS12ET)	
TGQA 14XXX8	5606 HF @ RT (FS13RT)	MIL-PRF-5606 Hydraulic Oil
TGQA 14XXX9	5606 HF @ 180F (FS13ET)	
TGQA 15XXXC	83282 HF @ RT (FS14RT)	MIL-PRF-83282 Hydraulic Oil
TGQA 15XXXD	83282 HF @ 180F (FS14ET)	
TGQA 16XXXH	7808 EO @ RT (FS15RT)	MIL-PRF-7808 Engine Oil
TGQA 16XXXI	7808 EO @ 180F (FS15ET)	
TGQA 17XXXJ	23699 EO @ RT (FS16RT)	MIL-PRF-23699, Class STD Engine Oil
TGQA 17XXXK	23699 EO @ 180F (FS16ET)	
TGQA 18XXXL	SEA @ RT (FS17RT)	Sea Water (ASTM D1141 or equiv.)
TGQA 18XXXM	SEA @ 180F (FS17ET)	
TGQA 19XXXN	SKYDROL @ RT (FS18RT)	Skydrol LD-4 (SAE AS1241, Type IV, Class 1)
TGQA 19XXXO	SKYDROL @ 180F (FS18ET)	
TGQA 1AXXXP	50% W + S @ RT (FS19RT)	50% Water With 50% Skydrol LD-4 (SAE AS1241, Type IV, Class 1)
TGQA 1AXXXQ	50% W + S @ 180F (FS19ET)	
TGQA 1BXXXR	MEK @ RT (FS21RT)	MEK washing fluid ASTM D 740
TGQA 1BXXXS	MEK @ 180F (FS21ET)	
TGQA 1CXXXT	P DEICING @ RT (FS22RT)	Polypropylene Glycol Deicer (Type I) Mil-A-824-3
TGQA 1CXXXU	P DEICING @ 180F (FS22ET)	
TGQA 1DXXXV	TT-I-735 @ RT (FS23RT)	Isopropyl Alcohol Deicing Agent (TT-I-735)
TGQA 1DXXXW	TT-I-735 @ 180F (FS23ET)	
TGQA 1EXXXX	DISTILLED @ RT (FS31RT)	Distilled Water
TGQA 1EXXXY	DISTILLED @ 180F (FS31ET)	
TGQA 1FXXXa	6.1 DRY @ RT (FS32RT)	Dry
TGQA 1FXXXb	6.1 DRY @ 180F (FS32ET)	
TGQA 1GXXXm	6.1 WET @ RT (FS33RT)	85% Relative Humidity
TGQA 1GXXXn	6.1 WET @ 180F (FS33ET)	

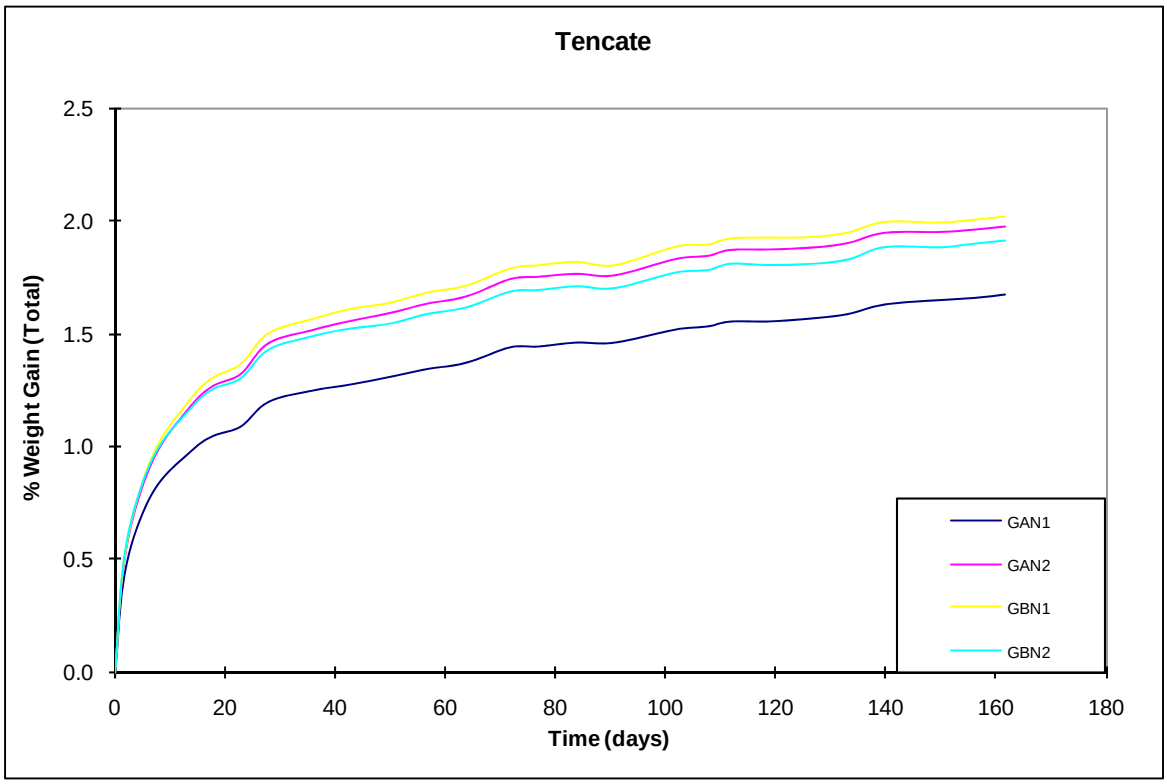
Table 5-2: Fluid Sensitivity Naming Convention



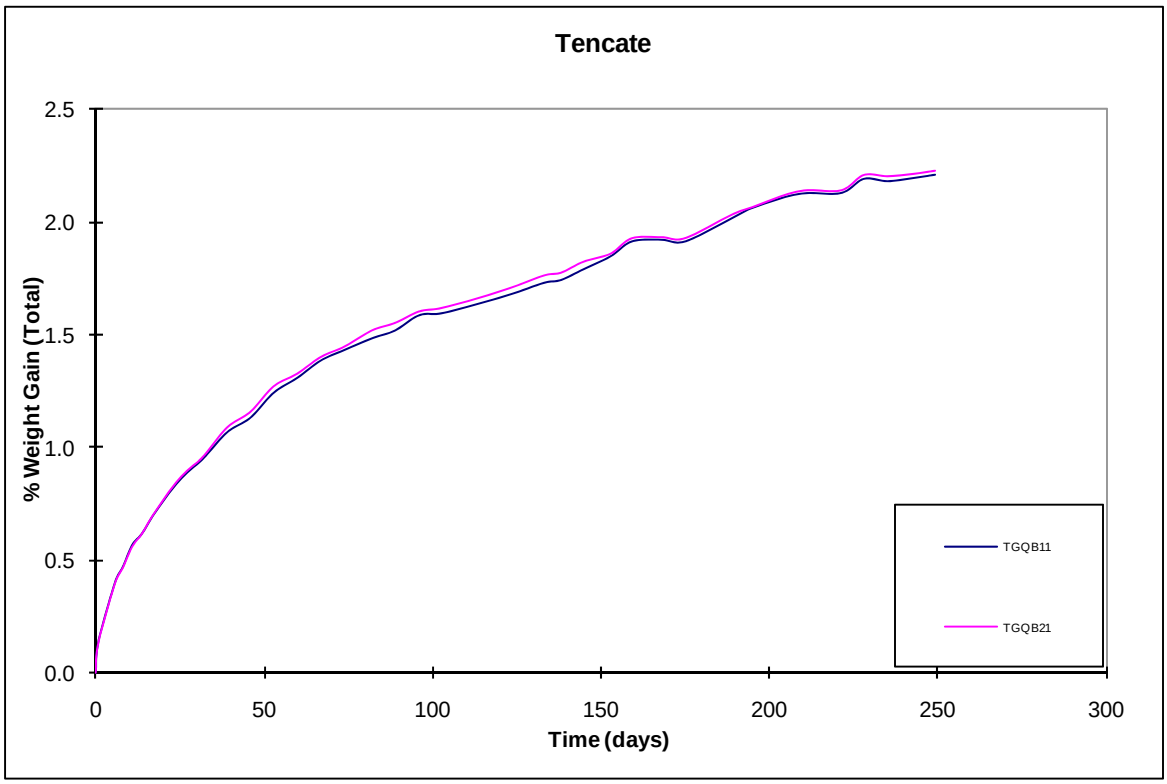
Fluid	SPECIMEN NAME	FLUID EXPOSURE, DURATION	CODE
1	TGQA120174	100 Low Lead Av Fuel @ RT, 90 days	FS11RT
2	TGQA120225	100 Low Lead Av Fuel @ 180F, 90 days	FS11ET
3	TGQA130256	SAE AMS 2629 JET REF FLUID @ RT, 90 days	FS12RT
4	TGQA130317	SAE AMS 2629 JET REF FLUID @ 1800F, 90 days	FS12ET
5	TGQA140378	MIL 5606 HYDRAULIC @ RT, 90 days	FS13RT
6	TGQA140479	MIL 5606 HYDRAULIC @ 180F, 90 days	FS13ET
7	TGQA1F160a	DRY @ RT, 90 days	FS32RT
8	TGQA1F168b	DRY @ 180F, 90 days	FS32ET
9	TGQA15051C	MIL 83282 HYDRAULIC @ RT, 90 days	FS14RT
10	TGQA15060D	MIL 83282 HYDRAULIC @ 180F, 90 days	FS14ET
11	TGQA16061H	MIL 7808 ENGINE OIL @ RT, 90 days	FS15RT
12	TGQA16071I	MIL 7808 ENGINE OIL @ 180F, 90 days	FS15ET
13	TGQA17076J	MIL 23699 ENGINE OIL @ RT, 90 days	FS16RT
14	TGQA17081K	MIL 23699 ENGINE OIL @ 180F, 90 days	FS16ET
15	TGQA18086L	SALT WATER @ RT, 90 days	FS17RT
16	TGQA18094M	SALT WATER @ 180F, 90 days	FS17ET
17	TGQA19101N	SKYDROL LD-4 @ RT, 90 days	FS18RT
18	TGQA19102O	SKYDROL LD-4 @ 180F, 90 days	FS18ET
19	TGQA1A109P	50% WATER AND 50% SKYDROL LD-4 @ RT, 90 days	FS19RT
20	TGQA1A118Q	50% WATER AND 50% SKYDROL LD-4 @ 180F, 90 days	FS19ET
21	TGQA1B120R	MEK WASHING FLUID ASTM D740 @ RT, 90 minutes	FS21RT
22	TGQA1B128S	MEK WASHING FLUID ASTM D740 @ 180F, 90 minutes	FS21ET
23	TGQA1C131T	POLYPROPYLENE GLYCOL DEICER @ RT, 90 minutes	FS22RT
24	TGQA1C135U	POLYPROPYLENE GLYCOL DEICER @ 180F, 90 minutes	FS22ET
25	TGQA1D141V	ISOPROPYL ALCOHOL DEICING AGENT @ RT, 48±4 hours	FS23RT
26	TGQA1D144W	ISOPROPYL ALCOHOL DEICING AGENT @ 180F, 48±4 hou	FS23ET
27	TGQA1E151X	DISTILLED WATER @ RT, 90 days	FS31RT
28	TGQA1E158Y	DISTILLED WATER @ 180F, 90 days	FS31ET
29	TGQA1G174m	85% RELATIVE HUMIDITY @ RT, per Sec 6.1 of test plan	FS33RT
30	TGQA1G177n	85% RELATIVE HUMIDITY @ 180F, per Sec 6.1 of test plan	FS33ET

8 MOISTURE CONDITIONING CHARTS

8.1 In-Plane Shear Properties – Thinnest Panel



8.2 Lamina Short Beam Shear Properties – Thickest Panel



The rest of the curves can be found on the CD that accompanies this report.

9 DMA Results

The charts below are only examples. The remaining files can be obtained from the CD provided with this report.

DMA Results Summary				
Tencate 071029C1 TGTX XX WET				
	Onset Storage Modulus		**Peak of Tangent Delta**	
Sample #	**Tg [°C]**	**Tg [°F]**	**Tg [°C]**	**Tg [°F]**
TGTA 11 (B02-ACT-SSB1-A-C1-DMA-WET)	93.08	199.54	131.61	268.90
TGTA 20 (B02-ACT-UNC1-A-C2-DMA-WET)	90.25	194.45	115.21	239.38
TGTA 29 (B02-ACT-FHC3-A-C2-DMA-WET)	92.73	198.91	119.48	247.06
TGTA 1G (B02-ACT-OHC1-A-C1-DMA-WET)	91.38	196.48	123.78	254.80
TGTA 1J (B02-ACT-WT-A-C1-DMA-WET)	94.63	202.33	117.02	242.64
TGTA 1L (B02-ACT-WC-A-C1-DMA-WET)	89.47	193.05	126.24	259.23
TGTA 2L (B02-ACT-WC-A-C2-DMA-WET)	87.81	190.06	120.98	249.76
TGTA 1U (B02-ACT-FT-A-C1-DMA-WET)	89.14	192.45	111.32	232.38
TGTB 29 (B02-ACT-FHC3-B-C2-DMA-WET)	89.19	192.54	121.20	250.16
TGTB 1J (B02-ACT-WT-B-C1-DMA-WET)	90.43	194.77	114.01	237.22
TGTB 2C (B02-ACT-UNT3-B-C2-DMA-WET)	90.38	194.68	110.67	231.21
TGTB 2I (B02-ACT-OHC3-B-C2-DMA-WET)	90.06	194.11	124.80	256.64
TGTB 2L (B02-ACT-WC-B-C2-DMA-WET)	89.92	193.86	132.46	270.43
TGTB 2U (B02-ACT-FT-B-C2-DMA-WET)	90.21	194.38	110.93	231.67
TGTB 2Y (B02-ACT-UNC3-B-C2-DMA-WET)	89.39	192.90	112.61	234.70
TGTB 1Z (B02-ACT-FC-B-C1-DMA-WET)	93.16	199.69	116.56	241.81
TGTC 11 (B02-ACT-SSB1-C-C1-DMA-WET)	93.90	201.02	128.19	262.74
TGTC 20 (B02-ACT-UNC1-C-C2-DMA-WET)	98.48	209.26	125.73	258.31
TGTC 26 (B02-ACT-FHT3-C-C2-DMA-WET)	91.53	196.75	122.66	252.79
TGTC 1G (B02-ACT-OHC1-C-C1-DMA-WET)	90.58	195.04	131.85	269.33
TGTC 1J (B002-ACT-WT-C-C1-DMA-WET)	86.50	187.70	113.27	235.89
TGTC 1L (B02-ACT-WC-C-C1-DMA-WET)	94.09	201.36	122.43	252.37
TGTC 2L (B02-ACT-WC-C-C2-DMA-WET)	93.84	200.91	118.22	244.80
TGTC 1U (B02-ACT-FT-C-C1-DMA-WET)	95.15	247.42	116.35	372.29
Average	91.47	198.49	120.32	254.02
Standard Deviation	2.68	11.40	6.79	27.96

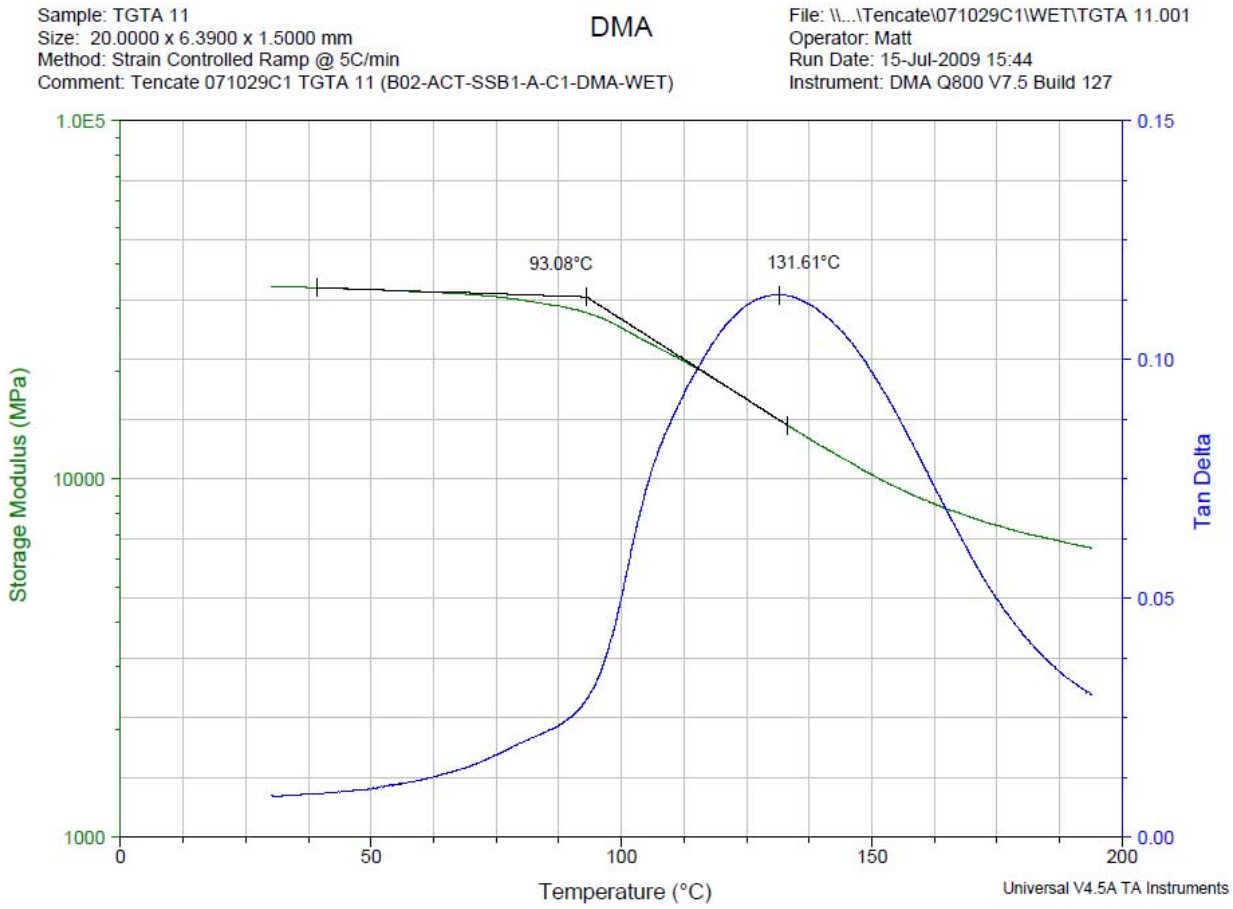
Table 9-1: DMA Wet Results

DMA Results Summary				
Tencate 071029C1 TGTX XX RTD				
	Onset Storage Modulus		**Peak of Tangent Delta**	
Sample #	**Tg [°C]**	**Tg [°F]**	**Tg [°C]**	**Tg [°F]**
TGTA 11 (B02-ACT-SSB1-A-C1-DMA-DRY)	130.42	266.76	194.61	382.30
TGTA 20 (B02-ACT-UNC1-A-C2-DMA-DRY)	128.15	262.67	188.19	370.74
TGTA 29 (B02-ACT-FHC3-A-C2-DMA-DRY)	139.17	282.51	195.04	383.07
TGTA 1G (B02-ACT-OHC1-A-C1-DMA-DRY)	123.91	255.04	197.94	388.29
TGTA 1J (B02-ACT-WT-A-C1-DMA-DRY)	123.62	254.52	187.43	369.37
TGTA 1L (B02-ACT-WC-A-C1-DMA-DRY)	130.97	267.75	188.66	371.59
TGTA 2L (B02-ACT-WC-A-C2-DMA-DRY)	130.57	267.03	186.85	368.33
TGTA 1U (B02-ACT-FT-A-C1-DMA-DRY)	124.07	255.33	186.37	367.47
TGTB 29 (B02-ACT-FHC3-B-C2-DMA-DRY)	123.83	254.89	196.01	384.82
TGTB 1J (B02-ACT-WT-B-C1-DMA-DRY)	123.66	254.59	195.63	384.13
TGTB 2C (B02-ACT-UNT3-B-C2-DMA-DRY)	124.45	256.01	193.56	380.41
TGTB 2I (B02-ACT-OHC3-B-C2-DMA-DRY)	126.05	258.89	193.98	381.16
TGTB 2L (B02-ACT-WC-B-C2-DMA-DRY)	129.17	264.51	168.36	335.05
TGTB 2U (B02-ACT-FT-B-C2-DMA-DRY)	118.46	245.23	186.37	367.47
TGTB 2Y (B02-ACT-UNC3-B-C2-DMA-DRY)	125.06	257.11	187.60	369.68
TGTB 1Z (B02-ACT-FC-B-C1-DMA-DRY)	130.92	267.66	190.18	374.32
TGTC 11 (B02-ACT-SSB1-C-C1-DMA-DRY)	121.57	250.83	189.49	373.08
TGTC 20 (B02-ACT-UNC1-C-C2-DMA-DRY)	129.52	265.14	191.80	377.24
TGTC 26 (B02-ACT-FHT3-C-C2-DMA-DRY)	117.09	242.76	184.18	363.52
TGTC 1G (B02-ACT-OHC1-C-C1-DMA-DRY)	128.90	264.02	194.61	382.30
TGTC 1J (B002-ACT-WT-C-C1-DMA-DRY)	132.10	269.78	183.16	361.69
TGTC 1L (B02-ACT-WC-C-C1-DMA-DRY)	120.20	248.36	191.34	376.41
TGTC 2L (B02-ACT-WC-C-C2-DMA-DRY)	128.65	263.57	191.35	376.43
TGTC 1U (B02-ACT-FT-C-C1-DMA-DRY)	119.68	247.42	189.05	372.29

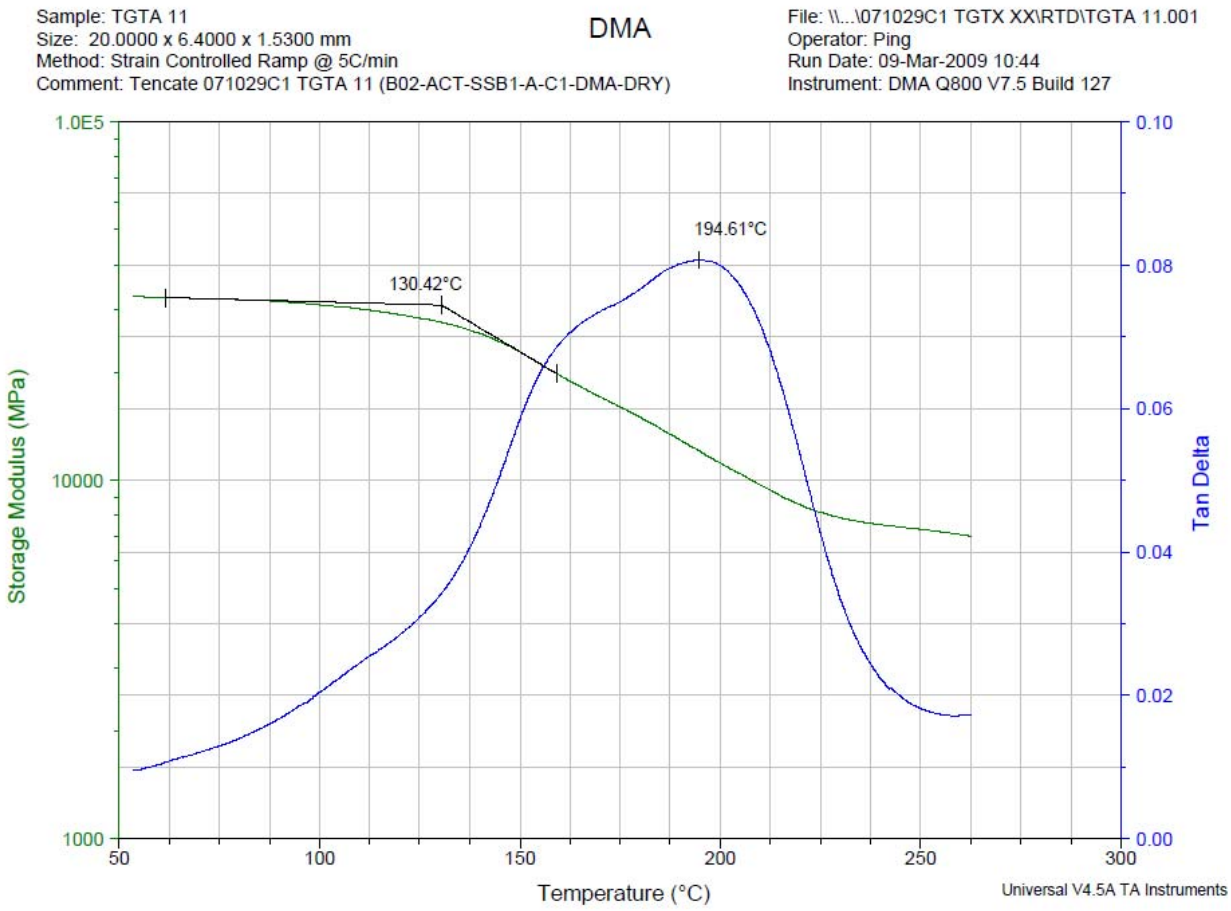
Average	126.26	259.26	189.66	373.38
Standard Deviation	5.10	9.17	6.03	10.85

Table 9-2: DMA Dry Results

9.1 DMA Wet Batch A



9.2 DMA Dry Batch A



10 Physical Test Results

Physical test results were obtained at TenCate. HPLC and chemical reactivity results can be obtained from the CD accompanying this report.

11 Deviations

For fluid sensitivity testing Jet Reference fluid called out in the NCAMP test plan is a rare fuel and therefore extremely expensive. As a replacement, we used Jet Fuel A per ASTM D1655. AMS2629 is a jet reference fuel intended to simulate jet engine fuel only. This was approved by all participating panel fabricators.

One of the Warp Tension Panels: NTP6888Q2-TCA-B02-ACT-WT-A-C2 is only 13” in length along the 0° direction instead of 24” as per the test plan panel dimensions.

Single Shear Bearing Batch A and B RTD tests were stopped soon after 2% offset was obtained; consequently Ultimate Bearing Load was not obtained.

Laminate Short Beam Strength specimens are taken from UNC1 panel instead of CAI1 in order to obtain enough samples to meet the test matrix (3 batches at 2 cures each)