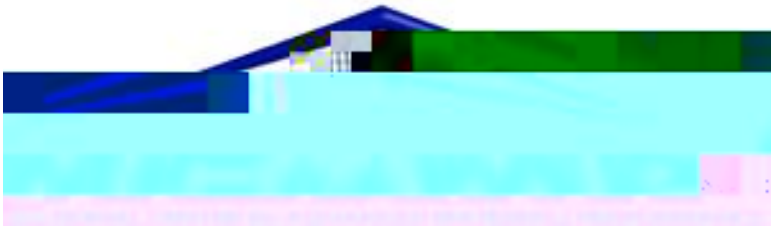

# TenCate BT250E-6 AS4C 3k-PW Fabric Gr 195 gsm 40% RC Qualification Material Property Data Report

## FAA Special Project Number: TD03019RC-R

## NCAMP Test Report Number: CAM-RP-2015-039 N/C

## Report Date: October 24, 2017

### Testing Facility:

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# 1. Introduction

## 1.1 Scope

The test methods and results described in this document are intended to provide basic composite properties essential to most methods of analysis and are consistent with CMH-17-1G—Composite Materials Handbook for Polymer Matrix Composites. This report contains material property data of common usefulness to wide range of projects. The lamina material property data have been generated with FAA oversight through FAA Special Project Number TD03019RC-R, and also meet the requirements of NCAMP Standard Operating Procedure NSP100; the test panels and test specimens have been inspected by an FAA Designated Airworthiness Representative (DAR) and the testing has been witnessed by an FAA Designated Engineering Representative (DER). However, the data may not fulfill all the needs of any specific company's program; specific properties, environments, laminate architecture, and loading situations may require additional testing.

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

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

This report contains material property data only. Statistical analysis of the data including the calculations of b-basis values is given in a separate report, TenCate Advance Composites AS4C 3k-PW Fabric with BT250E-6 Resin Material Allowables Statistical Analysis Report, NCP-RP-2015-020 Rev N/C. The qualification material was procured to Erickson Air-Crane (EAC) Material Specification ES0095 Revision B dated May 22, 2013. An equivalent NCAMP Material Specification NMS 250/2 Rev Initial Release dated January 2, 2018 has been created, which contains specification limits that are derived from guidelines in DOT/FAA/AR-03/19. The qualification test panels were cured

db

**Superscripts**

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

**Subscripts**

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

**Acronyms and Definitions**

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

## 1.3 NIAR–Specimen Naming Format

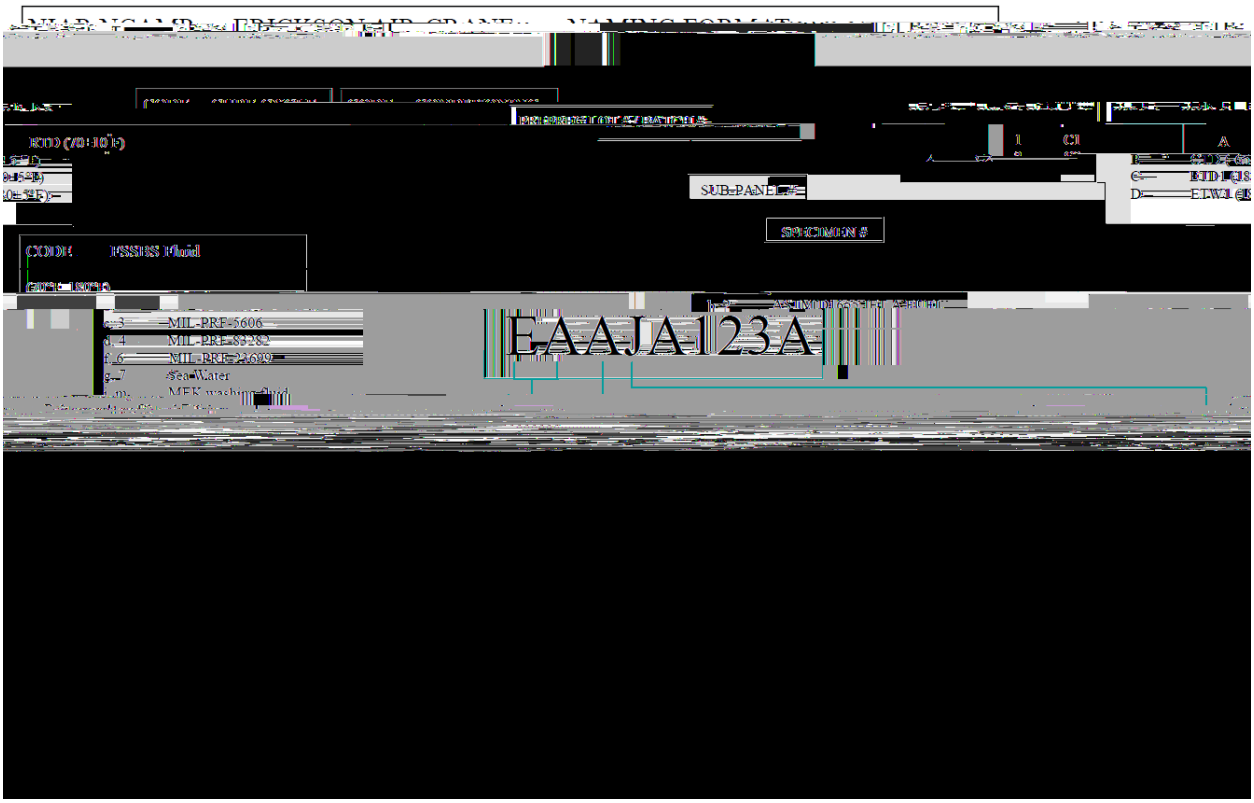



**Figure 1-1: Naming Format**

## 1.4 References

**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-08 – 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 D6641/D6641M-01e1(2009) – Standard Test Method for Determining the Compressive Properties of Polymer Matrix Composite Laminates Using a Combined Loading Compression (CLC) Test Fixture
- ASTM D7028-07e1 – Standard Test Method for Glass Transition Temperature (DMA Tg) of Polymer Matrix Composites by Dynamic Mechanical Analysis (DMA)

## 1.5 Methodology

### 1.5.1 Process Definition

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

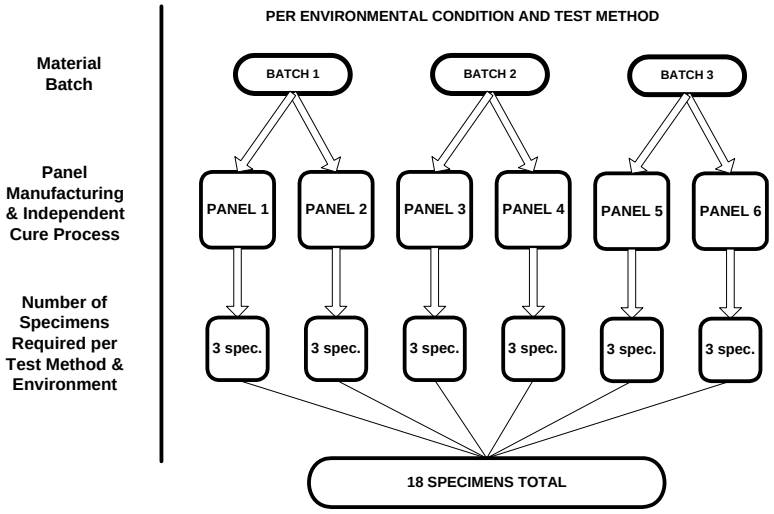



**Figure 1-2: Specimen Selection Methodology**

All panels were fabricated in accordance with Erickson Air-Crane (EAC) Process Specification ES0098 which is equivalent to NCAMP Process Specification NPS 81250 baseline “C” Cure Cycle, caul plate is used.

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

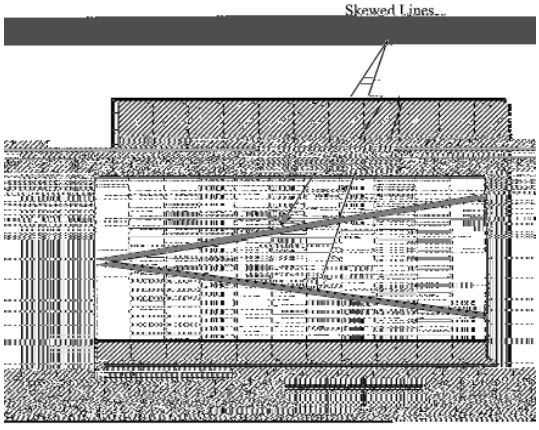



**Figure 1-3: Specimen Traceability Line**

## 1.5.2 Specimen & Testing Details

### 1.5.2.1 Tabbing

No tabs were used for this program.

### 1.5.2.2 Specimen Dimensions & Test Configuration

For SBS specimens, a span of 4.5T and 4T were used for CTD, RTD and ETD conditions and a span of 4T was used for ETW condition, where T was the average thickness of six qualification panels. The same T was used to compute the width and length of the specimen.

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

### 1.5.2.3

## 1.5.3 Test Matrix

The table below shows the lay-ups and test matrices used for lamina level testing.

| Layup | Test Type and Direction | Property | Number of Batches x No. of Panels x No. of Specimens | | | |
|---|---|---|---|---|---|---|
| | | | Test Temperature/Moisture Condition | | | |
| | | | CTD | RTD (4) | ETD | ETW |
| $[0]_{15}$ | ASTM D3039 0° Tension | Strength, Modulus and Poisson's Ratio | 3x2x3 | 3x2x3 | | 3x2x3 |
| $[0]_{15}$ | ASTM D6641 0° Compression | Strength and Modulus | 3x2x3 | 3x2x3 (1) | | 3x2x3 |
| $[90]_{15}$ | ASTM D3039 90° Tension | Strength and Modulus | 3x2x3 | 3x2x3 | | 3x2x3 |
| $[90]_{15}$ | ASTM D6641 90° Compression | Strength and Modulus | 3x2x3 | 3x2x3 (1) | 1x2x3 | 3x2x3 (3) |
| $[45/-45]_{3S}$ | ASTM D3518 In-Plane Shear (2) | Strength and Modulus | 3x2x3 | 3x2x3 | | 3x2x3 |
| $[0]_{32}$ | ASTM D2344 Short Beam | Strength | 3x2x3 | 3x2x3 | 3x2x3 | 3x2x3 |

**Table 1-1: Lamina Level Test Matrix**

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

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

**Note 3:**

### 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 spec

### 1.5.7 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 theoretically calculated cured ply thickness was 0.0075 inches. The experimentally Out-of-Autoclave measured cured ply thickness of 0.0085 inches has been used as the nominal cured ply thickness (CPT) for normalization purpose. This has been done at the request of the material supplier. The following normalization formula was used:

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

### 1.5.8 Inspection Verification

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

Testing was witnessed by FAA DER. Mechanical testing was carried out at the National Institute for Aviation Research, Wichita State University.

### 1.5.9 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.

# 2. Test Results

## 2.1 Lamina Level Test Summary

| | | | | |
|---|---|---|---|---|
| **Prepreg Material:** | TenCate BT250E-6 AS4C 3k-PW Fabric 195gsm 40% RC | | | |
| **Material Specification:** | NMS 250/2 | | | |
| **Process Specification:** | NPS 81250 | | | |
| **Fiber:** | AS4C 3k-PW | **Resin:** | TenCate BT250E-6 | |
| **Tg(dry):** | 275.46 °F | **Tg(wet):** | 249.55 °F | **Tg METHOD:** |

## 2.2 Individual Test Summaries

### 2.2.1 Warp Tension Properties (WT)

## 2.2.2 Fill Tension Properties (FT)

**Material:** TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%

**Resin content:** 38.25 % wt
**Fiber volume:** 51.64 % vol
**Ply count:** 15
**Comp. density:** 1.489 g/cc

**Test method:** ASTM D 3039-08
**Modulus calculation:** 1000 to 3000 microstrain

**Normalized by:** 0.0085 in. CPT

**Tension, 2-axis**
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
[90]15

| | | CTD | | RTD | | ETW | |
|---|---|---|---|---|---|---|---|
| **Test Temperature [°F]** | | -65 | | 70 | | 180 | |
| **Moisture Conditioning** | | Dry | | Dry | | Equilbrium | |
| **Equilbrium at T, RH** | | | | | | 160 F,85% | |
| **Source code** | | EABUX XXXB | | EABUX XXXA | | EABUX XXXD | |
| | | **Normalized** | **Measured** | **Normalized** | **Measured** | **Normalized** | **Measured** |
| $F_2^{tu}$ [ksi] | **Mean** | 120.271 | 120.324 | 124.751 | 125.323 | 110.388 | 110.164 |
| | **Minimum** | 111.238 | 109.120 | 114.261 | 114.351 | 99.509 | 98.594 |
| | **Maximum** | 132.730 | 133.218 | 133.012 | 132.998 | 121.328 | 122.561 |
| | **C.V.(%)** | 4.488 | 5.194 | 3.967 | 4.373 | 5.533 | 6.081 |
| | **No. Specimens** | 21 | | 21 | | 21 | |
| | **No. Prepreg Lots** | 3 | | 3 | | 3 | |
| $E_2^t$ [Msi] | **Mean** | 8.641 | 8.615 | 8.530 | 8.569 | 8.604 | 8.585 |
| | **Minimum** | 8.482 | 8.404 | 8.215 | 8.195 | 8.421 | 8.363 |
| | **Maximum** | 8.783 | 8.746 | 8.737 | 9.003 | 8.790 | 8.871 |
| | **C.V.(%)** | 1.021 | 0.978 | 1.385 | 1.983 | 1.286 | 1.618 |
| | **No. Specimens** | 18 | | 21 | | 21 | |
| | **No. Prepreg Lots** | 3 | | 3 | | 3 | |

## 2.2.3 Warp Compression Properties (WC)

**Material:**

| | | | |
|---|---|---|---|
| **Resin content:** | 39.64 % wt | **Comp. density:** | 1.484 g/cc |
| **Fiber volume:** | 50.33 % vol | | |
| **Ply count:** | 15 | | |
| **Test method:** | ASTM D 6641-09 | | |
| **Normalized by:** | 0.0085 in. CPT | | |

# 2.2.4 Fill Compression Properties (FC)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Material:** | TenCate BT250E-6 AS4C-PW 3k fabric with RC 40% | | | | | | | **Compression, 2-axis** TenCate BT250E-6 AS4C-PW 3k fabric with RC 40% [90]15 | |
| **Resin content:** | 39.10 % wt | | **Comp. density:** | 1.486 g/cc | | | | | |
| **Fiber volume:** | 50.83 % vol | | | | | | | | |
| **Ply count:** | 15 | | | | | | | | |
| **Test method:** | ASTM D 6641-09 | | **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 | | Equilbrium | |
| **Equilbrium at T, RH** | | | | | | | | 160 F,85% | |
| **Source code** | | EABZX XXXB | | EABZX XXXA | | EABZX XXXC | | EABZX XXXD | |
| | | **Normalized** | **Measured** | **Normalized** | **Measured** | **Normalized** | **Measured** | **Normalized** | **Measured** |
| $F_2^{cu}$ [ksi] | **Mean** | 93.260 | 93.152 | 85.122 | 85.240 | 73.543 | 72.056 | 50.327 | 49.864 |
| | **Minimum** | 82.771 | 82.690 | 78.582 | 79.502 | 64.866 | 64.293 | 44.995 | 45.571 |
| | **Maximum** | 103.399 | 104.268 | 93.019 | 92.628 | 81.002 | 78.115 | 57.347 | 55.730 |
| | **C.V.(%)** | 6.828 | 7.194 | 5.207 | 4.832 | 9.239 | 8.143 | 7.059 | 6.029 |
| | **No. Specimens** | 21 | | 21 | | 7 | | 22 | |
| | **No. Prepreg Lots** | 3 | | 3 | | 1 | | 3 | |
| $E_2^c$ [Msi] | **Mean** | 8.111 | 8.109 | 7.862 | 7.882 | 7.896 | 7.724 | 7.906 | 7.886 |
| | **Minimum** | 7.688 | 7.691 | 7.576 | 7.661 | 7.629 | 7.555 | 7.737 | 7.682 |
| | **Maximum** | 8.439 | 8.526 | 8.450 | 8.596 | 8.157 | 7.868 | 8.101 | 8.065 |
| | **C.V.(%)** | 2.181 | 2.873 | 2.269 | 2.676 | 3.329 | 1.751 | 1.222 | 1.521 |
| | **No. Specimens** | 18 | | 18 | | 6 | | 21 | |
| | **No. Prepreg Lots** | 3 | | 3 | | 1 | | 3 | |

## 2.2.5 In-Plane Shear Properties (IPS)

**Material:**

| | | | |
|---|---|---|---|
| **Resin content:** | 38.29 % wt | **Comp. density:** | 1.465 g/cc |
| **Fiber volume:** | 50.73 % vol | | |
| **Ply count:** | 12 | | |

# 2.2.6 Lamina Short-Beam Strength Properties (SBS)

**Material:**

**Resin content:** 39.04 % wt **Comp. density:** 1.520 g/cc
**Fiber volume:** 51.87 % vol
**Ply count:** 32

**Test method:** ASTM D 2344-06

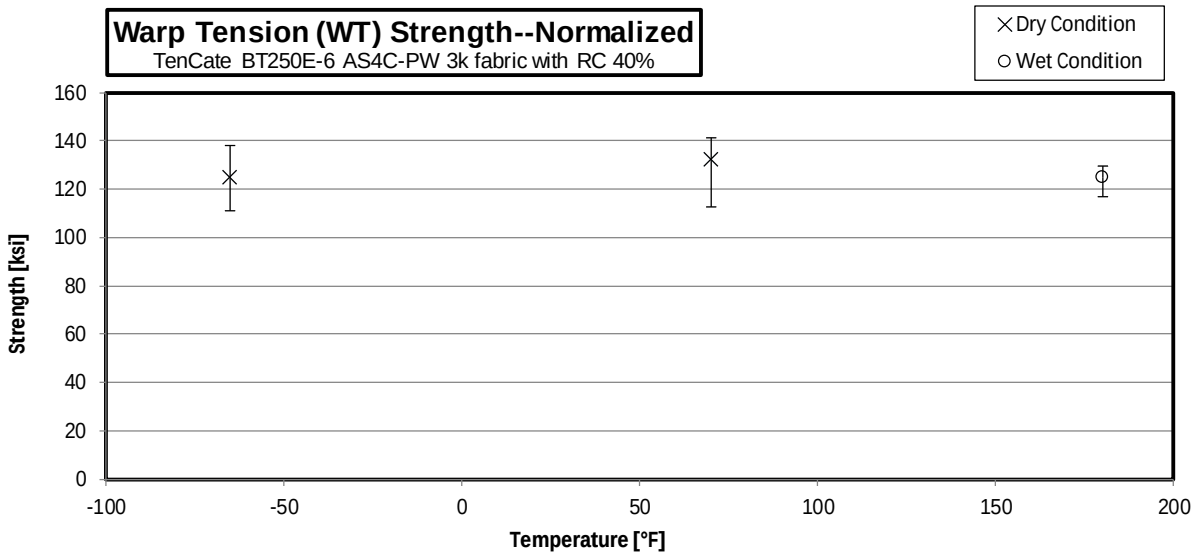
**Normalized by:** NA

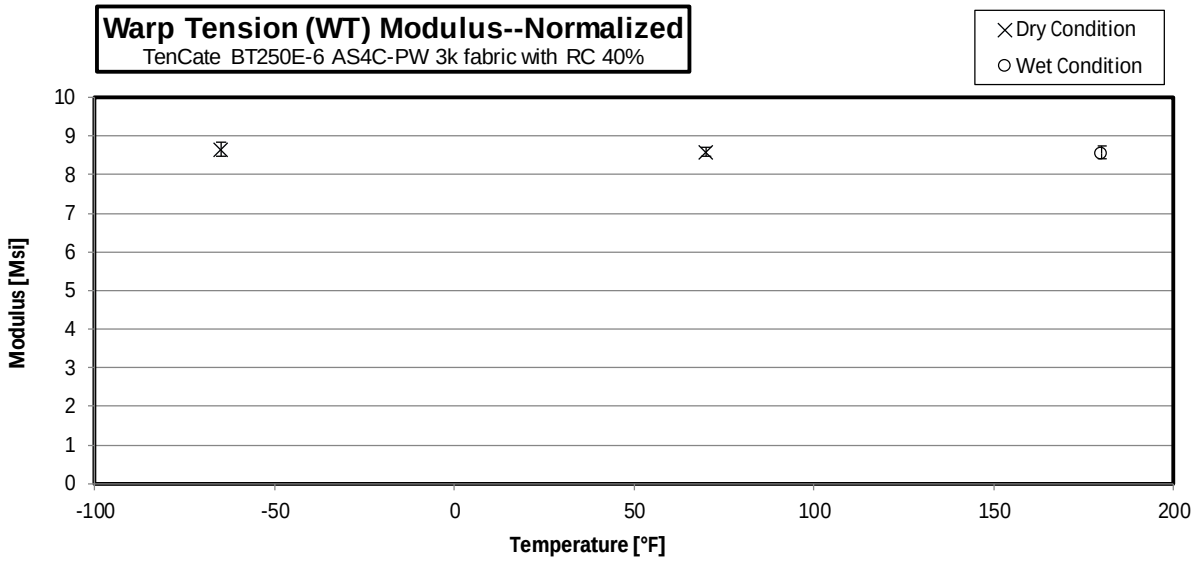
| | | **CTD** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | -65 | | | | | | | |
| | | Dry | | | | Dry | | | |
| **Source code** | | EABQX XXXB | | EABQX XXXA | | EABQX XXXC | | EABQX XXXD | |
| | | **Normalized** | **Measured** | **Normalized** | **Measured** | **Normalized** | **Measured** | **Normalized** | **Measured** |
| **SBS [ksi]** | **Mean** | | 8.466 | | 8.157 | | 7.109 | | 5.044 |
| | **Minimum** | | 7.885 | | 7.745 | | 6.443 | | 4.597 |
| | **Maximum** | | 8.948 | | 8.896 | | 7.554 | | 5.630 |
| | **C.V.(%)** | | 3.323 | | 3.458 | | 4.617 | | 4.444 |
| | **No. Specimens** | | 22 | | 23 | | 21 | | 22 |
| | **No. Prepreg Lots** | | 3 | | 3 | | 3 | | 3 |

## 3. Individual Test Charts

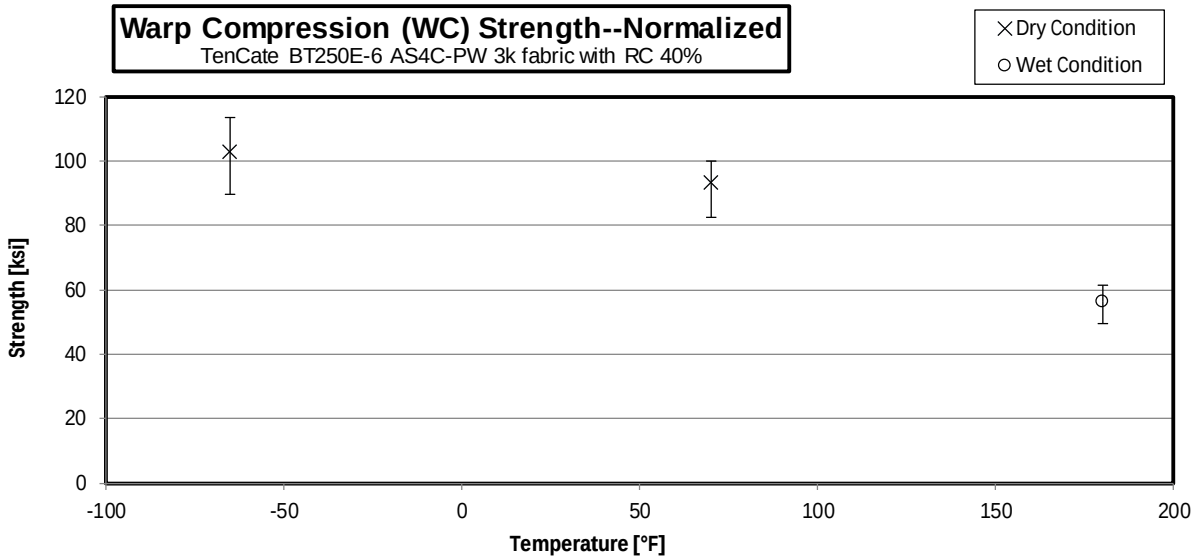
These charts combine all three batches of data and plot the minimum and maximum modulus and strength range based on the test temperature.

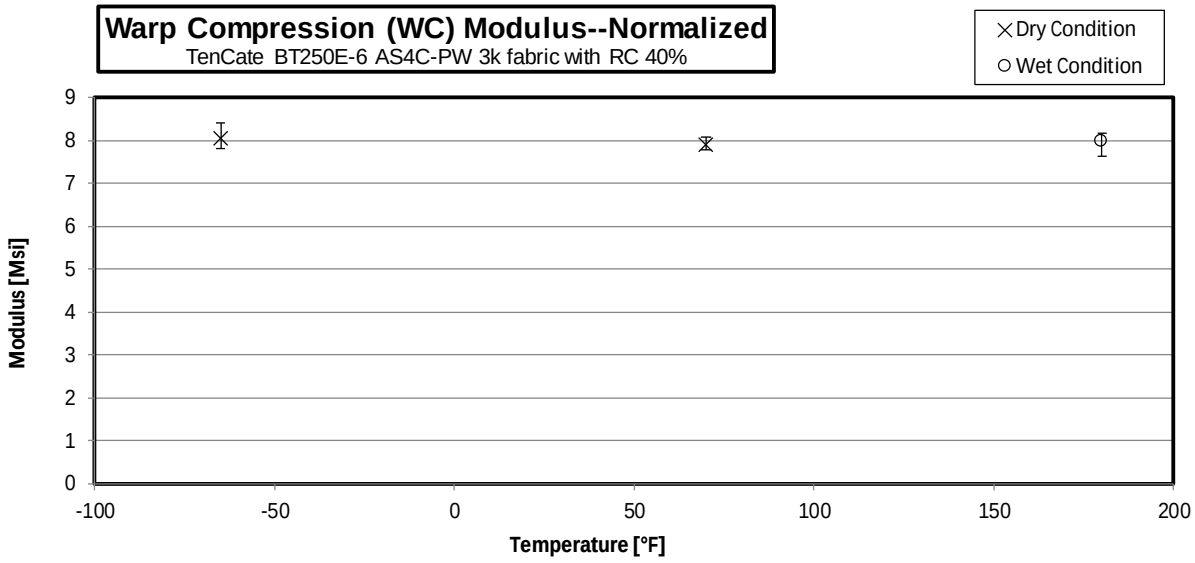
## 3.1 Warp Tension Properties (WT)



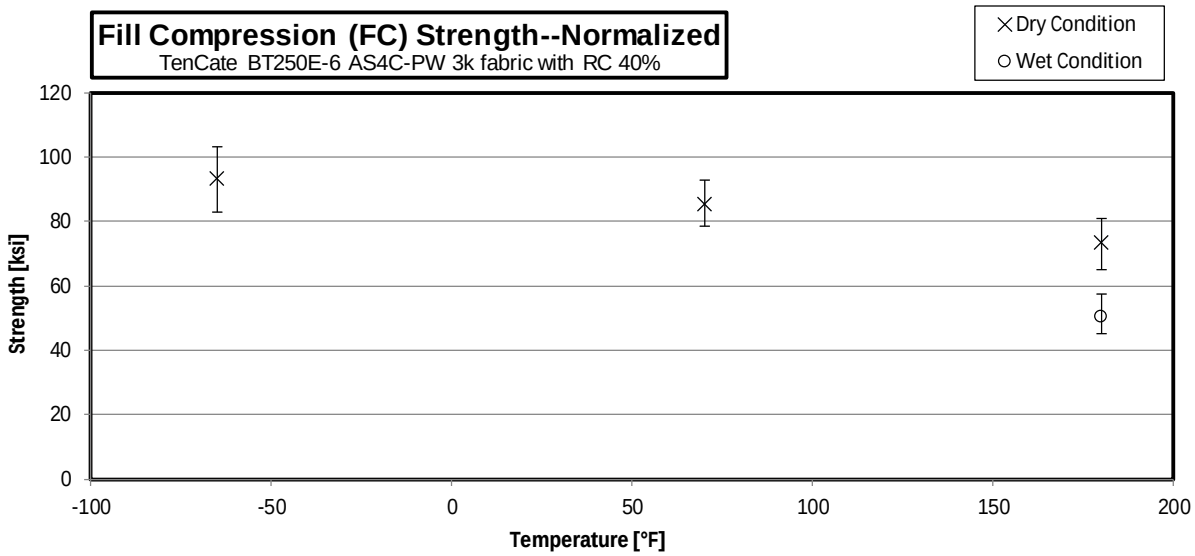



## 3.3 Warp Compression Properties (WC)

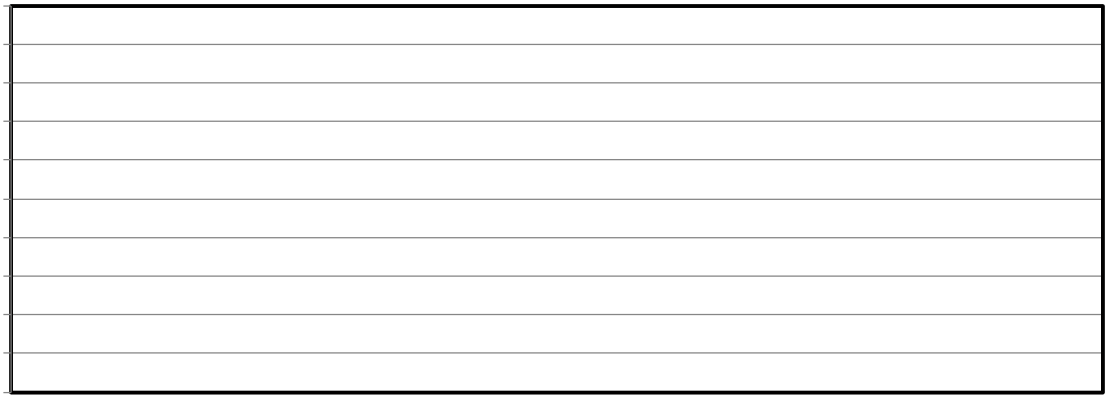


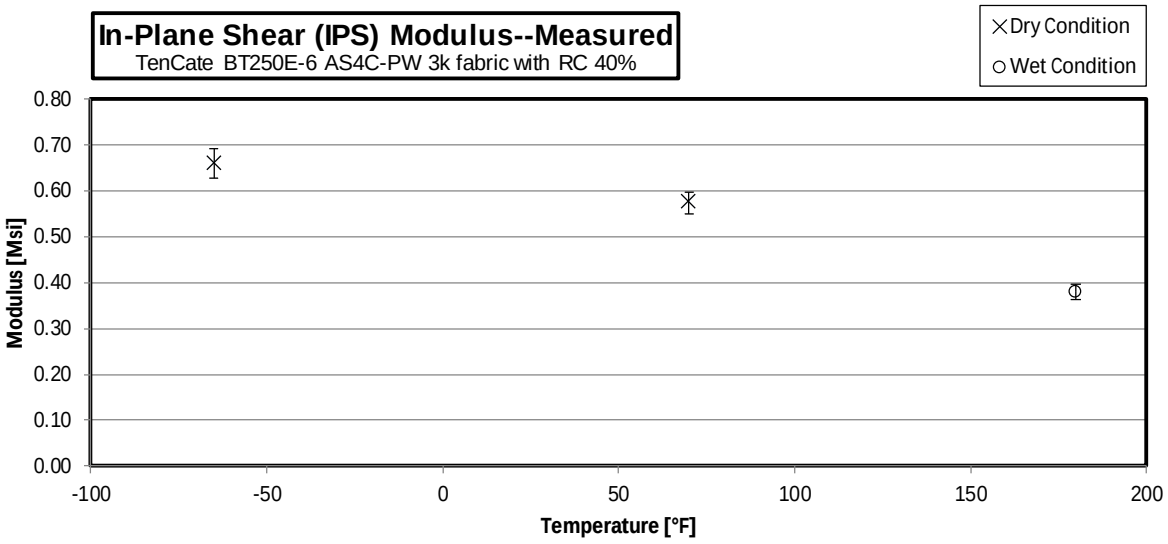



## 3.4 Fill Compression Properties (FC)



## 3.5 In-Plane Shear Properties (IPS)



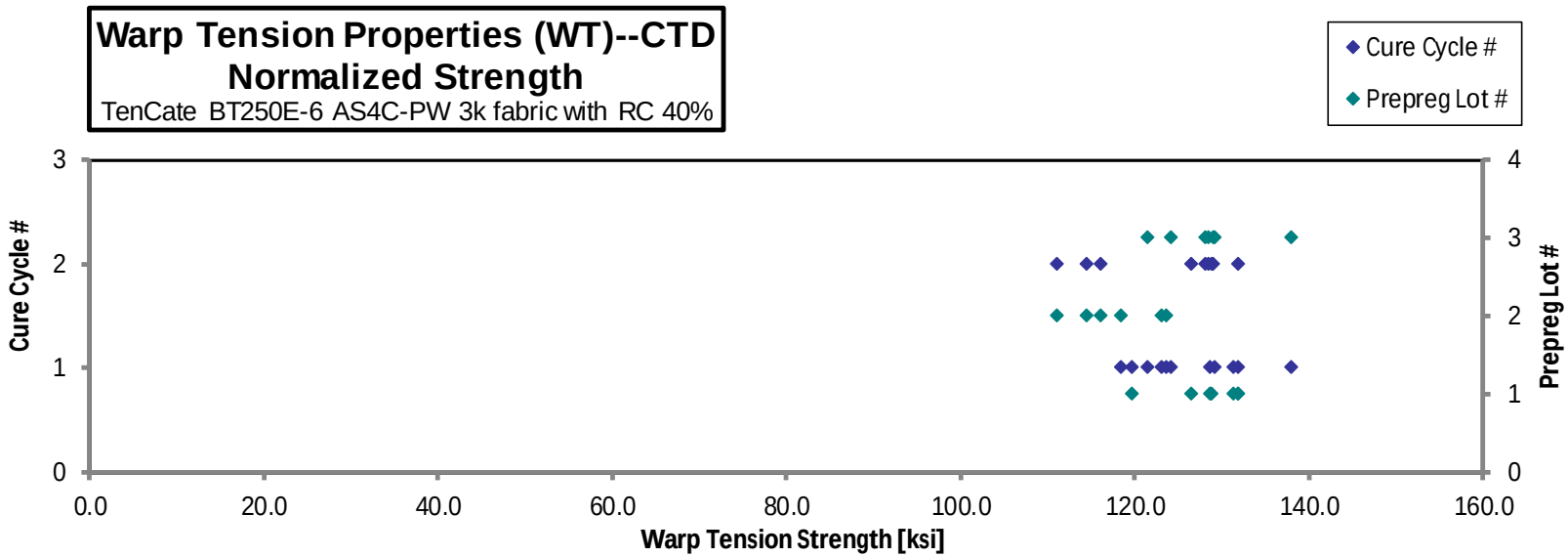

In-Plane Shear (IPS) Modulus--Measured
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Dry Condition
Wet Condition
Modulus [Msi]
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
-100
-50
0
50
100
150
200
Temperature [°F]

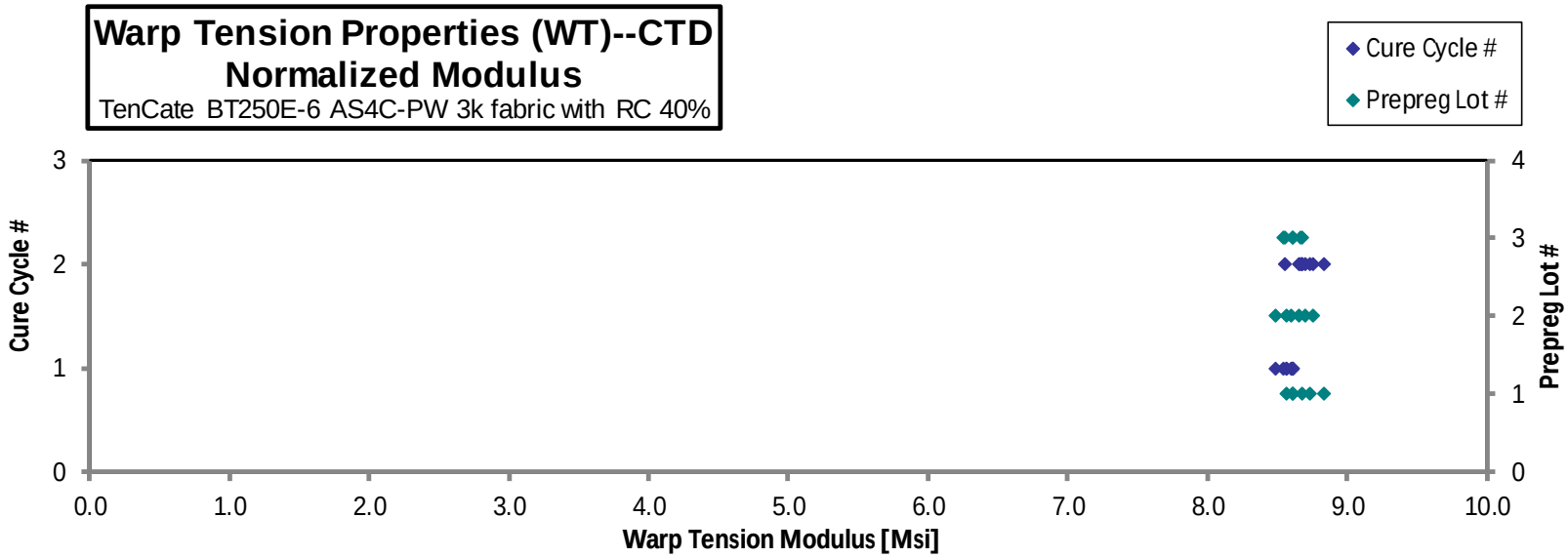
# 4. Individual Test Data

## 4.1 Warp Tension Properties (WT)

| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

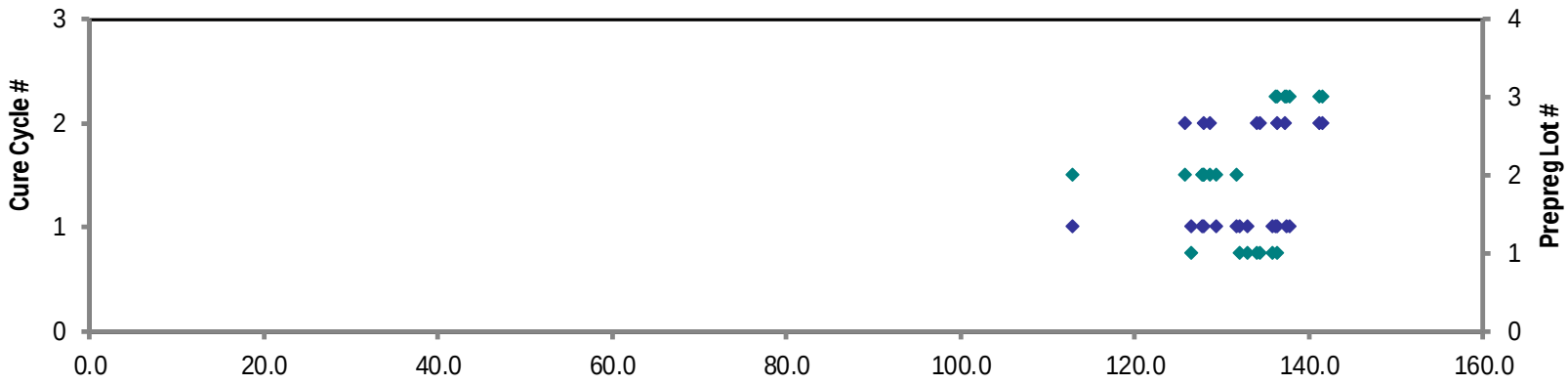
| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Poisson's Ratio | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABJA116B | A | C1 | 1 | 1 | 129.990 | 8.695 | 0.060 | 0.126 | 15 | LGM/ LWB | 0.0084 | 128.614 | 8.603 |
| EABJA117B | A | C1 | 1 | 1 | 134.359 | 8.760 | *** | 0.125 | 15 | LGM | 0.0083 | 131.267 | 8.558 |
| EABJA118B | A | C1 | 1 | 1 | 122.974 | 8.843 | *** | 0.124 | 15 | LGM | 0.0083 | 119.630 | 8.603 |
| EABJA119B* | A | C1 | 1 | 1 | 133.790 | | | 0.126 | 15 | LGM/ LWB | 0.0084 | 131.762 | |
| EABJA215B | A | C2 | 1 | 2 | 126.493 | 8.684 | *** | 0.127 | 15 | LGM / LWT | 0.0085 | 126.394 | 8.677 |
| EABJA216B | A | C2 | 1 | 2 | 132.440 | 8.764 | 0.066 | 0.127 | 15 | LWT / LGM | 0.0085 | 131.869 | 8.726 |
| EABJA217B | A | C2 | 1 | 2 | 131.243 | 9.004 | 0.066 | 0.125 | 15 | LAB | 0.0083 | 128.687 | 8.829 |
| EABJB116B | B | C1 | 2 | 1 | 120.123 | 8.364 | 0.059 | 0.131 | 15 | LAT | 0.0087 | 122.965 | 8.562 |
| EABJB117B | B | C1 | 2 | 1 | 115.311 | 8.268 | *** | 0.131 | 15 | LGM | 0.0087 | 118.340 | 8.485 |
| EABJB118B | B | C1 | 2 | 1 | ** | 8.402 | 0.062 | 0.130 | 15 | LIT | 0.0087 | | 8.595 |
| EABJB119B* | B | C1 | 2 | 1 | 124.227 | | | 0.127 | 15 | LGM | 0.0085 | 123.610 | |
| EABJB215B | B | C2 | 2 | 2 | 110.386 | 8.714 | 0.055 | 0.128 | 15 | LAB | 0.0085 | 110.920 | 8.756 |
| EABJB216B | B | C2 | 2 | 2 | 113.891 | 8.612 | 0.051 | 0.128 | 15 | LAB | 0.0085 | 114.412 | 8.651 |
| EABJB217B | B | C2 | 2 | 2 | 117.330 | 8.787 | 0.056 | 0.126 | 15 | LAT / LWB | 0.0084 | 116.073 | 8.693 |
| EABJC116B | C | C1 | 3 | 1 | 124.808 | 8.257 | 0.055 | 0.132 | 15 | LWB / LAT | 0.0088 | 129.132 | 8.543 |
| EABJC117B | C | C1 | 3 | 1 | 120.132 | 8.332 | 0.049 | 0.132 | 15 | LGM / LWT | 0.0088 | 124.058 | 8.605 |
| EABJC118B | C | C1 | 3 | 1 | 118.502 | 8.405 | 0.060 | 0.131 | 15 | LWT/LWB | 0.0087 | 121.322 | 8.605 |

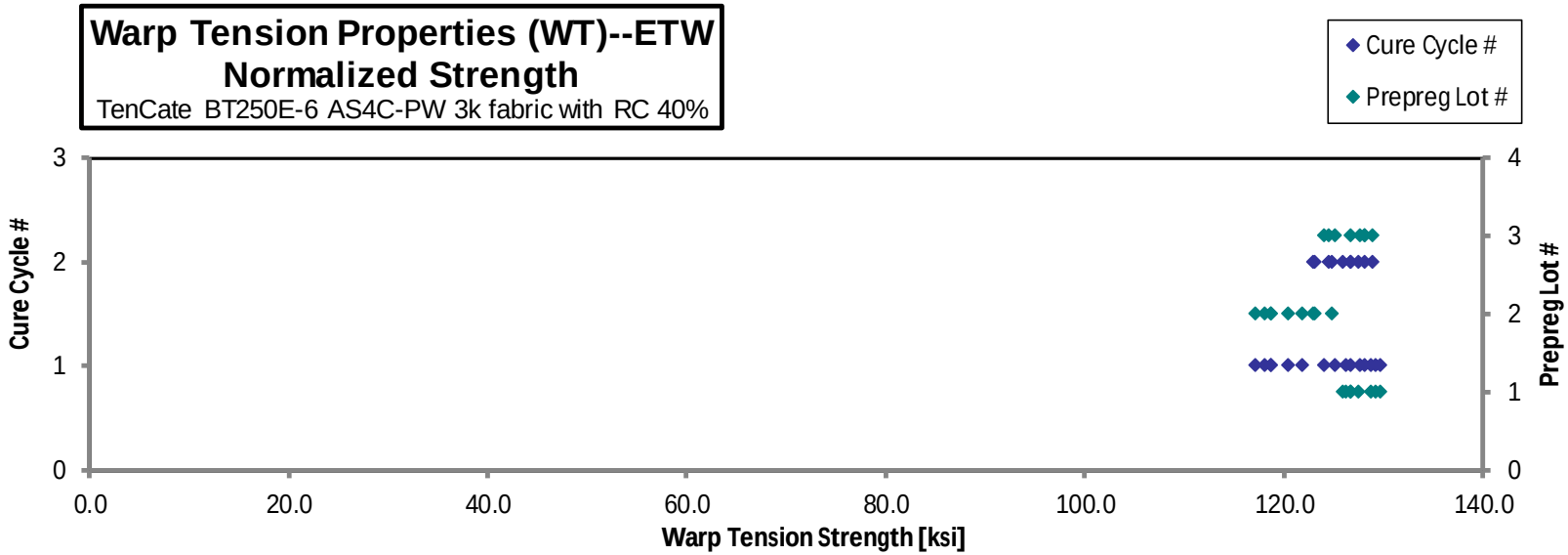

Warp Tension Properties (WT)--CTD
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
Warp Tension Strength [ksi]

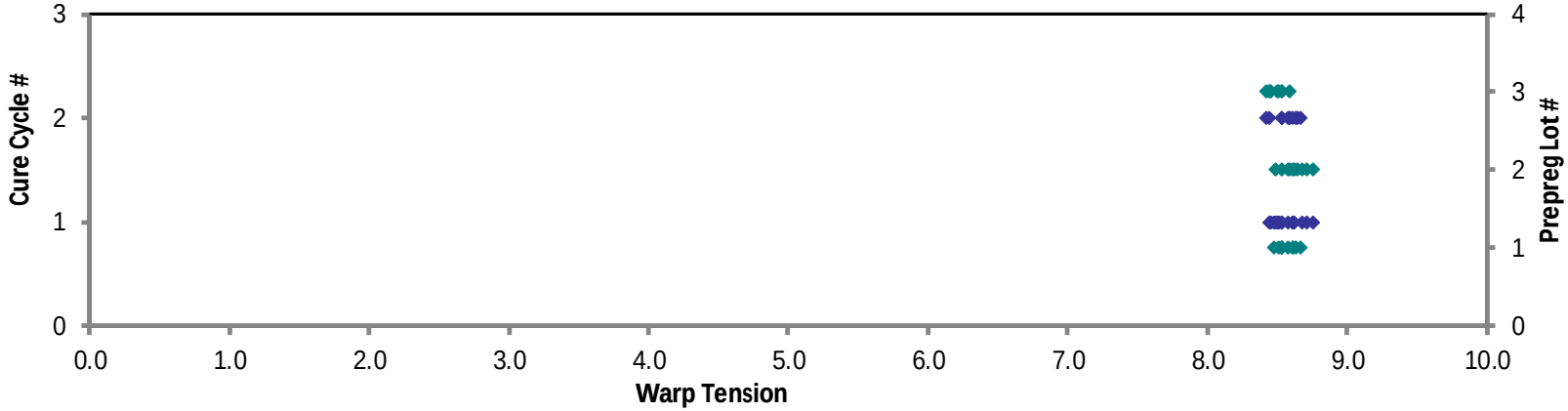

Warp Tension Properties (WT)--CTD
Normalized Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Warp Tension Modulus [Msi]

| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Poisson's Ratio | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABJA111A | A | C1 | 1 | 1 | 136.161 | 8.911 | 0.051 | 0.124 | 15 | LWB/LWT | 0.0083 | 132.904 | 8.698 |
| EABJA112A | A | C1 | 1 | 1 | 134.214 | 8.742 | ** | 0.125 | 15 | LWB/LWT | 0.0084 | 131.951 | 8.594 |
| EABJA113A | A | C1 | 1 | 1 | 128.471 | 8.710 | 0.053 | 0.125 | 15 | LWB/LWT | 0.0084 | 126.439 | 8.572 |
| EABJA114A | A | C1 | 1 | 1 | 137.605 | 8.714 | 0.057 | 0.126 | 15 | LWB/LWT | 0.0084 | 135.716 | 8.595 |


Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0


Warp Tension Properties (WT)--ETW
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Warp Tension Strength [ksi]


Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Warp Tension

# 4.2 Fill Tension Properties (FT)

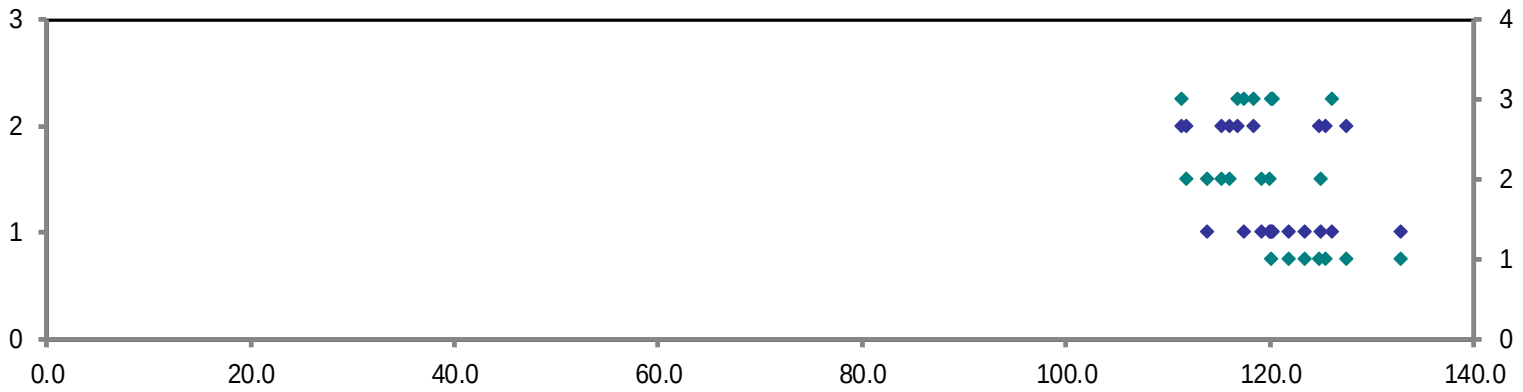
**Fill Tension Properties (FT)--CTD**
**Strength & Modulus**
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%

**normalizing $t_{ply}$ [in]**: 0.0085

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABUA116B | A | C1 | 1 | 1 | 133.218 | 8.664 | 0.127 | 15 | LGM | 0.0085 | 132.730 | 8.632 |
| EABUA117B | A | C1 | 1 | 1 | 122.223 | 8.596 | 0.127 | 15 | LWT | 0.0085 | 121.695 | 8.559 |
| EABUA118B | A | C1 | 1 | 1 | 124.625 | 8.636 | 0.126 | 15 | LWT | 0.0084 | 123.403 | 8.551 |
| EABUA119B* | A | C1 | 1 | 1 | 122.935 | | 0.124 | 15 | LWB | 0.0083 | 119.978 | |
| EABUA215B | A | C2 | 1 | 2 | 123.536 | 8.404 | 0.129 | 15 | LWB | 0.0086 | 124.682 | 8.482 |
| EABUA216B | A | C2 | 1 | 2 | 126.473 | 8.498 | 0.128 | 15 | LWB | 0.0086 | 127.366 | 8.558 |
| EABUA217B | A | C2 | 1 | 2 | 125.745 | 8.639 | 0.127 | 15 | LAB | 0.0085 | 125.383 | 8.614 |
| EABUB116B | B | C1 | 2 | 1 | 117.783 | 8.571 | 0.130 | 15 | LAT/ LWB | 0.0086 | 119.815 | 8.719 |
| EABUB117B | B | C1 | 2 | 1 | 112.145 | 8.597 | 0.129 | 15 | LGM | 0.0086 | 113.787 | 8.722 |
| EABUB118B | B | C1 | 2 | 1 | 117.070 | 8.637 | 0.130 | 15 | LGM | 0.0086 | 119.044 | 8.783 |
| EABUB119B* | B | C1 | 2 | 1 | 124.853 | | 0.127 | 15 | LGM | 0.0085 | 124.837 | |
| EABUB215B | B | C2 | 2 | 2 | 109.120 | 8.566 | 0.131 | 15 | LAB | 0.0087 | 111.773 | 8.774 |
| EABUB216B | B | C2 | 2 | 2 | 113.526 | 8.536 | 0.130 | 15 | LAB | 0.0087 | 116.034 | 8.725 |
| EABUB217B | B | C2 | 2 | 2 | 115.424 | 8.659 | 0.127 | 15 | LAB | 0.0085 | 115.213 | 8.643 |
| EABUC116B | C | C1 | 3 | 1 | 121.165 | 8.681 | 0.127 | 15 | LAB | 0.0084 | 120.215 | 8.613 |
| EABUC117B | C | C1 | 3 | 1 | 121.228 | 8.746 | 0.126 | 15 | LGM | 0.0084 | 120.102 | 8.664 |
| EABUC118B | C | C1 | 3 | 1 | 118.259 | 8.609 | 0.127 | 15 | LAT / LWB | 0.0084 | 117.332 | 8.541 |
| EABUC119B* | C | C1 | 3 | 1 | 130.128 | | 0.123 | 15 | LGM / LWB | 0.0082 | 125.995 | |
| EABUC216B | C | C2 | 3 | 2 | 116.288 | 8.719 | 0.128 | 15 | LGM | 0.0085 | 116.728 | 8.752 |
| EABUC217B | C | C2 | 3 | 2 | 120.237 | 8.726 | 0.126 | 15 | LWT/ LWB | 0.0084 | 118.351 | 8.589 |
| EABUC218B | C | C2 | 3 | 2 | 110.832 | 8.587 | 0.128 | 15 | LAB | 0.0085 | 111.238 | 8.619 |

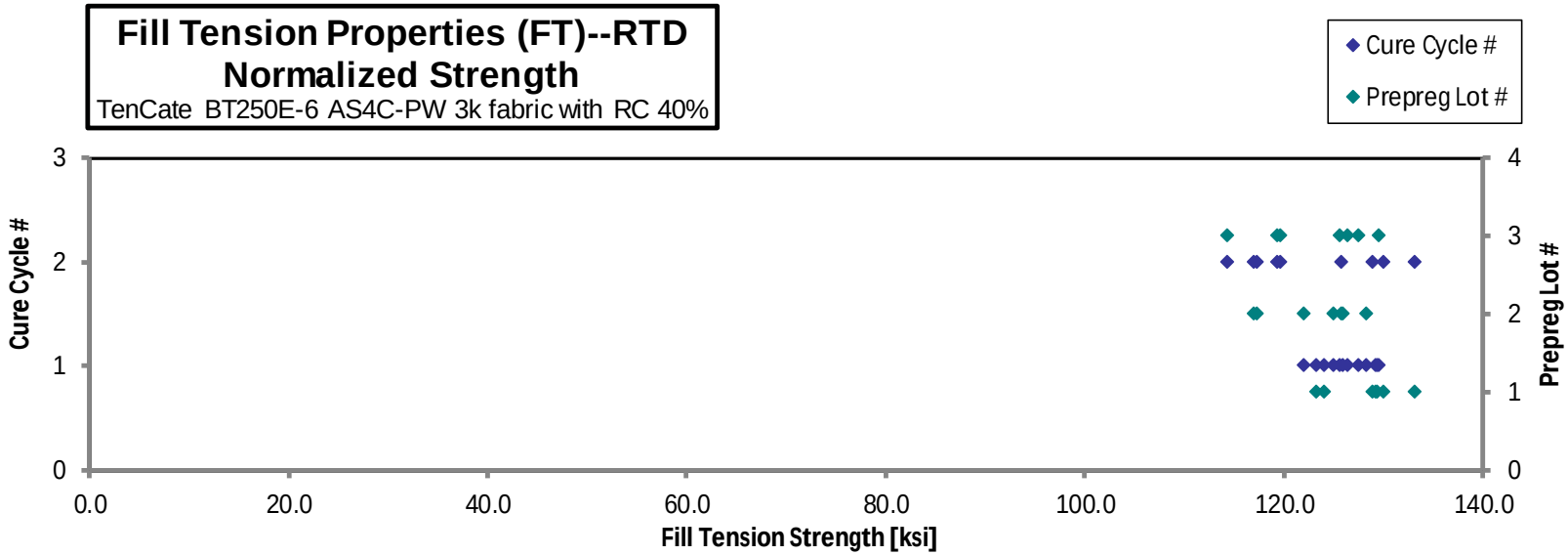
* Specimen was not gaged and tested for strength only.

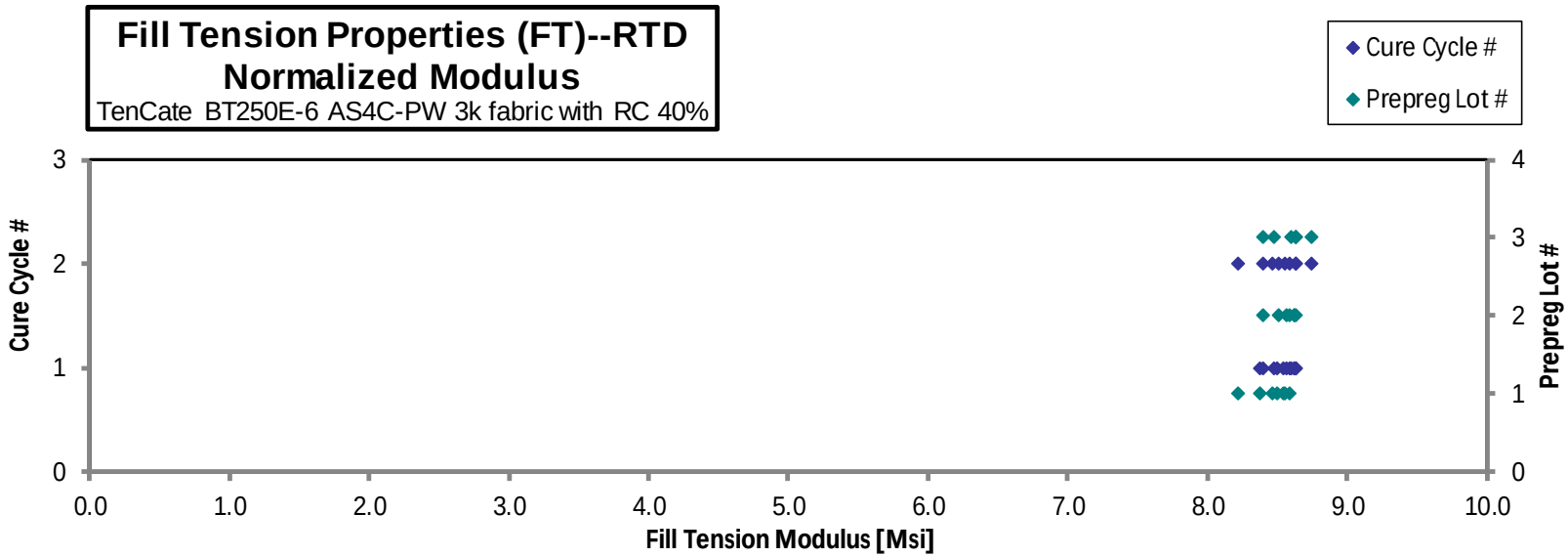
| | Strength [ksi] | Modulus [Msi] | | | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|
| **Average** | **120.324** | **8.615** | | **$Average_{norm}$** | **0.0085** | **120.271** | **8.641** |
| **Standard Dev.** | **6.250** | **0.084** | | **Standard $Dev._{norm}$** | | **5.398** | **0.088** |
| **Coeff. of Var. [%]** | **5.194** | **0.978** | | **Coeff. of Var. $[\%]_{norm}$** | | **4.488** | **1.021** |
| **Min.** | **109.120** | **8.404** | | **Min.** | **0.0082** | **111.238** | **8.482** |
| **Max.** | **133.218** | **8.746** | | **Max.** | **0.0087** | **132.730** | **8.783** |
| **Number of Spec.** | **21** | **18** | | **Number of Spec.** | **21** | **21** | **18** |


3
2
1
0
4
3
2
1
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0

| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] |
|---|---|---|---|---|---|---|


Fill Tension Properties (FT)--RTD
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
Fill Tension Strength [ksi]

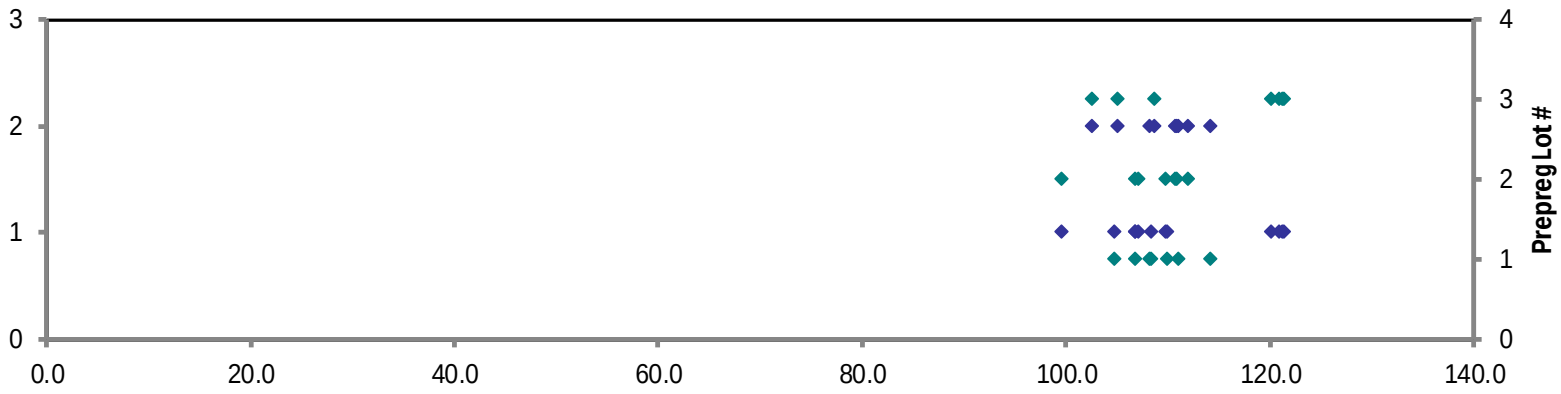

Fill Tension Properties (FT)--RTD
Normalized Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Fill Tension Modulus [Msi]

## Fill Tension Properties (FT)--ETW
## Strength & Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%

normalizing $t_{ply}$ [in]: 0.0085

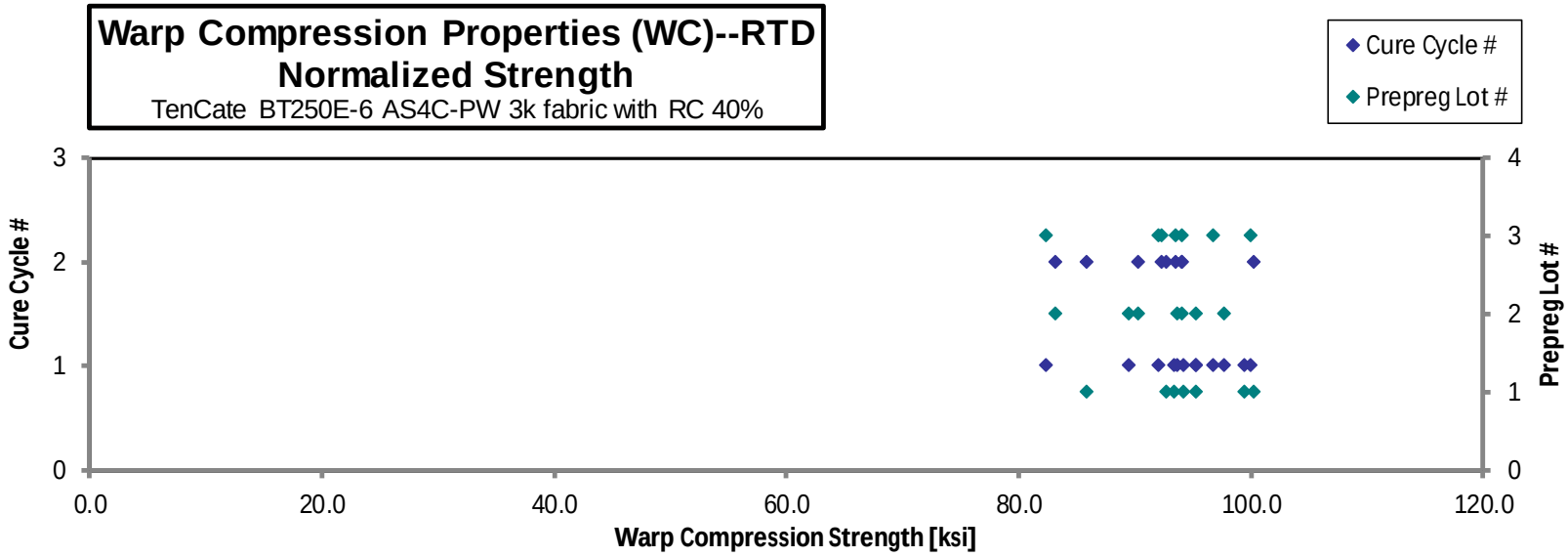
| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABUA11BD | A | C1 | 1 | 1 | 105.781 | 8.653 | 0.126 | 15 | LGM | 0.0084 | 104.689 | 8.564 |
| EABUA11CD | A | C1 | 1 | 1 | 109.023 | 8.635 | 0.127 | 15 | LGM | 0.0084 | 108.324 | 8.580 |
| EABUA11DD | A | C1 | 1 | 1 | 106.818 | 8.469 | 0.127 | 15 | LWB | 0.0085 | 106.622 | 8.453 |
| EABUA11ED | A | C1 | 1 | 1 | 110.082 | 8.501 | 0.127 | 15 | LGM/LWB | 0.0085 | 109.909 | 8.488 |
| EABUA219D | A | C2 | 1 | 2 | 107.596 | 8.459 | 0.128 | 15 | LGM | 0.0085 | 108.172 | 8.505 |
| EABUA21AD | A | C2 | 1 | 2 | 110.091 | 8.399 | 0.129 | 15 | LWT/LWB/DGM | 0.0086 | 110.955 | 8.465 |
| EABUA21BD | A | C2 | 1 | 2 | 113.251 | 8.363 | 0.128 | 15 | LGM | 0.0086 | 114.035 | 8.421 |
| EABUB11BD | B | C1 | 2 | 1 | 109.038 | 8.552 | 0.128 | 15 | LGM | 0.0085 | 109.637 | 8.599 |
| EABUB11CD | B | C1 | 2 | 1 | 106.289 | 8.614 | 0.128 | 15 | LGM | 0.0086 | 106.984 | 8.671 |
| EABUB11DD | B | C1 | 2 | 1 | 105.986 | 8.564 | 0.128 | 15 | LWB/DGM | 0.0086 | 106.707 | 8.622 |
| EABUB11ED | B | C1 | 2 | 1 | 98.594 | 8.592 | 0.129 | 15 | LGM | 0.0086 | 99.509 | 8.671 |
| EABUB219D | B | C2 | 2 | 2 | 110.058 | 8.428 | 0.128 | 15 | LGM | 0.0086 | 110.806 | 8.485 |
| EABUB21AD | B | C2 | 2 | 2 | 109.443 | 8.694 | 0.129 | 15 | LWT | 0.0086 | 110.573 | 8.784 |
| EABUB21BD | B | C2 | 2 | 2 | 109.874 | 8.551 | 0.130 | 15 | LGM | 0.0087 | 111.943 | 8.712 |
| EABUC11BD | C | C1 | 3 | 1 | 121.105 | 8.871 | 0.126 | 15 | LGM/DGM | 0.0084 | 119.997 | 8.790 |
| EABUC11CD | C | C1 | 3 | 1 | 122.067 | 8.713 | 0.126 | 15 | LGM/DGM | 0.0084 | 120.823 | 8.624 |
| EABUC11DD | C | C1 | 3 | 1 | 122.561 | 8.832 | 0.126 | 15 | LGM/DGM | 0.0084 | 121.328 | 8.743 |
| EABUC11ED | C | C1 | 3 | 1 | 122.182 | 8.790 | 0.126 | 15 | LGM/DGM | 0.0084 | 121.080 | 8.711 |
| EABUC219D | C | C2 | 3 | 2 | 101.223 | 8.569 | 0.129 | 15 | LGM | 0.0086 | 102.533 | 8.680 |
| EABUC21AD | C | C2 | 3 | 2 | 103.909 | 8.456 | 0.129 | 15 | LWB | 0.0086 | 104.955 | 8.541 |
| EABUC21BD | C | C2 | 3 | 2 | 108.479 | 8.571 | 0.128 | 15 | LGM | 0.0085 | 108.564 | 8.578 |

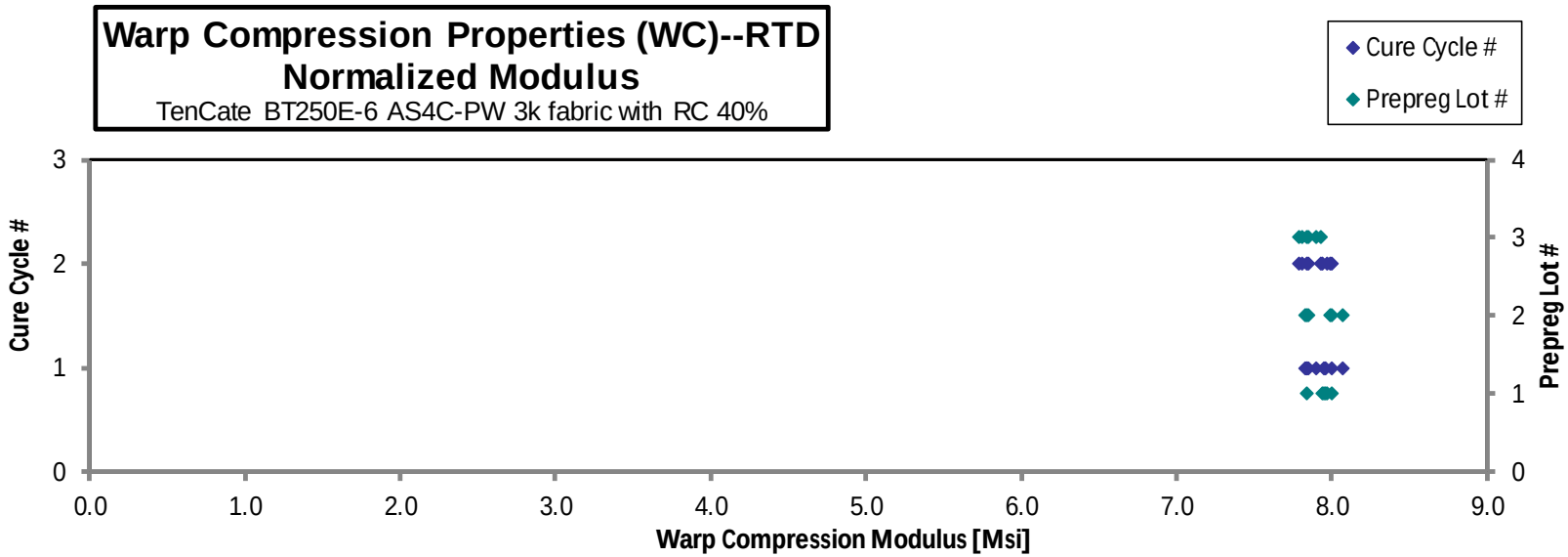
| | | | | | | |
|---|---|---|---|---|---|---|
| **Average** | **110.164** | **8.585** | **$Average_{norm}$** | **0.0085** | **110.388** | **8.604** |
| **Standard Dev.** | **6.699** | **0.139** | **Standard $Dev._{norm}$** | | **6.108** | **0.111** |
| **Coeff. of Var. [%]** | **6.081** | **1.618** | **Coeff. of Var. $[\%]_{norm}$** | | **5.533** | **1.286** |
| **Min.** | **98.594** | **8.363** | **Min.** | **0.0084** | **99.509** | **8.421** |
| **Max.** | **122.561** | **8.871** | **Max.** | **0.0087** | **121.328** | **8.790** |
| **Number of Spec.** | **21** | **21** | **Number of Spec.** | **21** | **21** | **21** |


3
2
1
0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
4
3
2
1
0
Prepreg Lot #

## 4.3 Warp Compression Properties (WC)

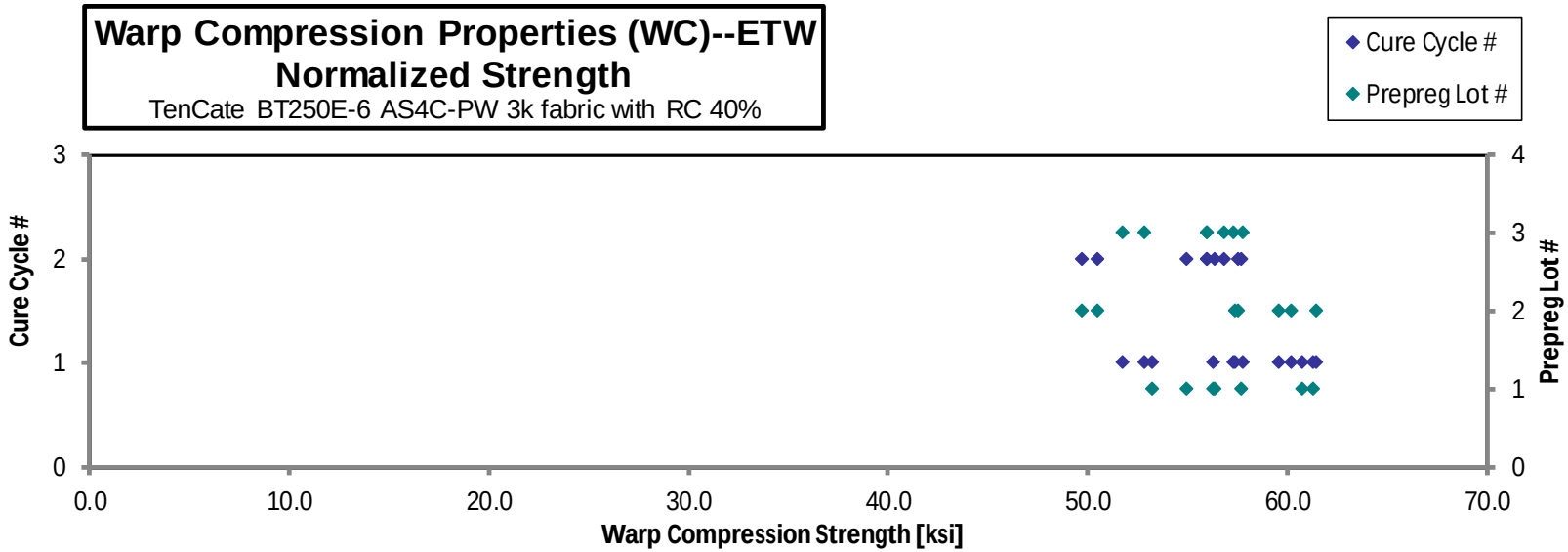
| | normalizing t |
|---|---|
| | |

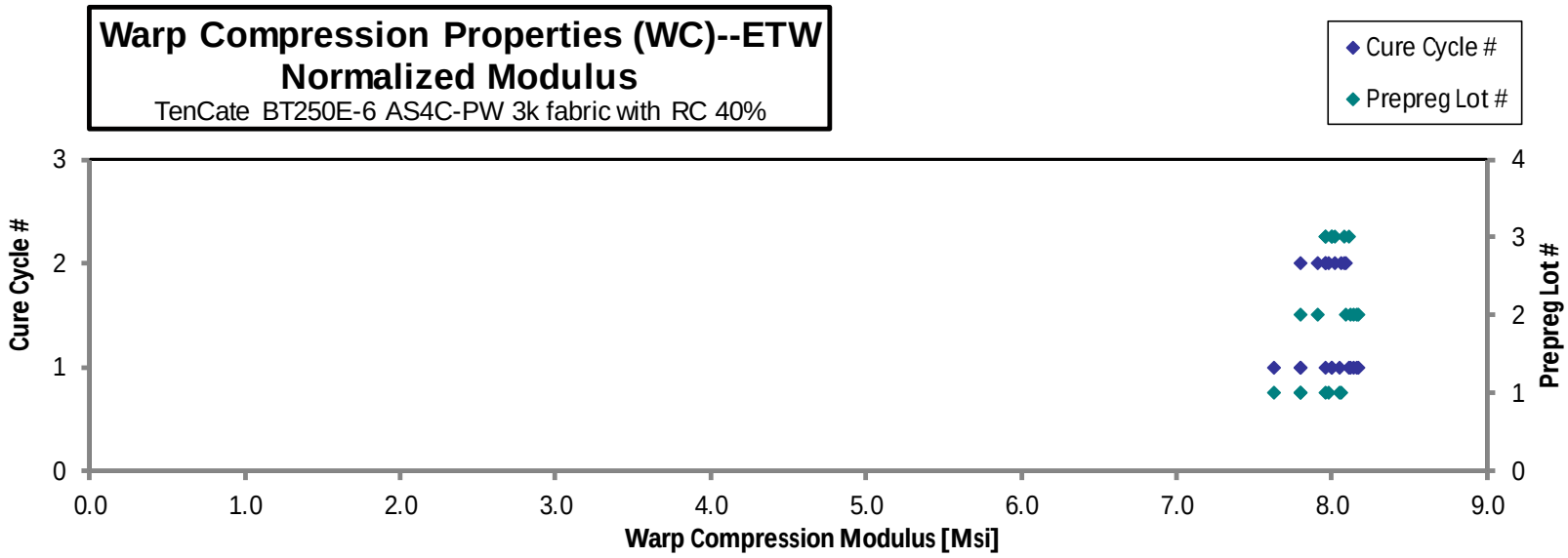

Warp Compression Properties (WC)--RTD
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Warp Compression Strength [ksi]


Warp Compression Properties (WC)--RTD
Normalized Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
Warp Compression Modulus [Msi]

| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABLA11BD | A | C1 | 1 | 1 | | 8.179 | 0.125 | 15 | HGM | 0.0084 | | 8.049 |
| EABLA11CD | A | C1 | 1 | 1 | | 7.835 | 0.127 | 15 | BGM | 0.0085 | | 7.790 |
| EABLA11DD | A | C1 | 1 | 1 | | 7.787 | 0.128 | 15 | BGM | 0.0085 | | 7.800 |
| EABLA11ED | A | C1 | 1 | 1 | | 7.550 | 0.129 | 15 | HGM | 0.0086 | | 7.622 |
| EABLA11FD | A | C1 | 1 | 1 | 60.544 | | 0.129 | 15 | BGM | 0.0086 | 61.238 | |
| EABLA11GD | A | C1 | 1 | 1 | 60.161 | | 0.129 | 15 | BGM | 0.0086 | 60.692 | |
| EABLA11HD | A | C1 | 1 | 1 | 55.968 | | 0.128 | 15 | HGM | 0.0085 | 56.226 | |
| EABLA11ID | A | C1 | 1 | 1 | 53.306 | | 0.127 | 15 | HAT | 0.0085 | 53.196 | |
| EABLA219D | A | C2 | 1 | 2 | | 7.890 | 0.129 | 15 | BGM | 0.0086 | | 7.955 |
| EABLA21AD | A | C2 | 1 | 2 | | 7.978 | 0.129 | 15 | HGM | 0.0086 | | 8.058 |
| EABLA21BD | A | C2 | 1 | 2 | | 7.850 | 0.130 | 15 | HGM | 0.0086 | | 7.977 |
| EABLA21CD | A | C2 | 1 | 2 | 53.958 | | 0.130 | 15 | HGM | 0.0086 | 54.904 | |
| EABLA21DD | A | C2 | 1 | 2 | 55.325 | | 0.130 | 15 | HAT | 0.0087 | 56.307 | |
| EABLA21ED | A | C2 | 1 | 2 | 56.636 | | 0.130 | 15 | HGM | 0.0086 | 57.624 | |
| EABLB11BD | B | C1 | 2 | 1 | | 8.282 | 0.126 | 15 | BGM | 0.0084 | | 8.158 |
| EABLB11CD | B | C1 | 2 | 1 | | 8.212 | 0.126 | 15 | BGM | 0.0084 | | 8.113 |
| EABLB11DD | B | C1 | 2 | 1 | | 8.191 | 0.127 | 15 | HGM | 0.0085 | | 8.172 |
| EABLB11ED | B | C1 | 2 | 1 | | 8.091 | 0.128 | 15 | HGM | 0.0085 | | 8.137 |
| EABLB11FD | B | C1 | 2 | 1 | 59.720 | | 0.128 | 15 | BGM | 0.0086 | 60.153 | |


Warp Compression Properties (WC)--ETW
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Warp Compression Strength [ksi]


Warp Compression Properties (WC)--ETW
Normalized Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
Warp Compression Modulus [Msi]

# 4.4 Fill Compression Properties (FC)

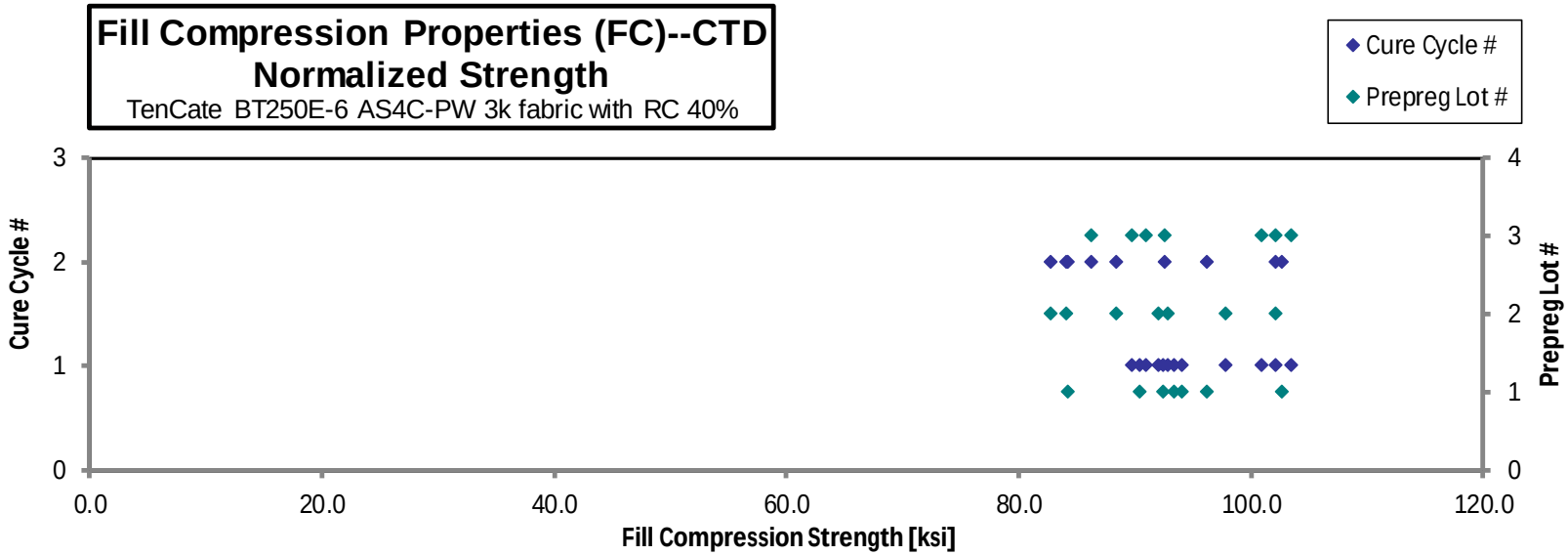
| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

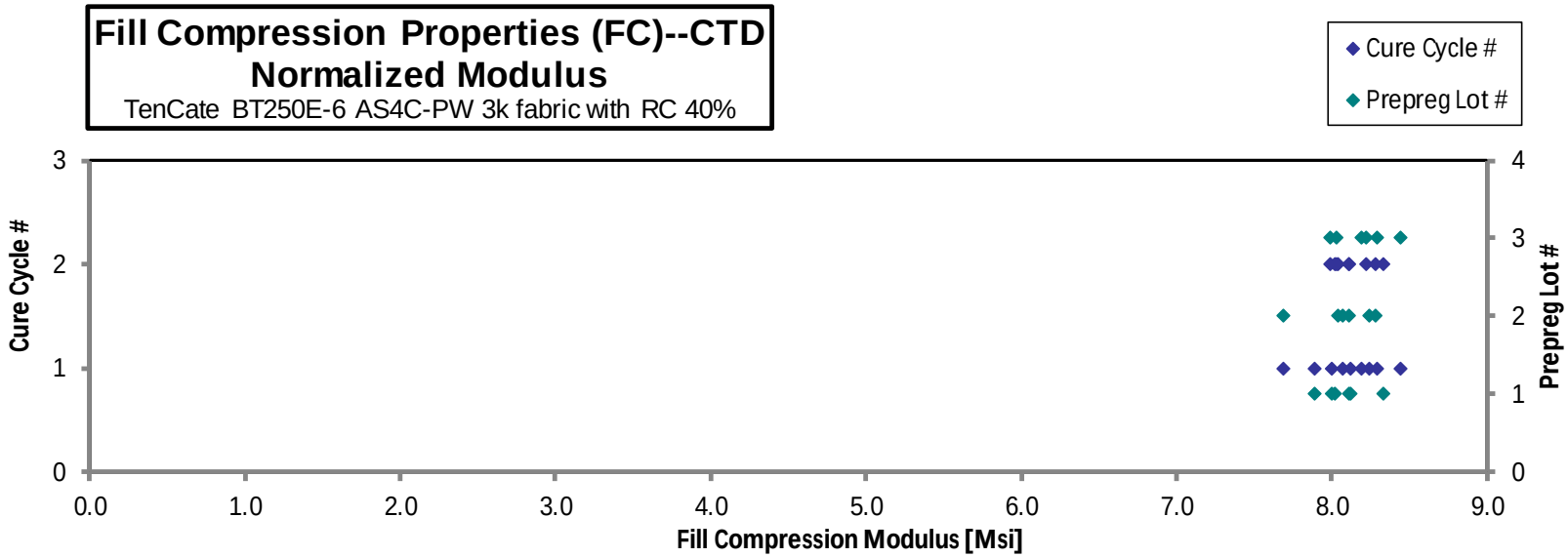
| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABZA116B | A | C1 | 1 | 1 | 91.100 | 7.691 | 0.131 | 15 | BGM | 0.0087 | 93.386 | 7.884 |
| EABZA117B | A | C1 | 1 | 1 | 87.790 | 7.771 | 0.131 | 15 | BGM | 0.0087 | 90.337 | 7.997 |
| EABZA118B | A | C1 | 1 | 1 | 89.410 | 7.850 | 0.132 | 15 | BGM | 0.0088 | 92.417 | 8.114 |
| EABZA119B* | A | C1 | 1 | 1 | 90.841 | | 0.132 | 15 | BGM | 0.0088 | 93.994 | |
| EABZA215B | A | C2 | 1 | 2 | 96.903 | 8.394 | 0.127 | 15 | BGM | 0.0084 | 96.171 | 8.330 |
| EABZA216B | A | C2 | 1 | 2 | 102.989 | 8.054 | 0.127 | 15 | BGM | 0.0085 | 102.565 | 8.021 |
| EABZA217B | A | C2 | 1 | 2 | 84.579 | 8.143 | 0.127 | 15 | BGM | 0.0085 | 84.165 | 8.104 |
| EABZB116B* | B | C1 | 2 | 1 | 92.839 | | 0.127 | 15 | BGM | 0.0085 | 92.757 | |
| EABZB117B | B | C1 | 2 | 1 | 92.286 | 8.268 | 0.127 | 15 | BGM | 0.0085 | 91.960 | 8.239 |
| EABZB118B | B | C1 | 2 | 1 | 102.512 | 8.094 | 0.127 | 15 | BGM | 0.0085 | 102.110 | 8.062 |
| EABZB119B | B | C1 | 2 | 1 | 98.392 | 7.736 | 0.127 | 15 | BGM | 0.0084 | 97.775 | 7.688 |
| EABZB215B | B | C2 | 2 | 2 | ** | 8.303 | 0.127 | 15 | HIT/BGM | 0.0085 | | 8.281 |
| EABZB216B | B | C2 | 2 | 2 | 84.317 | 8.061 | 0.127 | 15 | BGM | 0.0085 | 84.078 | 8.038 |
| EABZB217B | B | C2 | 2 | 2 | 88.592 | 8.128 | 0.127 | 15 | BGM | 0.0085 | 88.366 | 8.108 |
| EABZB218B* | B | C2 | 2 | 2 | 82.690 | | 0.128 | 15 | BGM | 0.0085 | 82.771 | |
| EABZC116B | C | C1 | 3 | 1 | 104.268 | 8.360 | 0.126 | 15 | BGM | 0.0084 | 103.399 | 8.291 |
| EABZC117B | C | C1 | 3 | 1 | 91.625 | 8.245 | 0.127 | 15 | BGM | 0.0084 | 90.933 | 8.183 |
| EABZC118B | C | C1 | 3 | 1 | 101.843 | 8.526 | 0.126 | 15 | BGM | 0.0084 | 100.805 | 8.439 |
| EABZC119B* | C | C1 | 3 | 1 | 91.089 | | 0.126 | 15 | BGM | 0.0084 | 89.696 | |
| EABZC215B | C | C2 | 3 | 2 | 86.781 | 8.070 | 0.127 | 15 | BGM | 0.0085 | 86.270 | 8.022 |
| EABZC216B | C | C2 | 3 | 2 | 102.676 | 8.036 | 0.127 | 15 | BGM | 0.0084 | 102.042 | 7.986 |
| EABZC217B | C | C2 | 3 | 2 | 92.664 | 8.230 | 0.127 | 15 | BGM | 0.0085 | 92.473 | 8.214 |

* Specimen was not gaged and tested for strength only.

** Strength not reported due to dominant bad failure mode.

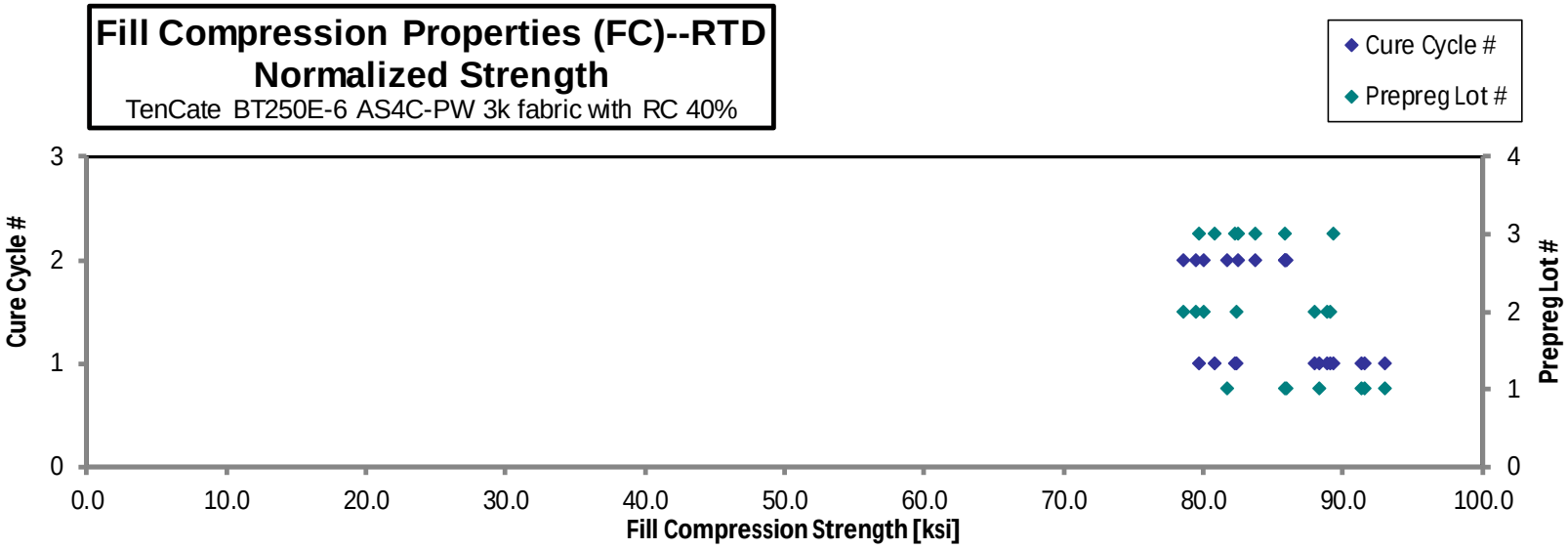
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **Average** | **93.152** | **8.109** | | | **Average** | | | |

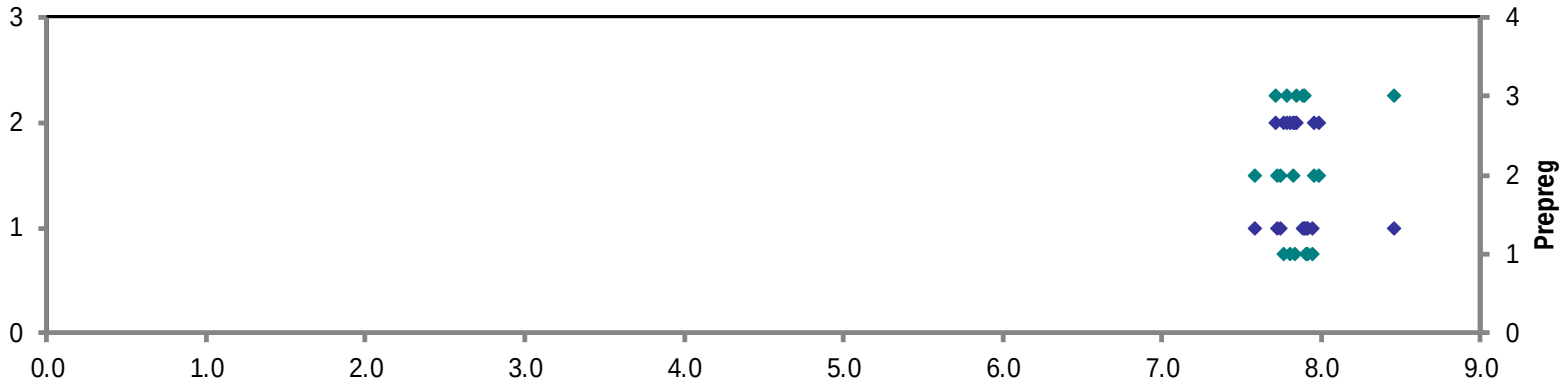

Fill Compression Properties (FC)--CTD
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
20.0
40.0
60.0
80.0
100.0
120.0
Fill Compression Strength [ksi]


Fill Compression Properties (FC)--CTD
Normalized Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
Fill Compression Modulus [Msi]

| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABZA111A | A | C1 | 1 | 1 | 92.628 | 7.875 | 0.128 | 15 | BGM | 0.0085 | 93.019 | 7.909 |
| EABZA112A | A | C1 | 1 | 1 | 87.261 | 7.851 | 0.129 | 15 | BGM/HIB | 0.0086 | 88.322 | 7.946 |
| EABZA113A | A | C1 | 1 | 1 | 89.835 | 7.780 | 0.130 | 15 | BGM | 0.0086 | 91.253 | 7.903 |
| EABZA114A* | A | C1 | 1 | 1 | 89.504 | | 0.130 | 15 | BGM | 0.0087 | 91.469 | |


Fill Compression Properties (FC)--RTD
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0


Prepreg
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0

## Fill Compression Properties (FC)--ETD
## Strength & Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%

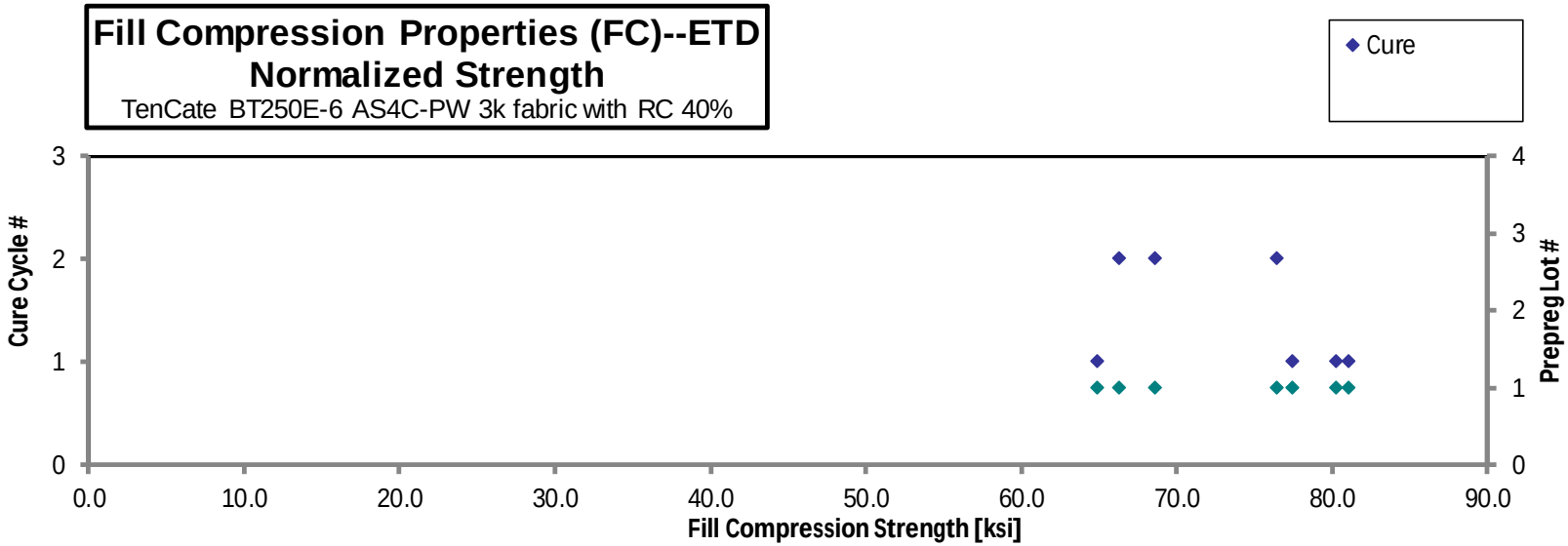
| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABZA11BC | A | C1 | 1 | 1 | 77.377 | 7.868 | 0.132 | 15 | BGM | 0.0088 | 80.222 | 8.157 |
| EABZA11CC | A | C1 | 1 | 1 | 78.115 | 7.840 | 0.132 | 15 | BGM/CIT | 0.0088 | 81.002 | 8.130 |
| EABZA11DC | A | C1 | 1 | 1 | 74.576 | 7.819 | 0.132 | 15 | BGM/HIB | 0.0088 | 77.427 | 8.118 |
| EABZA11EC* | A | C1 | 1 | 1 | 64.293 | | 0.129 | 15 | BGM | 0.0086 | 64.866 | |
| EABZA219C | A | C2 | 1 | 2 | 65.575 | 7.555 | 0.129 | 15 | BGM | 0.0086 | 66.218 | 7.629 |
| EABZA21AC | A | C2 | 1 | 2 | 68.173 | 7.597 | 0.128 | 15 | BGM | 0.0086 | 68.614 | 7.646 |
| EABZA21BC | A | C2 | 1 | 2 | ** | 7.663 | 0.128 | 15 | HIT/BGM | 0.0085 | | 7.696 |
| EABZA21CC* | A | C2 | 1 | 2 | 76.281 | | 0.128 | 15 | BAB | 0.0085 | 76.453 | |

* Specimen was not gaged and tested for strength only.

** Strength not reported due to dominant bad failure mode.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Average** | **72.056** | **7.724** | | **$Average_{norm}$** | **0.0087** | **73.543** | **7.896** |
| **Standard Dev.** | **5.868** | **0.135** | | **$Standard\ Dev._{norm}$** | | **6.795** | **0.263** |
| **Coeff. of Var. [%]** | **8.143** | **1.751** | | **$Coeff.\ of\ Var.\ [\%]_{norm}$** | | **9.239** | **3.329** |
| **Min.** | **64.293** | **7.555** | | **Min.** | **0.0085** | **64.866** | **7.629** |
| **Max.** | **78.115** | **7.868** | | **Max.** | **0.0088** | **81.002** | **8.157** |
| **Number of Spec.** | **7** | **6** | | **Number of Spec.** | **8** | **7** | **6** |


Fill Compression Properties (FC)--ETD
Normalized Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
1
2
3
4
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0

| normalizing $t_{ply}$ [in] |
|---|
| 0.0085 |

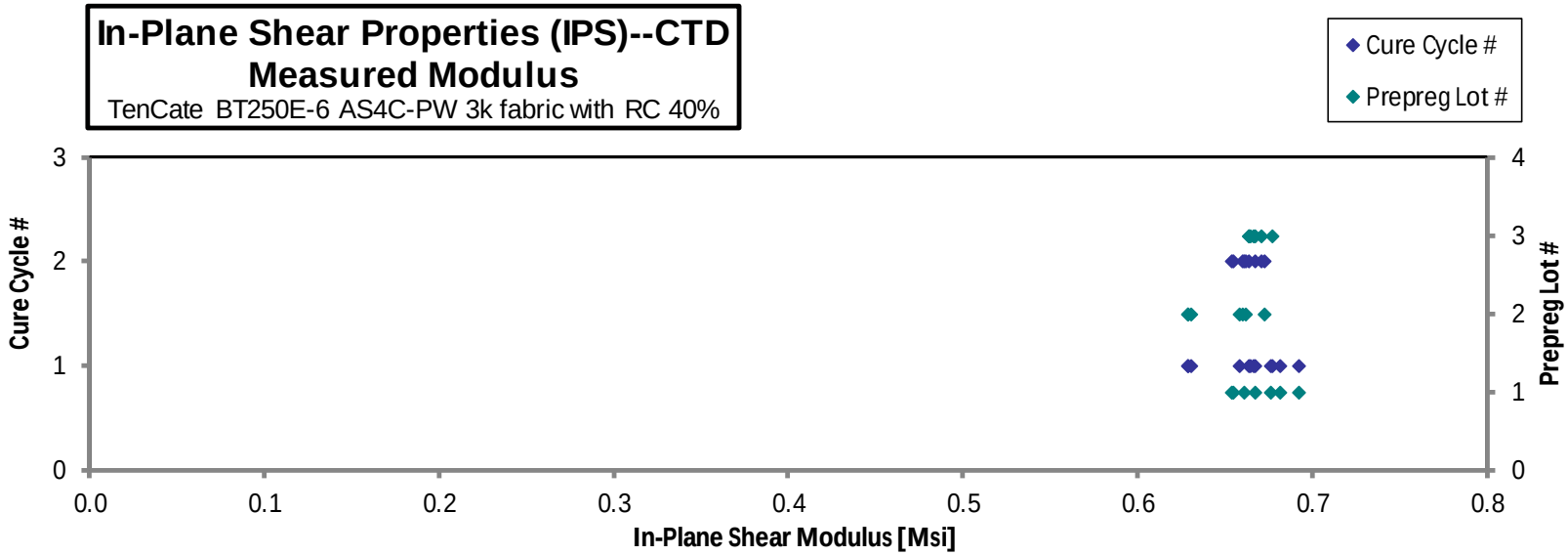
| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Failure Mode | Avg. $t_{ply}$ [in] | $Strength_{norm}$ [ksi] | $Modulus_{norm}$ [Msi] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EABZA11GD | A | C1 | 1 | 1 | | 7.735 | 0.130 | 15 | HGM | 0.0087 | | 7.898 |
| EABZA11HD | A | C1 | 1 | 1 | | 7.682 | 0.131 | 15 | HGM | 0.0087 | | 7.872 |
| EABZA11ID | A | C1 | 1 | 1 | | 7.731 | 0.131 | 15 | HGM | 0.0087 | | 7.918 |
| EABZA11JD | A | C1 | 1 | 1 | | 7.737 | 0.131 | 15 | HGM | 0.0087 | | 7.941 |
| EABZA11KD | A | C1 | 1 | 1 | 51.567 | | 0.131 | 15 | HGM | 0.0088 | 53.164 | |

## 4.5 In-Plane Shear Properties (IPS)

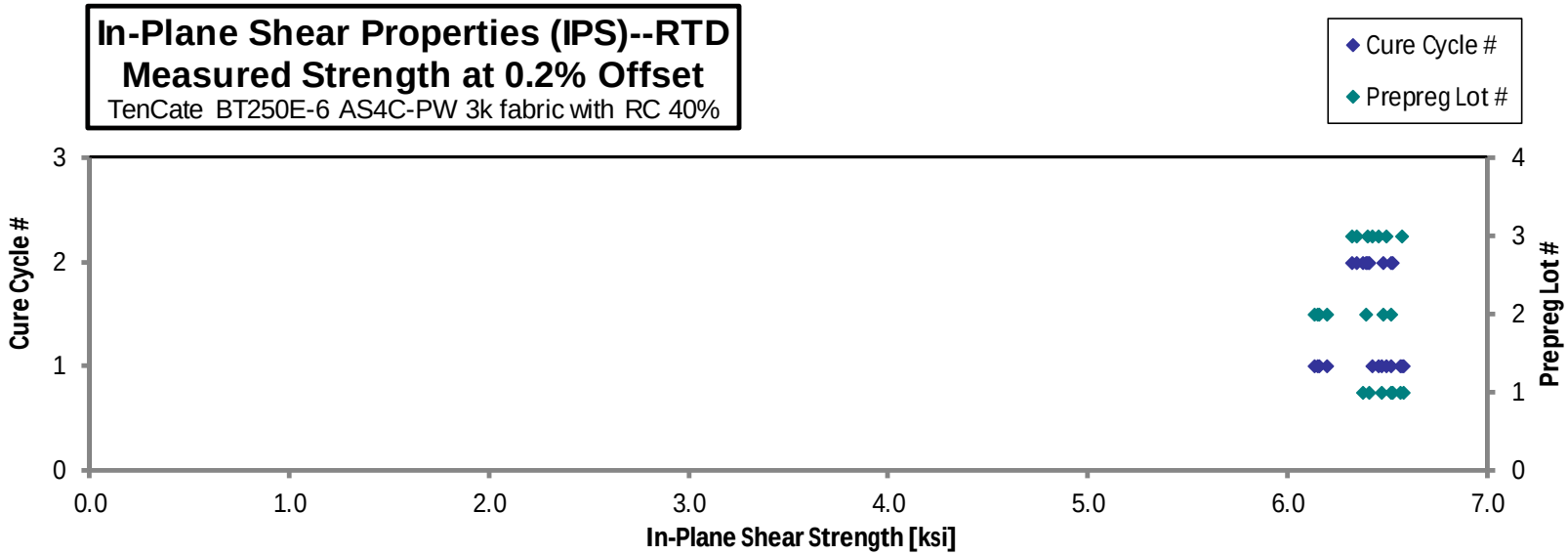
**In-Plane Shear Properties (IPS)--CTD**
**Strength & Modulus**
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%

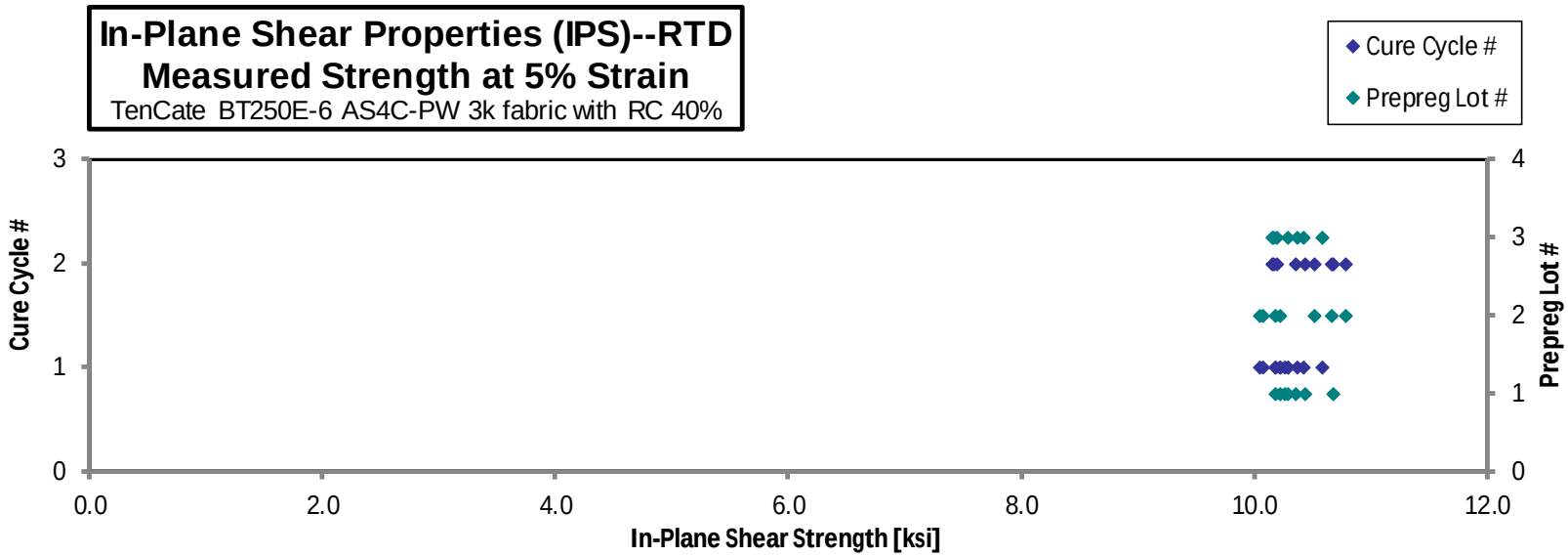
| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | 0.2% Offset Strength [ksi] | Strength at 5% Strain [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Avg. $t_{ply}$ [in] |
|---|---|---|---|---|---|---|---|---|---|---|
| EABNA116B | A | C1 | 1 | 1 | 8.538 | 13.444 | 0.676 | 0.102 | 12 | 0.0085 |
| EABNA117B | A | C1 | 1 | 1 | 8.636 | 13.465 | 0.667 | 0.102 | 12 | 0.0085 |
| EABNA118B | A | C1 | 1 | 1 | 8.646 | 13.472 | 0.681 | 0.102 | 12 | 0.0085 |
| EABNA119B | A | C1 | 1 | 1 | 8.724 | 13.316 | 0.692 | 0.099 | 12 | 0.0082 |
| EABNA215B | A | C2 | 1 | 2 | 8.285 | 12.717 | 0.660 | 0.105 | 12 | 0.0087 |
| EABNA216B | A | C2 | 1 | 2 | 8.254 | 12.799 | 0.654 | 0.105 | 12 | 0.0087 |
| EABNA217B | A | C2 | 1 | 2 | 8.237 | 12.517 | 0.655 | 0.103 | 12 | 0.0085 |
| EABNB116B | B | C1 | 2 | 1 | 8.101 | 13.163 | 0.630 | 0.108 | 12 | 0.0090 |
| EABNB117B | B | C1 | 2 | 1 | 8.129 | 13.133 | 0.629 | 0.107 | 12 | 0.0089 |
| EABNB118B | B | C1 | 2 | 1 | 7.957 | 12.890 | 0.629 | 0.106 | 12 | 0.0088 |
| EABNB119B | B | C1 | 2 | 1 | 8.245 | 13.497 | 0.658 | 0.105 | 12 | 0.0088 |
| EABNB215B | B | C2 | 2 | 2 | 8.424 | 13.973 | 0.662 | 0.103 | 12 | 0.0085 |
| EABNB216B | B | C2 | 2 | 2 | 8.274 | 13.786 | 0.659 | 0.103 | 12 | 0.0086 |
| EABNB217B | B | C2 | 2 | 2 | 8.490 | 13.742 | 0.672 | 0.102 | 12 | 0.0085 |
| EABNC116B | C | C1 | 3 | 1 | 8.506 | 13.010 | 0.666 | 0.102 | 12 | 0.0085 |
| EABNC117B | C | C1 | 3 | 1 | 8.564 | 13.406 | 0.677 | 0.102 | 12 | 0.0085 |
| EABNC118B | C | C1 | 3 | 1 | 8.494 | 13.137 | 0.664 | 0.102 | 12 | 0.0085 |
| EABNC119B | C | C1 | 3 | 1 | 8.426 | 13.271 | 0.664 | 0.103 | 12 | 0.0085 |
| EABNC215B | C | C2 | 3 | 2 | 8.373 | 12.955 | 0.670 | 0.103 | 12 | 0.0086 |
| EABNC216B | C | C2 | 3 | 2 | 8.487 | 13.074 | 0.663 | 0.103 | 12 | 0.0086 |
| EABNC217B | C | C2 | 3 | 2 | 8.515 | 13.392 | 0.667 | 0.103 | 12 | 0.0085 |

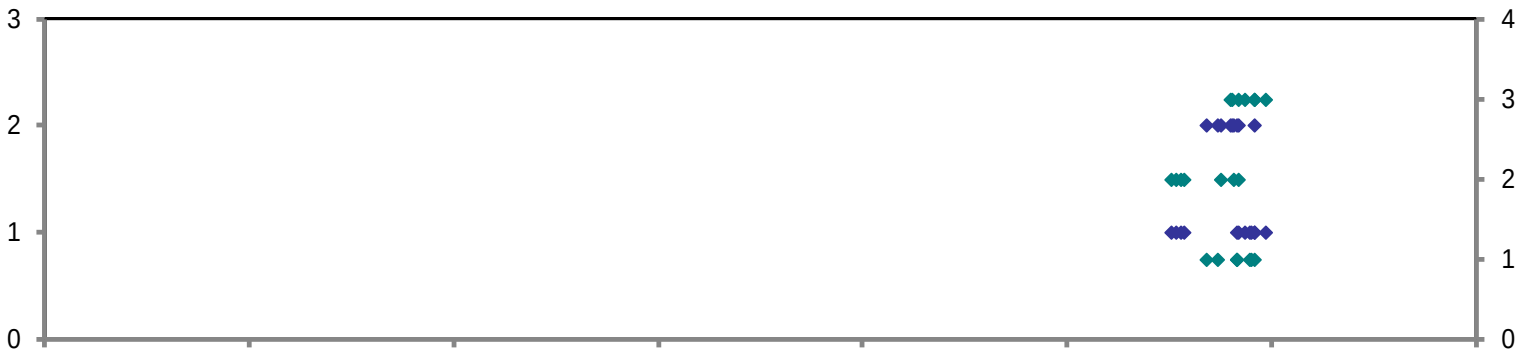
| | | | | | |
|---|---|---|---|---|---|
| **Average** | **8.396** | **13.246** | **0.662** | **Average** | **0.0086** |
| **Standard Dev.** | **0.197** | **0.365** | **0.016** | **Standard Dev.** | |
| **Coeff. of Var. [%]** | **2.348** | **2.753** | **2.460** | **Coeff. of Var. [%]** | |
| **Min.** | **7.957** | **12.517** | **0.629** | **Min.** | **0.0082** |
| **Max.** | **8.724** | **13.973** | **0.692** | **Max.** | **0.0090** |
| **Number of Spec.** | **21** | **21** | **21** | **Number of Spec.** | **21** |


In-Plane Shear Properties (IPS)--CTD
Measured Modulus
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus [Msi]
0
1
2
3
4
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8

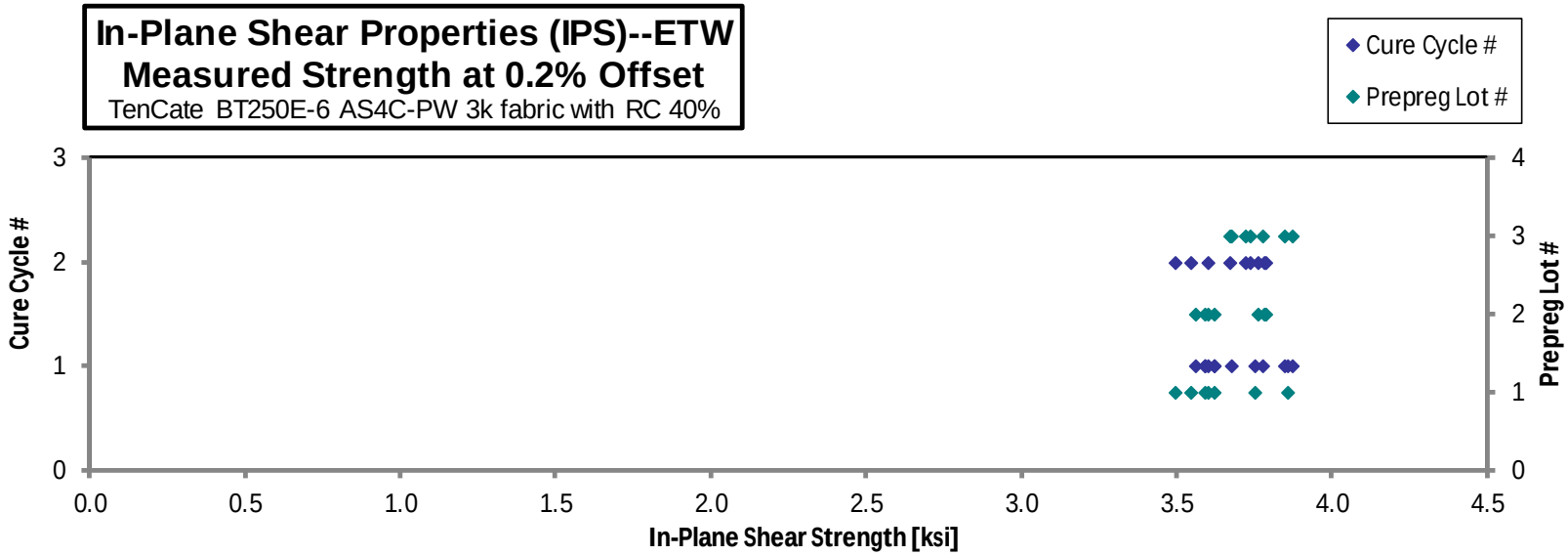
| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | 0.2% Offset Strength [ksi] | Strength at 5% Strain [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Avg. $t_{ply}$ [in] |
|---|---|---|---|---|---|---|---|---|---|---|
| EABNA111A | A | C1 | 1 | 1 | 6.583 | 10.217 | 0.590 | 0.100 | 12 | 0.0083 |
| EABNA112A | A | C1 | 1 | 1 | 6.472 | 10.185 | 0.583 | 0.101 | 12 | 0.0084 |
| EABNA113A | A | C1 | 1 | 1 | 6.562 | 10.291 | 0.589 | 0.101 | 12 | 0.0084 |
| EABNA114A | A | C1 | 1 | 1 | 6.515 | 10.260 | 0.591 | 0.101 | 12 | 0.0085 |
| EABNA211A | A | C2 | 1 | 2 | 6.527 | 10.668 | 0.583 | 0.102 | 12 | 0.0085 |
| EABNA212A | A | C2 | 1 | 2 | 6.373 | 10.430 | 0.568 | 0.105 | 12 | 0.0087 |
| EABNA213A | A | C2 | 1 | 2 | 6.404 | 10.353 | 0.573 | 0.104 | 12 | 0.0087 |
| EABNB111A | B | C1 | 2 | 1 | 6.159 | 10.050 | 0.553 | 0.105 | 12 | 0.0088 |
| EABNB112A | B | C1 | 2 | 1 | 6.134 | 10.072 | 0.556 | 0.106 | 12 | 0.0088 |
| EABNB113A | B | C1 | 2 | 1 | 6.198 | 10.218 | 0.557 | 0.107 | 12 | 0.0089 |
| EABNB114A | B | C1 | 2 | 1 | 6.145 | 10.176 | 0.550 | 0.107 | 12 | 0.0089 |
| EABNB211A | B | C2 | 2 | 2 | 6.393 | 10.520 | 0.575 | 0.102 | 12 | 0.0085 |
| EABNB212A | B | C2 | 2 | 2 | 6.479 | 10.660 | 0.582 | 0.102 | 12 | 0.0085 |
| EABNB213A | B | C2 | 2 | 2 | 6.516 | 10.779 | 0.584 | 0.102 | 12 | 0.0085 |
| EABNC111A | C | C1 | 3 | 1 | 6.421 | 10.288 | 0.584 | 0.102 | 12 | 0.0085 |
| EABNC112A | C | C1 | 3 | 1 | 6.489 | 10.418 | 0.591 | 0.101 | 12 | 0.0084 |
| EABNC113A | C | C1 | 3 | 1 | 6.572 | 10.587 | 0.597 | 0.101 | 12 | 0.0084 |
| EABNC114A | C | C1 | 3 | 1 | 6.453 | 10.360 | 0.586 | 0.102 | 12 | 0.0085 |
| EABNC211A | C | C2 | 3 | 2 | 6.403 | 10.149 | 0.591 | 0.101 | 12 | 0.0084 |
| EABNC212A | C | C2 | 3 | 2 | 6.342 | 10.170 | 0.580 | 0.103 | 12 | 0.0086 |

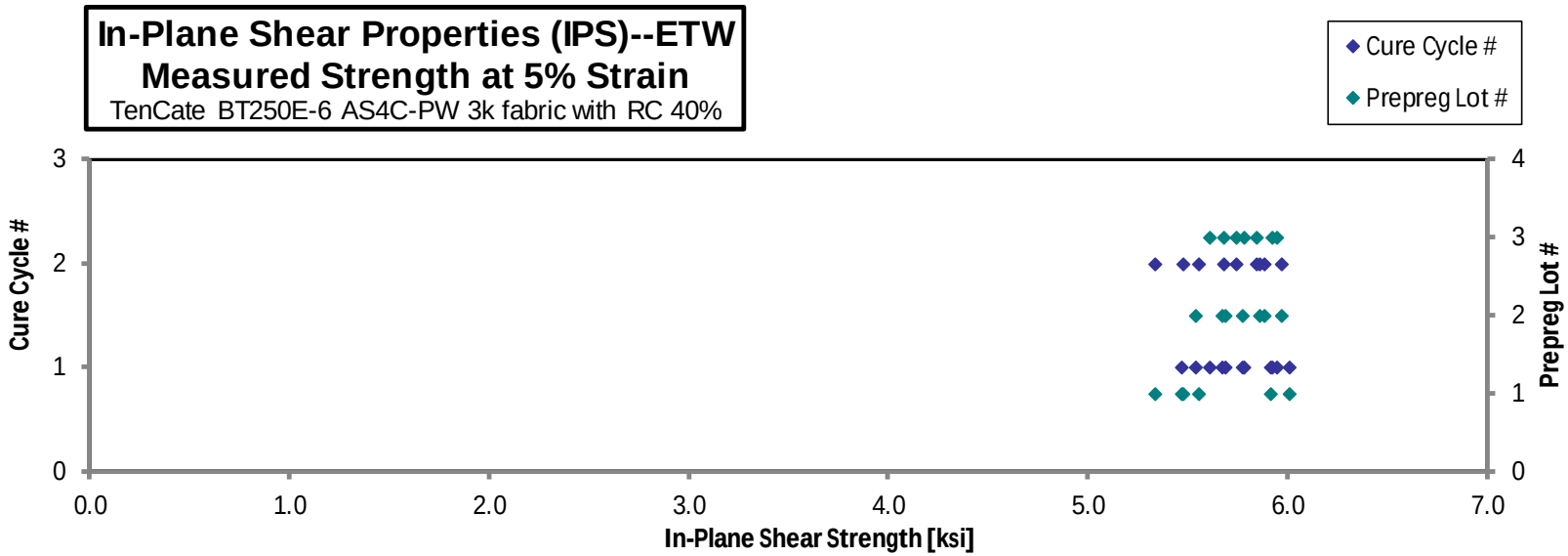

In-Plane Shear Properties (IPS)--RTD
Measured Strength at 0.2% Offset
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
In-Plane Shear Strength [ksi]

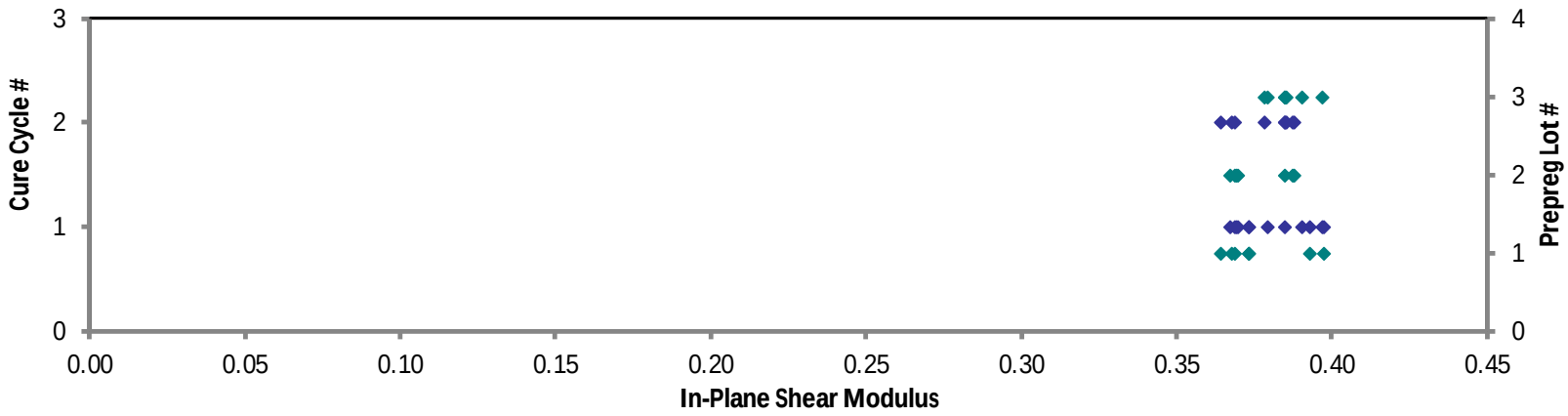

In-Plane Shear Properties (IPS)--RTD
Measured Strength at 5% Strain
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
2.0
4.0
6.0
8.0
10.0
12.0
In-Plane Shear Strength [ksi]


3
2
1
0
4
3
2
1
0

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | 0.2% Offset Strength [ksi] | Strength at 5% Strain [ksi] | Modulus [Msi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Avg. $t_{ply}$ |
|---|---|---|---|---|---|---|---|---|---|---|

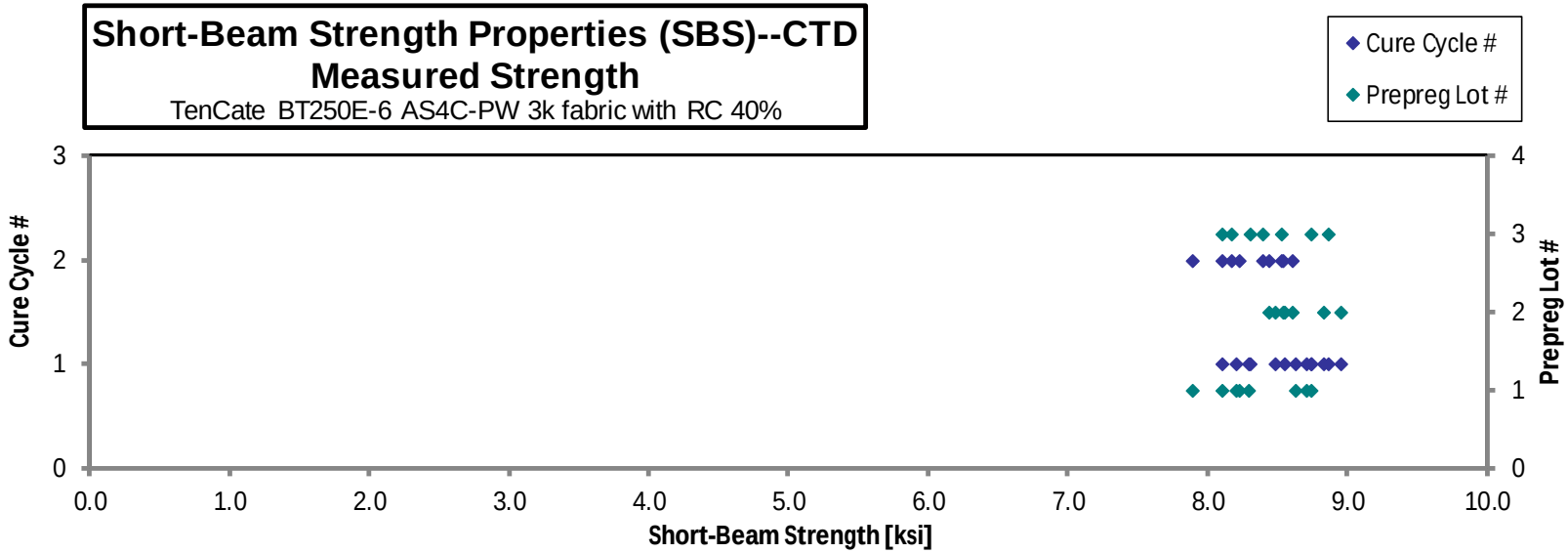

In-Plane Shear Properties (IPS)--ETW
Measured Strength at 0.2% Offset
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
0
1
2
3
4


In-Plane Shear Properties (IPS)--ETW
Measured Strength at 5% Strain
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Strength [ksi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
0
1
2
3
4


Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus
0
1
2
3
4
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45

## 4.6 Lamina Short-Beam Strength Properties (SBS)

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Avg. $t_{ply}$ [in] | Failure Mode |
|---|---|---|---|---|---|---|---|---|---|
| EABQA116B* | A | C1 | 1 | 1 | 8.631 | 0.268 | 32 | 0.0084 | COMPRESSION |


Short-Beam Strength Properties (SBS)--CTD
Measured Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

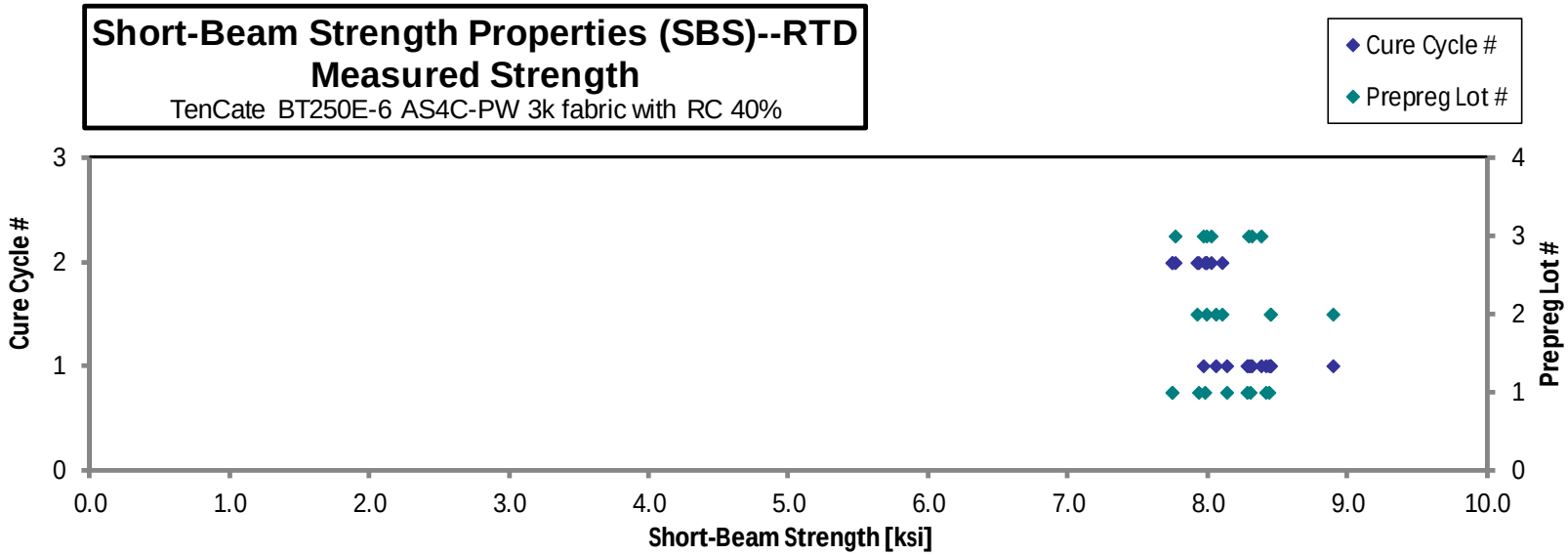
## Short-Beam Strength Properties (SBS)--RTD
## Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Avg. $t_{ply}$ [in] | Failure Mode |
|---|---|---|---|---|---|---|---|---|---|
| EABQA111A* | A | C1 | 1 | 1 | 8.130 | 0.264 | 32 | 0.0082 | COMPRESSION |
| EABQA112A* | A | C1 | 1 | 1 | 8.309 | 0.266 | 32 | 0.0083 | COMPRESSION |
| EABQA113A* | A | C1 | 1 | 1 | 8.417 | 0.267 | 32 | 0.0084 | COMPRESSION |
| EABQA114A | A | C1 | 1 | 1 | 8.437 | 0.269 | 32 | 0.0084 | ILS |
| EABQA115A | A | C1 | 1 | 1 | 8.275 | 0.269 | 32 | 0.0084 | 1st: COMPRESSION/ 2nd: ILS |
| EABQA211A | A | C2 | 1 | 2 | 7.746 | 0.262 | 32 | 0.0082 | 1st: ILS / 2nd: COMPRESSION |
| EABQA212A | A | C2 | 1 | 2 | 7.933 | 0.266 | 32 | 0.0083 | ILS |
| EABQA213A | A | C2 | 1 | 2 | 7.978 | 0.268 | 32 | 0.0084 | 1st: ILS / 2nd: COMPRESSION |
| EABQA214A | A | C2 | 1 | 2 | 7.745 | 0.270 | 32 | 0.0084 | 1st: COMPRESSION/ 2nd: ILS |
| EABQB111A | B | C1 | 2 | 1 | 8.063 | 0.263 | 32 | 0.0082 | COMPRESSION |
| EABQB112A | B | C1 | 2 | 1 | 8.454 | 0.264 | 32 | 0.0082 | 1st: ILS / 2nd: COMPRESSION |
| EABQB113A | B | C1 | 2 | 1 | 8.447 | 0.266 | 32 | 0.0083 | 1st: ILS / 2nd: COMPRESSION |
| EABQB114A | B | C1 | 2 | 1 | 8.896 | 0.267 | 32 | 0.0083 | COMPRESSION |
| EABQB211A | B | C2 | 2 | 2 | 7.922 | 0.258 | 32 | 0.0081 | 1st:COMPRESSION / 2nd: ILS |
| EABQB212A | B | C2 | 2 | 2 | 7.990 | 0.260 | 32 | 0.0081 | ILS |
| EABQB213A | B | C2 | 2 | 2 | 8.108 | 0.261 | 32 | 0.0082 | 1st: ILS / 2nd: COMPRESSION |
| EABQC111A | C | C1 | 3 | 1 | 7.966 | 0.262 | 32 | 0.0082 | ILS |
| EABQC112A | C | C1 | 3 | 1 | 8.386 | 0.264 | 32 | 0.0082 | COMPRESSION |
| EABQC113A | C | C1 | 3 | 1 | 8.296 | 0.265 | 32 | 0.0083 | ILS |
| EABQC114A | C | C1 | 3 | 1 | 8.320 | 0.266 | 32 | 0.0083 | COMPRESSION |
| EABQC211A | C | C2 | 3 | 2 | 7.766 | 0.257 | 32 | 0.0080 | 1st: ILS/ 2nd: COMPRESSION |
| EABQC212A | C | C2 | 3 | 2 | 7.994 | 0.259 | 32 | 0.0081 | 1st: ILS/ 2nd: COMPRESSION |
| EABQC213A | C | C2 | 3 | 2 | 8.025 | 0.260 | 32 | 0.0081 | ILS |

*4T span was used.

Span of 4.5T was used for all specimens except EABQA111A, EABQA112A, EABQA113A.

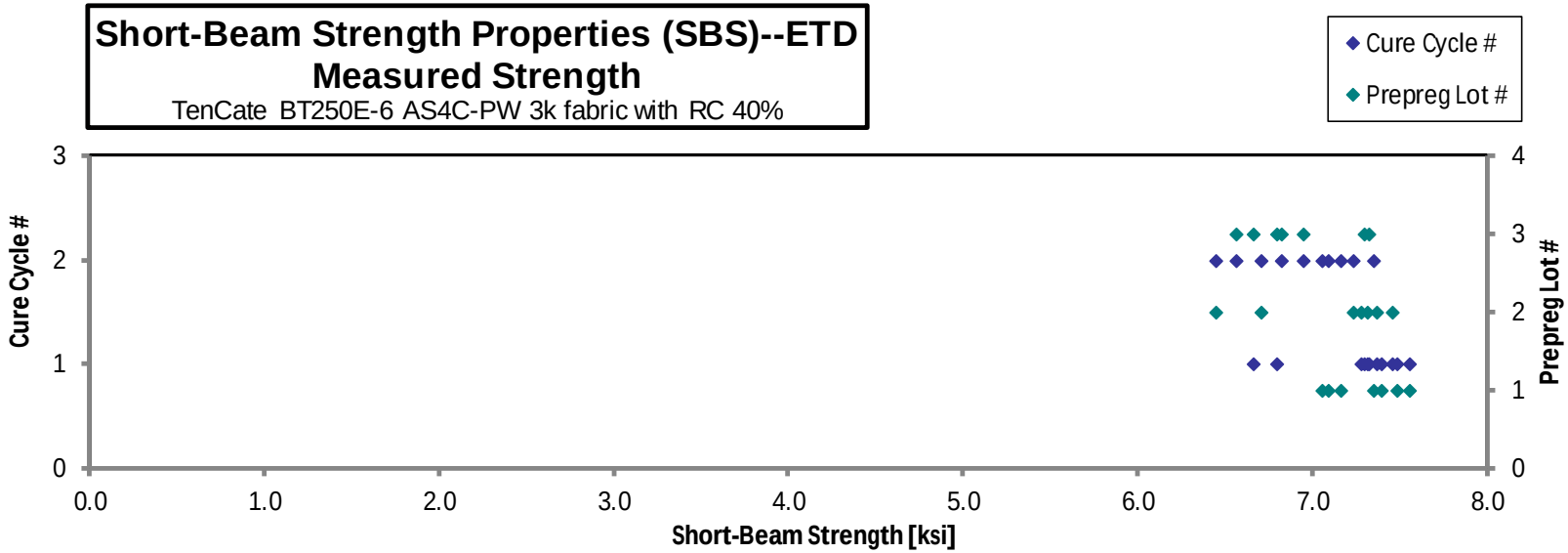
| | | | |
|---|---|---|---|
| **Average** | **8.157** | **Average** | **0.0082** |
| **Standard Dev.** | **0.282** | **Standard Dev.** | |
| **Coeff. of Var. [%]** | **3.458** | **Coeff. of Var. [%]** | |
| **Min.** | **7.745** | **Min.** | **0.0080** |
| **Max.** | **8.896** | **Max.** | **0.0084** |
| **Number of Spec.** | **23** | **Number of Spec.** | **23** |

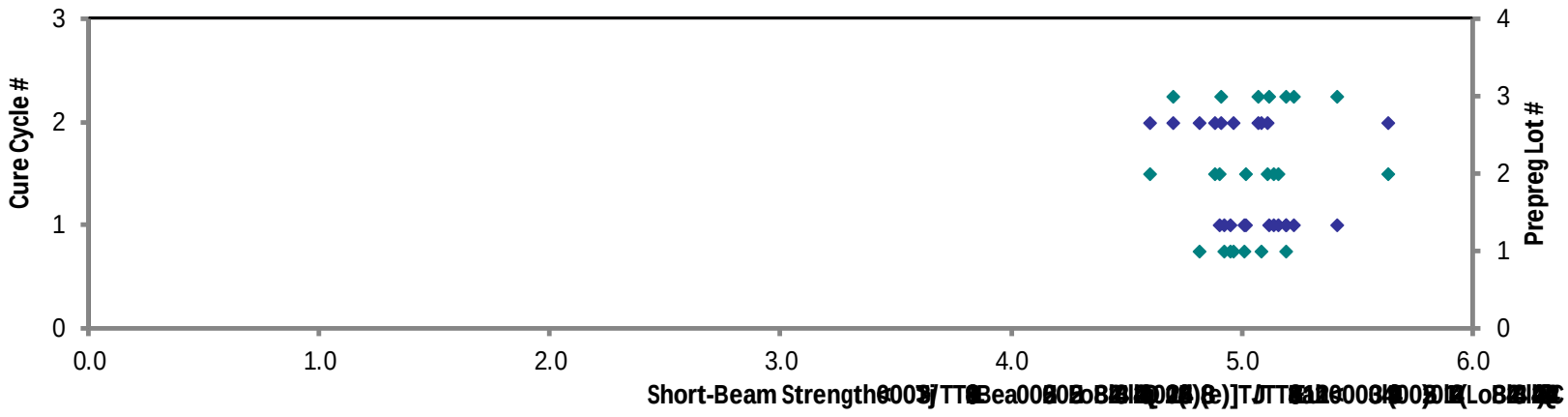

Short-Beam Strength Properties (SBS)--RTD
Measured Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3
4

| Specimen Number | EAC Batch # | EAC Cure Cycle | Prepreg Lot # | Cure Cycle # | Strength [ksi] | Avg. Specimen Thickness [in] | # Plies in Laminate | Avg. $t_{ply}$ [in] | Failure Mode |
|---|---|---|---|---|---|---|---|---|---|
| EABQA11BC* | A | C1 | 1 | 1 | 7.554 | 0.269 | 32 | 0.0084 | COMPRESSION/ ILS |
| EABQA11CC | A | C1 | 1 | 1 | 7.398 | 0.270 | 32 | 0.0085 | ILS |
| EABQA11FC | A | C1 | 1 | 1 | 7.483 | 0.275 | 32 | 0.0086 | ILS/ COMPRESSION |
| EABQA219C | A | C2 | 1 | 2 | 7.055 | 0.270 | 32 | 0.0084 | COMPRESSION/ ILS |
| EABQA21AC | A | C2 | 1 | 2 | 7.087 | 0.273 | 32 | 0.0085 | COMPRESSION/ ILS |
| EABQA21BC | A | C2 | 1 | 2 | 7.164 | 0.275 | 32 | 0.0086 | ILS |
| EABQA21CC | A | C2 | 1 | 2 | 7.349 | 0.277 | 32 | 0.0087 | ILS |
| EABQB11BC | B | C1 | 2 | 1 | 7.370 | 0.267 | 32 | 0.0083 | COMPRESSION/ ILS |
| EABQB11CC | B | C1 | 2 | 1 | 7.456 | 0.269 | 32 | 0.0084 | ILS |
| EABQB11DC | B | C1 | 2 | 1 | 7.315 | 0.268 | 32 | 0.0084 | COMPRESSION/ ILS |
| EABQB11EC | B | C1 | 2 | 1 | 7.276 | 0.269 | 32 | 0.0084 | ILS/ COMPRESSION |
| EABQB218C | B | C2 | 2 | 2 | 7.228 | 0.263 | 32 | 0.0082 | COMPRESSION/ ILS |
| EABQB219C | B | C2 | 2 | 2 | 6.443 | 0.264 | 32 | 0.0082 | COMPRESSION/ ILS |
| EABQB21AC | B | C2 | 2 | 2 | 6.709 | 0.265 | 32 | 0.0083 | COMPRESSION/ ILS |
| EABQC11AC | C | C1 | 3 | 1 | 6.799 | 0.269 | 32 | 0.0084 | ILS/ COMPRESSION |
| EABQC11BC | C | C1 | 3 | 1 | 6.659 | 0.262 | 32 | 0.0082 | ILS/ COMPRESSION |
| EABQC11CC | C | C1 | 3 | 1 | 7.322 | 0.263 | 32 | 0.0082 | ILS/ COMPRESSION |
| EABQC11DC | C | C1 | 3 | 1 | 7.291 | 0.265 | 32 | 0.0083 | ILS/ COMPRESSION |
| EABQC21AC | C | C2 | 3 | 2 | 6.558 | 0.262 | 32 | 0.0082 | ILS/ COMPRESSION |
| EABQC21BC | C | C2 | 3 | 2 | 6.818 | 0.261 | 32 | 0.0081 | ILS/ COMPRESSION |
| EABQC21CC | C | C2 | 3 | 2 | 6.945 | 0.262 | 32 | 0.0082 | ILS/ COMPRESSION |

*4T span was used.
Span of 4.5T was used for all specimens except EABQA11BC.

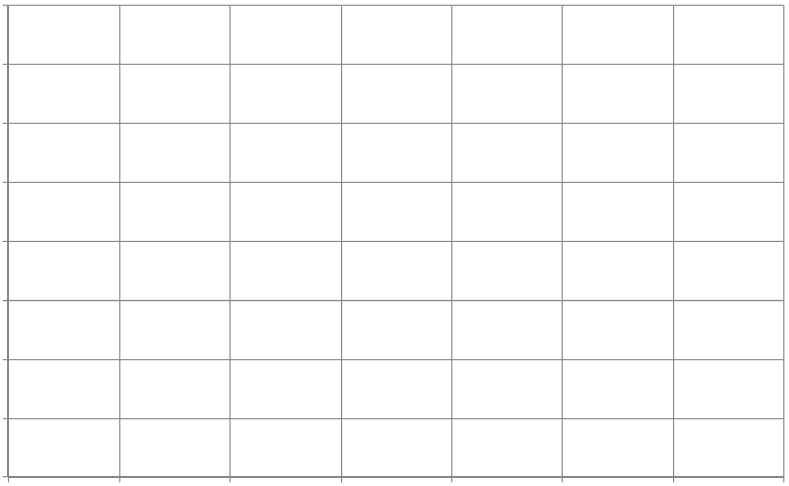
| | | | |
|---|---|---|---|
| **Average** | **7.109** | **Average** | **0.0084** |
| **Standard Dev.** | **0.328** | **Standard Dev.** | |


Short-Beam Strength Properties (SBS)--ETD
Measured Strength
TenCate BT250E-6 AS4C-PW 3k fabric with RC 40%
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Short-Beam Strength [ksi]
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0

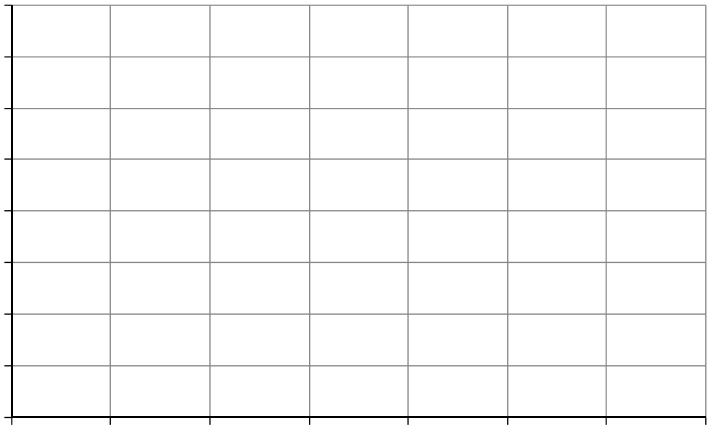

Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0.0
1.0
2.0
3.0
4.0
5.0
6.0
Short-Beam Strength

# 5. Full Stress vs. Strain Curve

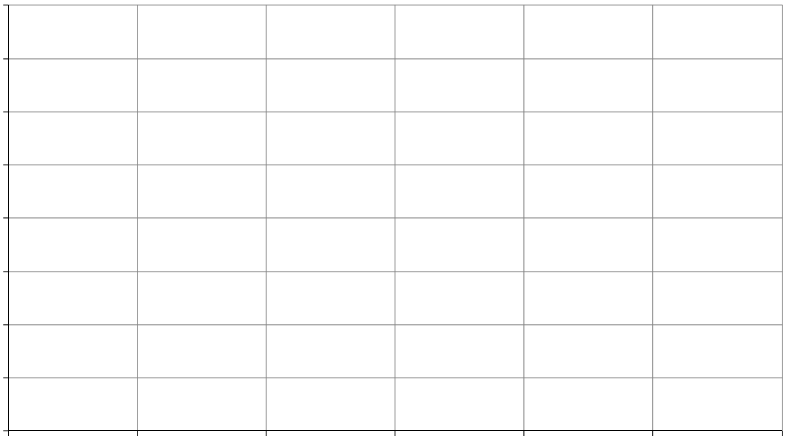
## 5.1 Warp Tension



## 5.3 Fill Tension



## 5.5 In-Plane Shear



For “wet” mechanical test specimens, the drying procedures may not have completely dried the specimens prior to moisture conditioning, so the total amount of moisture absorbed by the specimens may be higher than those recorded in the moisture gain charts.

## 7. DMA Results

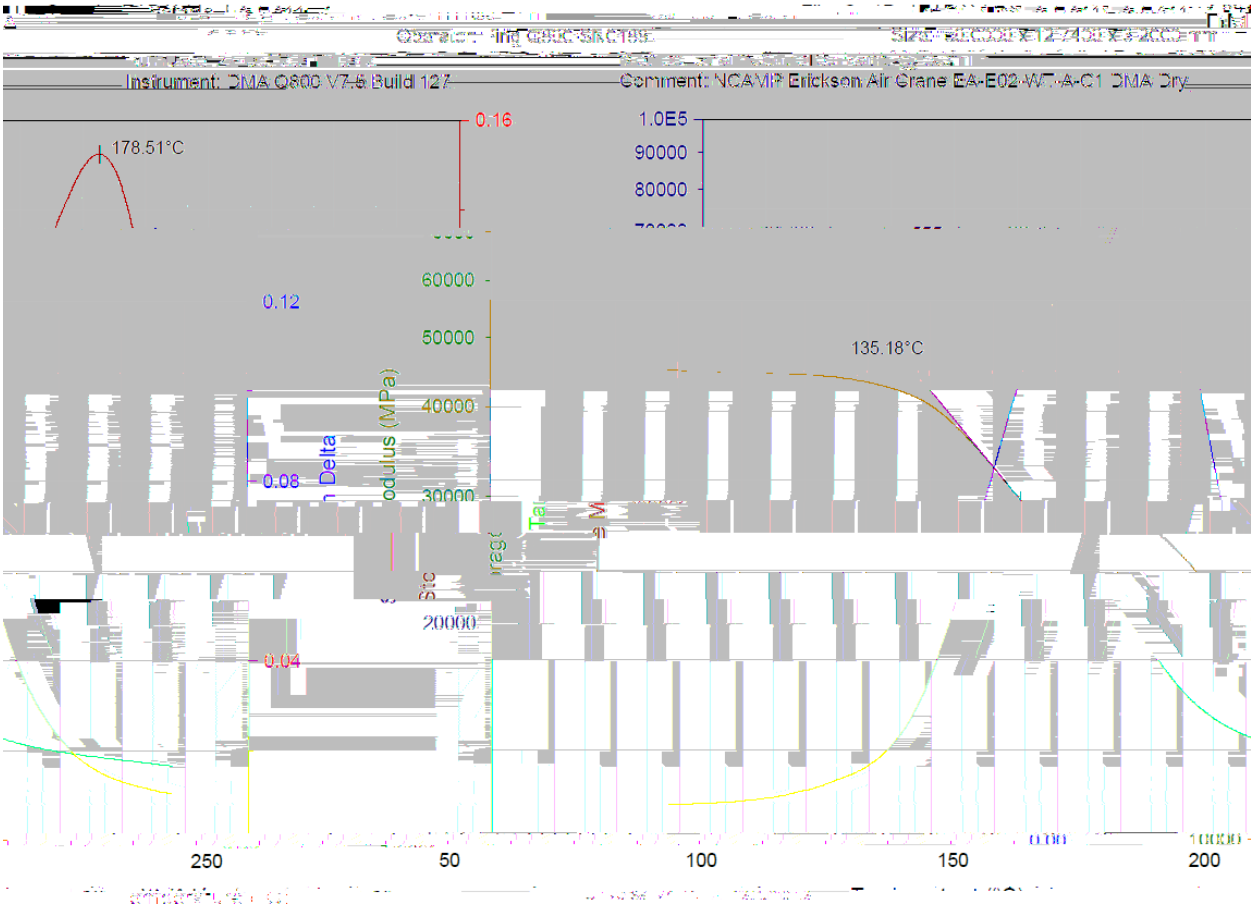
| DMA Results Summary | | | | |
|---|---|---|---|---|
| TenCate BT250E-6 AS4C-PW 3k Fabric DRY | | | | |
| Sample # | Onset Storage Modulus | | Peak of Tangent Delta | |
| | Average | | Average | |
| | Tg [°C] | Tg [°F] | Tg [°C] | Tg [°F] |
| EABJA11 - 1 (EA-E02-WT-A-C1) | 135.18 | 275.32 | 178.51 | 353.32 |
| EABJA11 - 2 (EA-E02-WT-A-C1) | 135.79 | 276.42 | 177.73 | 351.91 |
| EABJA21 - 1 (EA-E02-WT-A-C2) | 137.81 | 280.06 | 178.25 | 352.85 |
| EABJA21 - 2 (EA-E02-WT-A-C2) | 138.03 | 280.45 | 177.79 | 352.02 |
| EABJB11 - 1 (EA-E02-WT-B-C1) | 134.57 | 274.23 | 174.81 | 346.66 |
| EABJB11 - 2 (EA-E02-WT-B-C1) | 133.84 | 272.91 | 174.30 | 345.74 |
| EABJB21 - 1 (EA-E02-WT-B-C2) | 136.15 | 277.07 | 180.06 | 356.11 |
| EABJB21 - 2 (EA-E02-WT-B-C2) | 136.16 | 277.09 | 178.93 | 354.07 |
| EABJC11 - 1 (EA-E02-WT-C-C1) | 130.53 | 266.95 | 176.41 | 349.54 |
| EABJC11 - 2 (EA-E02-WT-C-C1) | 130.15 | 266.27 | 178.42 | 353.16 |
| EABJC21 - 1 (EA-E02-WT-C-C2) | 132.73 | 270.91 | 180.43 | 356.77 |
| EABJC21 - 2 (EA-E02-WT-C-C2) | 132.27 | 270.09 | 180.17 | 356.31 |
| EABLB21 - 1 (EA-E02-WC-B-C3) | 136.56 | 277.81 | 179.49 | 355.08 |
| EABLB21 - 2 (EA-E02-WC-B-C3) | 137.28 | 279.10 | 180.20 | 356.36 |
| EABUA11 - 1 (EA-E02-FT-A-C3) | 136.84 | 278.31 | 178.49 | 353.28 |
| EABUA11 - 2 (EA-E02-FT-A-C3) | 137.19 | 278.94 | 178.57 | 353.43 |
| EABUA21 - 1 (EA-E02-FT-A-C4) | 137.43 | 279.37 | 178.63 | 353.53 |
| EABUA21 - 2 (EA-E02-FT-A-C4) | 136.52 | 277.74 | 179.17 | 354.51 |
| EABUB11 - 1 (EA-E02-FT-B-C4) | 135.75 | 276.35 | 178.78 | 353.80 |
| EABUB11 - 2 (EA-E02-FT-B-C4) | 135.81 | 276.46 | 178.96 | 354.13 |
| EABUB21 - 1 (EA-E02-FT-B-C5) | 137.23 | 279.01 | 182.06 | 359.71 |
| EABUB21 - 2 (EA-E02-FT-B-C5) | 136.22 | 277.20 | 182.05 | 359.69 |
| EABUC11 - 1 (EA-E02-FT-C-C4) | 134.35 | 273.83 | 182.32 | 360.18 |
| EABUC11 - 2 (EA-E02-FT-C-C4) | 134.84 | 274.71 | 181.97 | 359.55 |
| EABUC21 - 1 (EA-E02-FT-C-C5) | 136.09 | 276.96 | 182.35 | 360.23 |
| EABUC21 - 2 (EA-E02-FT-C-C5) | 137.01 | 278.62 | 182.50 | 360.50 |
| EABNB21 - 1 (EA-E02-IPS-B-C11) | 132.93 | 271.27 | 157.71 | 315.88 |
| EABNB21 - 2 (EA-E02-IPS-B-C11) | 131.97 | 269.55 | 158.08 | 316.54 |
| Average | 135.26 | 275.46 | 177.76 | 351.96 |
| Standard Deviation | 2.17 | 3.90 | 5.98 | 10.77 |

# DMA Results Summary

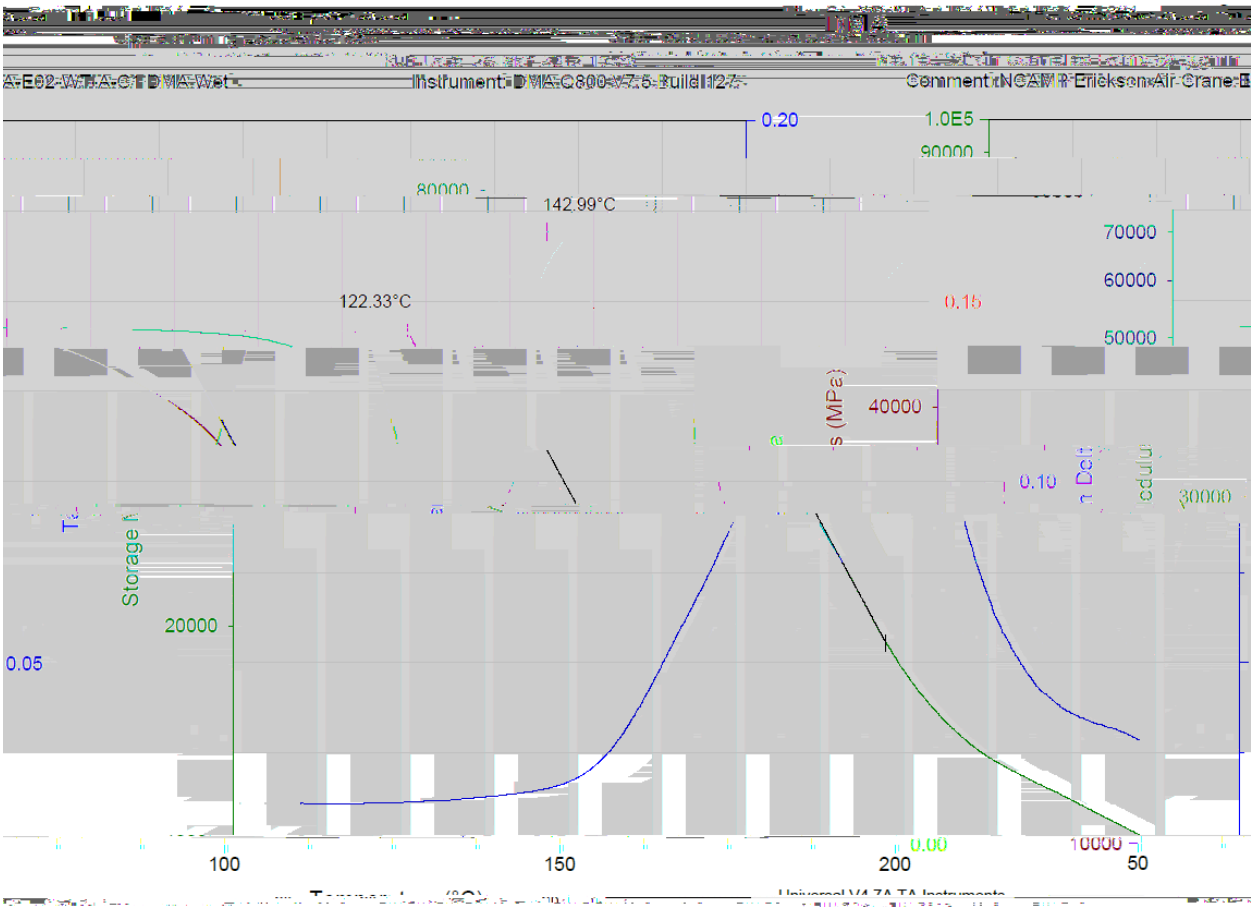
## TenCate BT250E-6 AS4C-PW 3k Fabric WET

| Sample # | Onset Storage Modulus Average | | Peak of Tangent Delta Average | |
|---|---|---|---|---|
| | Tg [°C] | Tg [°F] | Tg [°C] | Tg [°F] |
| EABJA11 - 1 (EA-E02-WT-A-C1) | 122.33 | 252.19 | 142.99 | 289.38 |
| EABJA11 - 2 (EA-E02-WT-A-C1) | 121.36 | 250.45 | 143.35 | 290.03 |
| EABJA21 - 1 (EA-E02-WT-A-C2) | 120.03 | 248.05 | 140.26 | 284.47 |
| EABJA21 - 2 (EA-E02-WT-A-C2) | 121.23 | 250.21 | 142.62 | 288.72 |
| EABJB11 - 1 (EA-E02-WT-B-C1) | 125.51 | 257.92 | 147.24 | 297.03 |
| EABJB11 - 2 (EA-E02-WT-B-C1) | 125.52 | 257.94 | 147.22 | 297.00 |
| EABJB21 - 1 (EA-E02-WT-B-C2) | 121.48 | 250.66 | 142.08 | 287.74 |
| EABJB21 - 2 (EA-E02-WT-B-C2) | 120.21 | 248.38 | 143.33 | 289.99 |
| EABJC11 - 1 (EA-E02-WT-C-C1) | 122.48 | 252.46 | 146.24 | 295.23 |
| EABJC11 - 2 (EA-E02-WT-C-C1) | 121.23 | 250.21 | 145.59 | 294.06 |
| EABJC21 - 1 (EA-E02-WT-C-C2) | 120.46 | 248.83 | 143.27 | 289.89 |
| EABJC21 - 2 (EA-E02-WT-C-C2) | 122.41 | 252.34 | 143.22 | 289.80 |
| EABLB21 - 1 (EA-E02-WC-B-C3) | 121.42 | 250.56 | 141.32 | 286.38 |
| EABLB21 - 2 (EA-E02-WC-B-C3) | 122.05 | 251.69 | 142.16 | 287.89 |
| EABUA11 - 1 (EA-E02-FT-A-C3) | 117.46 | 243.43 | 139.11 | 282.40 |
| EABUA11 - 2 (EA-E02-FT-A-C3) | 118.03 | 244.45 | 138.75 | 281.75 |
| EABUA21 - 1 (EA-E02-FT-A-C4) | 120.66 | 249.19 | 141.65 | 286.97 |
| EABUA21 - 2 (EA-E02-FT-A-C4) | 119.41 | 246.94 | 140.86 | 285.55 |
| EABUB11 - 1 (EA-E02-FT-B-C4) | 121.74 | 251.13 | 144.23 | 291.61 |
| EABUB11 - 2 (EA-E02-FT-B-C4) | 123.53 | 254.35 | 143.69 | 290.64 |
| EABUB21 - 1 (EA-E02-FT-B-C5) | 120.52 | 248.94 | 141.13 | 286.03 |
| EABUB21 - 2 (EA-E02-FT-B-C5) | 118.51 | 245.32 | 140.42 | 284.76 |
| EABUC11 - 1 (EA-E02-FT-C-C4) | 121.17 | 250.11 | 143.59 | 290.46 |
| EABUC11 - 2 (EA-E02-FT-C-C4) | 121.70 | 251.06 | 142.71 | 288.88 |
| EABUC21 - 1 (EA-E02-FT-C-C5) | 122.09 | 251.76 | 142.20 | 287.96 |
| EABUC21 - 2 (EA-E02-FT-C-C5) | 121.16 | 250.09 | 142.41 | 288.34 |
| EABNB21 - 1 (EA-E02-IPS-B-C11) | 114.41 | 237.94 | 145.63 | 294.13 |
| EABNB21 - 2 (EA-E02-IPS-B-C11) | 116.06 | 240.91 | 146.15 | 295.07 |
| Average | 120.86 | 249.55 | 142.98 | 289.36 |
| Standard Deviation | 2.41 | 4.34 | 2.24 | 4.03 |

## 7.1 DMA Dry Batch A



## 7.2 DMA Wet Batch A




## 8. Deviations

- D2344 SBS for CTD, RTD and ETD conditions were tested with a mixture of 4T and 4.5T span length. The SBS for ETW condition was tested with 4T span length.