



Advanced General Aviation Transport Experiments

B – Basis Design Allowables for Epoxy – Based Prepreg

Fiberite 8-Harness Graphite Fabric T650 3K-135-8H / 7740

AGATE-WP3.3-033051-102

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1.0 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. These properties are considered to provide the initial base of the “building block” approach. Additional coupon level tests and subelement tests may be required to fully substantiate the full-scale design.

The test methods and results contained in this document are consistent with MIL-HDBK-17-1E,2D,3E - Military Handbook for Polymer Matrix Composites. All material, specimens, fixtures and test results contained within this document were traceable and conformed by the Federal Aviation Administration (FAA). It should be noted that before application of the basis values presented in this document to design, demonstration of the ability to consistently produce equivalent material properties as that evaluated during this program should be substantiated through an acceptable test program.

1.2 Symbols Used

ν_{12}^{tu}	major Poisson's ratio, tension
$\mu\epsilon$	micro-strain
E_1^c	compressive modulus, longitudinal
E_1^t	tensile modulus, longitudinal
E_2^c	compressive modulus, transverse
E_2^t	tensile modulus, transverse
F_{12}^{su}	in – plane shear strength
F_{13}^{su}	apparent interlaminar shear strength
F_1^{cu}	compressive strength, longitudinal
F_1^{tu}	tensile strength, longitudinal
F_2^{cu}	compressive strength, transverse
F_2^{tu}	tensile strength, transverse
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	1 – axis; longitudinal (parallel to warp direction of reinforcement)
2	2 – axis; transverse (parallel to fill direction of reinforcement)
12	in – plane shear
13	interlaminar shear (apparent)

1.3 Acronyms and Definitions

A – Basis	95% lower confidence limit on the first population percentile
AGATE	Advanced General Aviation Transport Experiments
ASTM	American Society for Testing and Materials
B – Basis	95% lower confidence limit on the tenth population percentile
C. V.	coefficient of variation
CTD	cold temperature dry
CPT	cured ply thickness
DMA	dynamic mechanical analysis
dry	specimen tested with an “as fabricated” moisture content
ETD	elevated temperature dry
ETW	elevated temperature wet
FAR	Federal Aviation Regulations
FAW	fiber areal weight
Gr/Ep	Graphite/Epoxy
NASA	National Aeronautics and Space Administration
RTD	room temperature dry
SACMA	Suppliers of Advanced Composite Materials Association
SRM	SACMA Recommended Method
T_g	glass transition temperature
t_{ply}	cured ply thickness
wet	specimen tested with an equilibrium moisture content per section 1.5.2

1.4 References

ASTM Standards

D3039-95	Tensile Properties of Polymer Matrix Composite Materials
D5379-93	Shear Properties of Composite Materials by the V-Notched Beam Method
D2344-89	Apparent Interlaminar Shear Strength of Parallel Fiber Composites by Short – Beam Method
D792-91	Density and Specific Gravity (Relative Density) of Plastics by Displacement
D2734-94	Void Content of Reinforced Plastics
D3171-90	Fiber Content of Resin – Matrix Composites by Matrix Digestion
D695-91	Compressive Properties of Rigid Plastics

SACMA Standards

SRM 1-94	Compressive Properties of Oriented Fiber-Resin Composites
SRM 8-94	Short Beam Shear Strength of Oriented Fiber-Resin Composites
SRM 18-94	Glass Transition Temperature (T_g) Determination by DMA of Oriented Fiber-Resin Composites

Other Documents

FAA Document DOT/FAA/AR-00/47: Material Qualification and Equivalency for Polymer Matrix Composite Material Systems, J.S. Tomblin, Y.C. Ng and K.S. Raju, 2001.

MIL-HDBK-17 1E, 2D, 3E – Military Handbook for Polymer Matrix Composites

Cessna Aircraft Company, Document # 98-87-005: B-Basis Design Allowables Test Plan for Preimpregnated Carbon/Epoxy Broadgoods, Revision B, January 1999.

1.5 Methodology

1.5.1 Test Matrix

Testing was performed according to the test methods delineated in the test matrix, with modifications as referenced in the AGATE report, *Material Qualification and Equivalency for Polymer Matrix Composite Material Systems*. The test matrix for properties included in this document is listed on the next page, with the following notation cited in each column:

x

where the first # represents the required number of prepreg batches, defined as: Prepreg containing T650 3K-135 8-Harness Graphite Fabric from one mill roll, impregnated with one batch of resin in one continuous manufacturing operation with traceability to all components. The second # represents the required number of replicates per prepreg batch. For example, "3 x 6" refers to three prepreg batches of material and six specimens per prepreg batch for a total requirement of 18 test specimens.

Table 1.5.1: Test Matrix and Standards Used

TEST	METHOD	NO. OF REPLICATES PER TEST CONDITION			
		CTD ^{1,5}	RTD ^{2,5}	ETW ³	ETD ^{4,5}
0° (warp) Tension Strength	ASTM D3039-95	1x4	3x4	3x4	3x4
0° (warp) Tension Modulus, Strength and Poisson's Ratio	ASTM D3039-95	1x2	3x2	3x2	3x2
90° (fill) Tension Strength	ASTM D3039-95	1x4	3x4	3x4	3x4
90° (fill) Tension Modulus and Strength	ASTM D3039-95	1x2	3x2	3x2	3x2
0° (warp) Compression Strength	SACMA SRM 1-94	1x6	3x6	3x6	3x6
0° (warp) Compression Modulus	SACMA SRM 1-94	1x2	3x2	3x2	3x2
90° (fill) Compression Strength	SACMA SRM 1-94	1x6	3x6	3x6	3x6
90° (fill) Compression Modulus	SACMA SRM 1-94	1x2	3x2	3x2	3x2
In-Plane Shear Strength	ASTM D5379-93	1x4	3x4	3x4	3x4
In-Plane Shear Modulus and Strength	ASTM D5379-93	1x2	3x2	3x2	3x2
Short Beam Shear	ASTM D2344-89	--	3x6	--	--
Fiber Volume	ASTM D3171-90	One sample per panel			
Resin Volume	ASTM D3171-90	One sample per panel			
Void Content	ASTM D2734-94	One sample per panel			
Cured Neat Resin Density	---	Supplied by manufacturer for material			
Glass Transition Temperature	SACMA SRM 18-94	3 dry, 3 wet per prepreg lot			

Notes :

- 1 CTD: One prepreg lot of material tested (test temperature = $-65 \pm 5^\circ$ F, moisture content = as fabricated, soak time at -65 was 3 min.)
- 2 RTD: Three prepreg lots of material tested (test temperature = $70 \pm 10^\circ$ F, moisture content = as fabricated)
- 3 ETW: Three prepreg lots of material tested (test temperature = $180 \pm 5^\circ$ F, moisture content = equilibrium per section 1.5.2, soak time at 180 was 60 sec.)
- 4 ETD: Three prepreg lots of material tested (test temperature = $180 \pm 5^\circ$ F, moisture content = as fabricated, soak time at 180 was 60 sec.)
- 5 Dry specimens are "as fabricated" specimens that have been maintained at ambient conditions in an environmentally controlled laboratory.

1.5.2 Environmental Conditioning

All 'wet' conditioned samples were exposed to elevated temperature and humidity conditions to establish moisture saturation of the material. Specimens were exposed to 85 ± 5 % relative humidity and 145 ± 5 °F until an equilibrium moisture weight gain of traveler, or witness coupons (1" x 1" x specimen thickness) was achieved. ASTM D5229 and SACMA SRM 11 were used as guidelines for environmental conditioning and moisture absorption.

Effective moisture equilibrium was achieved when the average moisture content of the traveler specimen changed by less than 0.05% for two consecutive readings within a span of 7 ± 0.5 days and was 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

It is common to see small fluctuations in an unfitted plot of the weight gain vs. time curve. There were no fluctuations that made significant errors in results or caused rejection in the moisture equilibrium criteria. Once the traveler coupons passed the criteria for two consecutive readings, the samples were removed from the environmental chamber and placed in a sealed bag with a moist paper or cotton towel for a maximum of 14 days until mechanical testing. Strain gauged specimens were removed from the controlled environment for a maximum of 2 hours for application of gages in ambient laboratory conditions.

1.5.3 Fluid Sensitivity Screening

All 'wet' conditioned samples were exposed to elevated temperature and humidity conditions to establish moisture saturation of the material. Specimens were exposed to 85 ± 5 % relative humidity and 145 ± 5 °F until an equilibrium moisture weight gain of traveler, or witness coupons (1" x 1" x specimen thickness) was achieved. ASTM D5229 and SACMA SRM 11 were used as guidelines for environmental conditioning and moisture absorption.

Effective moisture equilibrium was achieved when the average moisture content of the traveler specimen changed by less than 0.05% for two consecutive readings within a span of 7 ± 0.5 days and was 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

It is common to see small fluctuations in an unfitted plot of the weight gain vs. time curve. There were no fluctuations that made significant errors in results or caused rejection in the moisture equilibrium criteria. Once the traveler coupons passed the criteria for two consecutive readings, the samples were removed from the environmental chamber and placed in a sealed bag with a moist paper or cotton towel for a maximum of 14 days until mechanical testing. Strain gauged specimens were removed from the controlled environment for a maximum of 2 hours for application of gages in ambient laboratory conditions.

1.5.4 Normalization Procedures

The normalization procedure attempts to reduce variability in fiber-dominated material properties by adjusting raw test values to a specified fiber volume content. Only the following properties were normalized:

- 0° (warp) Tensile Strength and Modulus
- 90° (fill) Tensile Strength and Modulus
- 0° (warp) Compressive Strength and Modulus
- 90° (fill) Compressive Strength and Modulus

The normalization procedure was adopted from MIL-HDBK-17-1E, section 2.4.3.3. The procedure which was used to normalize the data is based on two primary assumptions:

- The relationship between fiber volume fraction and ultimate laminate strength is linear over the entire range of fiber/resin ratios. (It neglects the effects of resin starvation at high fiber contents.)
- Fiber volume is not commonly measured for each test sample, so this method accounts for the fiber volume variation between individual test specimens by utilizing a relationship between fiber volume fraction and laminate cured ply thickness. This relationship is virtually linear in the 0.45 to 0.65 fiber volume fraction range.

Additional information is detailed in FAA Document DOT/FAA/AR-00/47: Material Qualification and Equivalency for Polymer Matrix Composite Material Systems. For all normalized data contained in this document, the test values are normalized by cured ply thickness according to:

$$\text{Normalized Value} = \text{Test Value} \times \frac{CPT_{\text{specimen}}}{CPT_{\text{normalizing}}}$$

where:

$$CPT_{\text{specimen}} = \frac{\text{Average Sample Thickness}}{\# \text{ of plies}}$$

1.5.5 Statistical Analysis

When compared to metallic materials, fiber reinforced composite materials exhibit a high degree of material property variability. This variability is due to many factors, including but not limited to: raw material and prepreg manufacture, material handling, part fabrication techniques, ply stacking sequence, environmental conditions, and testing techniques. This inherent variability drives up the cost of composite testing and tends to render smaller data sets than those produced for metallic materials. This necessitates the usage of statistical techniques for determining reasonable design allowables for composites.

The analyses and design allowable generation for both A and B basis values were performed using the procedure detailed in section 5.3 of FAA Document DOT/FAA/AR-00/47: Material Qualification and Equivalency for Polymer Matrix Composite Material Systems.

1.5.6 Material Performance Envelope and Interpolation

Using the B-basis numbers, a material performance envelope may be generated for the material system by plotting these values as a function of temperature. Figure 1.5.1 shows an example material performance envelope using B-basis values.

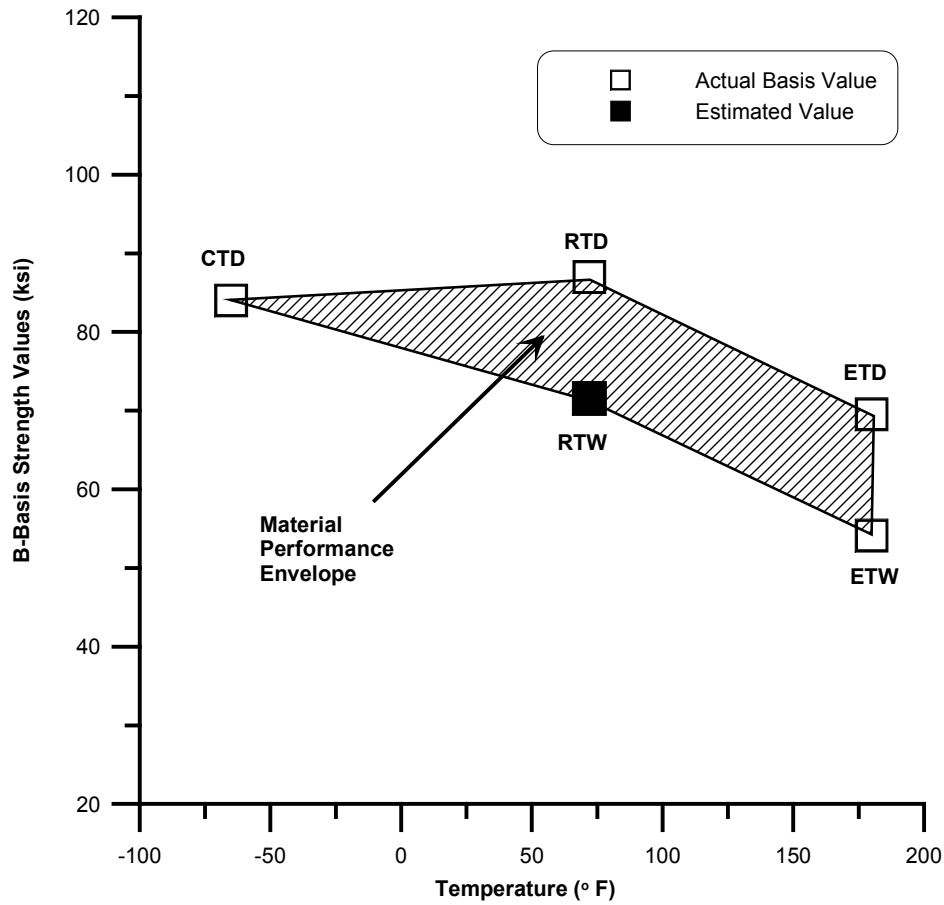


Figure 1.5.1 Material performance envelope.

Since each specific aircraft application of the qualified material may have different Material Operational Limits (MOL) than those tested in the material qualification (which is usually the upper limit), some applications may require a reduced MOL. In this case, simple linear interpolation may be used to obtain the corresponding basis values at the new application MOL.

This interpolation may be accomplished using the following simple relationships assuming $T_{RTD} < T_{MOL} < T_{ETD}$:

For the corresponding MOL “dry” basis value, the “interpolated” basis value using the qualification data is

$$B_{MOL} = B_{RTD} - \frac{(B_{RTD} - B_{ETD})(T_{RTD} - T_{MOL})}{(T_{RTD} - T_{ETD})}$$

where B_{MOL} = new application basis value interpolated to T_{MOL}

B_{RTD} = basis RTD strength value
 B_{ETD} = basis ETD strength value
 T_{RTD} = RTD test temperature
 T_{ETD} = ETD test temperature
 T_{MOL} = new application MOL temperature

For the corresponding MOL “wet” basis value, an estimated Room Temperature Wet (RTW) value must be calculated. This may be accomplished by the simple relation

$$B_{RTW} = B_{RTD} - (B_{ETD} - B_{ETW})$$

The “interpolated” wet basis value using the qualification data may then be obtained by

$$B_{MOL} = B_{RTW} - \frac{(B_{RTW} - B_{ETW})(T_{RTW} - T_{MOL})}{(T_{RTW} - T_{ETW})}$$

where:

- B_{MOL} = new application basis value interpolated to T_{MOL}
- B_{RTW} = estimated basis RTW strength value
- B_{ETW} = basis ETW strength value
- T_{RTW} = RTW (i.e., RTD) test temperature
- T_{ETW} = ETW test temperature
- T_{MOL} = new application MOL temperature

These equations may also be used for interpolated mean strengths as well as A-basis values with the appropriate substitutions. It should be noted that because unforeseen material property drop-offs with respect to temperature and environment can occur, *extrapolation* to a higher MOL should not be attempted without additional testing and verification. In addition, the interpolation equations shown above are practical for materials obeying *typical* mechanical behavior. In most cases, some minimal amount of testing may also be required to verify the interpolated values.

1.5.6.1 Interpolation Example

This section provides an example of linear interpolations to a specific application environment less than the tested upper material limit used in qualification. Assuming a specific application environment of 150° F, Figure 1.5.2 depicts the linear interpolation of the B-basis design allowable to this environment. Using the above equations along with the nominal testing temperatures (see Table 1.5.1), the interpolated basis values at 150° F become

$$\text{ETD} : B_{MOL} = 75.106 \text{ ksi}$$

ETW : $B_{MOL} = 59.746$ ksi

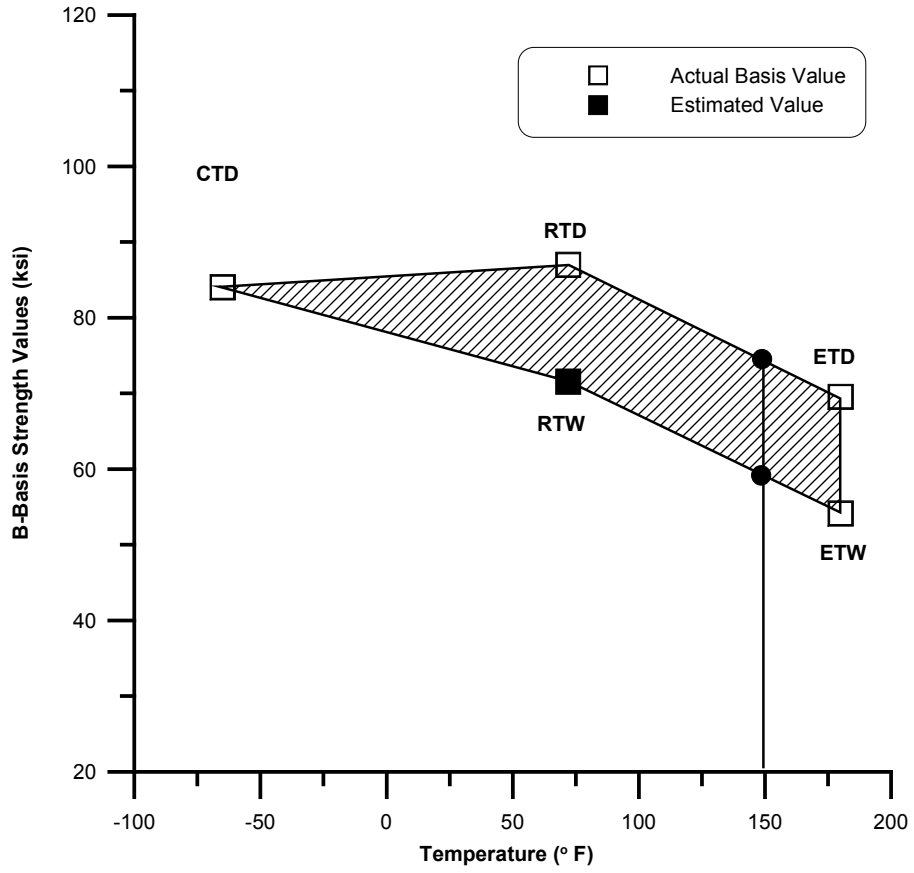


Figure 1.5.2 Example of 150° F interpolation for B-basis values.

2.0 FIBERITE T650 3K-135-8H / 7740 PREPREG PROPERTIES

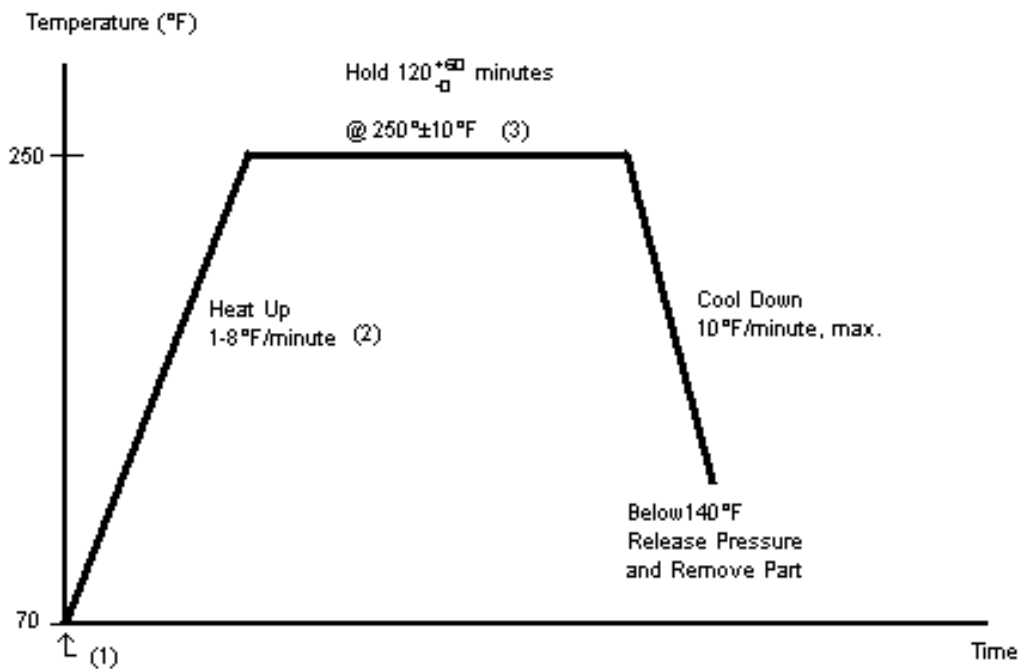
2.1 Prepreg Documentation by Prepreg Lot

Prepreg Documentation	Prepreg Manufacturer & Product ID: HMF 7740/T650-35-3K-8HS-370-42" Impregnation Method: SOLVENT		
Prepreg Batch or Lot #	310601	310602	310603
Batch (Lot) ID as labeled on samples	1	2	3
Date of Manufacture	11-13-97	11-13-97	11-13-97
Expiration Date	11-13-98	11-13-98	11-13-98
Resin Content [%]	37 %	39 %	38 %
Reinforcement Areal Weight & Test Method	371 g/sq m	368 g/sq m	369 g/sq m
Resin Flow & Test Conditions	20% @ 100 psi	23% @ 100 psi	22% @ 100 psi
Gel Time & Test Conditions	4 min @ 177 C	3 min @ 177 C	3 min @ 177 C
Volatile Content	0.9	1.0	0.9
Reinforcement Documentation	Fiber/Fabric Manufacturer & Product ID: T650/35 3K 309NT Precursor Type: PAN Nominal Filament Count: 3K Finish/Sizing Type and %: UC309, , .93—1.14% Nominal tow or yarn count/inch: Twist: not available		
Fabric Batch or Lot #, Warp	B3S0602, 705, 803, 804, 820	B3S0602, 705, 803, 804, 820	B3S0303
Sizing weight, %	.93, 1.14, .97, 1.03, 1.09 %	.93, 1.14, .97, 1.03, 1.09 %	1.11 %
Fabric Batch or Lot #, Fill	B3S0803, 804, 820	B3S0803, 804, 820	B3S0303
Sizing weight, %	.97, 1.03, 1.09 %	.97, 1.03, 1.09 %	1.11 %
Date of Manufacture	8-97	8-97	4-3-97
Average Fiber Density per Lot & Test Method	1.775 (warp), 1.776 (fill) g/cc	1.775 (warp), 1.776 (fill) g/cc	1.761 g/cc
Matrix Documentation	Resin Manufacturer & Product ID:		
Matrix Batch or Lot #	310601	310602	310603
Date of Manufacture	11-13-97	11-13-97	11-13-97
Average Neat Resin Density by Lot & Test Method	1.27 g/ccm	1.27 g/ccm	1.27 g/ccm

2.2 Process Specification

This specification does not address issues relating to safety, quality control, bagging material selection, bagging procedure, tool preparation, or equipment selection. Although these may affect overall part quality, it is the responsibility of the end user to develop procedures related to these issues in a manner that produces parts with high quality and consistency.

The following autoclave cure procedures are excerpts from Cessna process specification CSAC005. The exception to this specification is the cure cycle and ply orientation tolerance. The cure cycle for panel fabrication is 250°F, ±10°: for 120 minutes, +60, -0; 45 psi, ±5. Individual ply orientation is ±2° with respect to the tooled reference edge. The detailed cure cycle procedure is given below. All test specimens were cured per this specification by Cessna Aircraft Company. However, the effects of the upper and lower limits of vacuum, temperature, cure time, heat-up rate and hold temperature on the mechanical and thermal properties have not been investigated.



- (1) Apply 22 in-Hg of vacuum minimum to vacuum bag. Initiate autoclave pressure 3 psi/minute minimum, vent bag at 20±10 psig. Final vessel pressure 45±5 psi.
- (2) From 230°F to 240°F, a minimum heat up rate of 0.3°F/minute is acceptable.
- (3) All thermocouples shall be at temperature

3.0 FIBERITE T650 3K-135-8H / 7740 LAMINATE PROPERTIES

3.1 Test Results

3.1.1 Summary

MATERIAL:	Fiberite 7740/T650 3K-135-8H Graphite Fabric	7740/T650 3K-135-8H
PREPREG:	Fiberite HMF 7740/T650-35-3K-8HS-370-42"	Summary
FIBER:	Amoco T650/35 3K 309NT	RESIN: Fiberite HMF 7740
T_g (dry):	229.85 °F	T_g (wet): 183.22 °F
T_g (wet):	183.22 °F	T_g METHOD: DMA (SRM 18-94)
PROCESSING:	Autoclave cure: 250±10°F for 120+60,-0 min. @ 45±5 psi	

Date of fiber manufacture	4/3/97 – 8/97	Date of testing	2/4/99 – 4/21/99
Date of resin manufacture	11/13/97	Date of data submittal	8/99
Date of prepreg manufacture	11/13/97	Date of analysis	2/11/99 – 4/21/99
Date of composite manufacture	3/19/98 – 4/16/98		

LAMINA MECHANICAL PROPERTY SUMMARY

Data Reported as: Measured
 (Normalized by CPT=0.0150 in)

	CTD		RTD		ETD		ETW	
	B-Basis	Mean	B-Basis	Mean	B-Basis	Mean	B-Basis	Mean
F₁^{tu} (ksi)	115.71 (116.14)	125.79 (126.05)	121.89 (123.00)	132.52 (133.49)	119.95 (120.00)	130.41 (130.24)	120.76 (121.59)	130.77 (131.45)
E₁^t (Msi)	---	10.01 (10.09)	---	9.95 (10.04)	---	9.91 (9.89)	---	9.78 (9.82)
v₁₂^{tu}	---	0.060	---	0.050	---	0.030	---	0.032
F₂^{tu} (ksi)	111.78 (112.91)	120.55 (122.30)	116.18 (116.09)	125.30 (125.74)	116.13 (116.25)	125.24 (125.91)	114.91 (114.60)	123.48 (123.65)
E₂^t (Msi)	---	10.63 (10.75)	---	9.84 (9.86)	---	9.41 (9.48)	---	9.36 (9.44)
F₁^{cu} (ksi)	85.60 (83.49)	103.09 (101.61)	88.03 (86.73)	103.18 (102.55)	68.28 (67.93)	80.03 (80.32)	48.45 (47.89)	56.35 (56.16)
E₁^c (Msi)	---	9.61 (9.40)	---	9.43 (9.40)	---	9.53 (9.42)	---	9.73 (9.63)
F₂^{cu} (ksi)	97.21 (96.70)	112.73 (112.50)	93.31 (93.61)	105.92 (106.56)	69.12 (68.72)	77.47 (78.23)	44.39 (44.19)	50.10 (50.02)
E₂^c (Msi)	---	9.57 (9.28)	---	9.28 (9.29)	---	9.24 (9.23)	---	9.52 (9.53)
F₁₂^{su} (ksi)	20.74	22.99	16.57	18.09	11.97	13.07	8.15	8.86
G₁₂^s (Msi)	---	0.79	---	0.63	---	0.42	---	0.33
F₁₃^{su**} (ksi)	---	---	9.60	10.39	---	---	---	---

** *Apparent* interlaminar shear strength

3.1.2 Individual Test Summaries

3.1.2.1 Tension, 1-axis

Material: Fiberite 7740/T650 3K-135-8H Graphite Fabric							Tension, 1-axis G/Ep Fiberite 7740/T650 3K-135-8H Graphite Fabric [0]₇				
Resin content: 31 - 38 wt%		Comp. density: 1.52 - 1.54 g/cc		Fiber volume: 53 - 59 vol%		Void content: 1.0 to 3.6 %		Ply thickness: 0.0146 - 0.0156 in.		Ply range: 7 plies	
Test method: D3039-95		Modulus calculation: linear fit from 1000 - 3000 $\mu\epsilon$		Normalized by: 0.0150 in. ply thickness							
		CTD (B)		RTD (A)		ETD (G)		ETW (F)			
Test Temperature [°F]		-65		75		180		180			
Moisture Conditioning		dry		dry		dry		64 days, .63-.72% wt gain			
Equilibrium at T, RH		as fabricated		as fabricated		as fabricated		145 F, 85 %			
Source code		BDJXXXXB		BDJXXXXA		BDJXXXXG		BDJXXXXF			
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₁^{tu} (ksi)		126.05	125.79	133.49	132.52	130.24	130.41	131.45	130.77		
Minimum		111.17	111.90	124.05	122.94	117.61	118.02	125.68	124.30		
Maximum		136.47	138.67	142.82	138.64	138.80	141.04	136.24	137.84		
C.V.(%)		6.81	6.75	3.69	3.48	5.60	5.76	2.34	2.85		
B-value		116.14	115.71	123.00	121.89	120.00	119.95	121.59	120.76		
A-value		109.66	109.10	116.13	114.93	113.30	113.10	114.75	113.82		
No. Specimens		18		18		18		30			
No. Prepreg Lots		3		3		3		3			
E₁^t (Msi)		10.09	10.01	10.04	9.95	9.89	9.91	9.82	9.78		
Minimum		9.89	9.65	9.86	9.57	9.75	9.56	9.58	9.36		
Maximum		10.44	10.18	10.20	10.12	10.25	10.22	10.29	10.29		
C.V.(%)		2.09	2.08	1.57	2.06	1.89	2.97	2.67	3.41		
No. Specimens		5		6		6		6			
No. Prepreg Lots		3		3		3		3			
v₁₂^t		0.060		0.050		0.030		0.032			
No. Specimens		5		6		6		6			
No. Prepreg Lots		3		3		3		3			

3.1.2.2 Tension, 2-axis

Material: Fiberite 7740/T650 3K-135-8H Graphite Fabric Resin content: 32 - 38 wt% Comp. density: 1.50 - 1.53 g/cc Fiber volume: 53 - 59 vol% Void content: 1.4 to 4.1 % Ply thickness: 0.0144 - 0.0156 in. Ply range: 7 plies Test method: D3039-95 Modulus calculation: linear fit from 1000 - 3000 $\mu\epsilon$ Normalized by: 0.0150 in. ply thickness		Tension, 2-axis G/Ep Fiberite 7740/T650 3K-135-8H Graphite Fabric [0]₇									
		CTD (B)	RTD (A)	ETD (G)	ETW (F)						
Test Temperature [°F]		-65	75	180	180						
Moisture Conditioning		dry	dry	dry	50 days, .61-.68% wt gain						
Equilibrium at T, RH		as fabricated	as fabricated	as fabricated	145 F, 85 %						
Source code		BDUXXXXB	BDUXXXXA	BDUXXXXG	BDUXXXXF						
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₂^{tu} (ksi)	Mean	122.30	120.55	125.74	125.30	125.91	125.24	123.65	123.48		
	Minimum	113.03	113.68	117.25	117.17	117.09	116.54	105.95	110.00		
	Maximum	132.98	130.93	135.89	133.73	133.32	132.93	133.65	135.22		
	C.V.(%)	4.40	4.18	4.58	3.94	3.87	4.00	4.88	4.66		
	B-value	112.91	111.78	116.09	116.18	116.25	116.13	114.60	114.91		
	A-value	106.76	106.04	109.77	110.22	109.92	110.17	108.32	108.97		
	No. Specimens	18		18		18		30			
No. Prepreg Lots	3		3		3		3				
E₂^t (Msi)	Mean	10.75	10.63	9.86	9.84	9.48	9.41	9.44	9.36		
	Minimum	9.90	10.10	9.70	9.55	9.27	9.25	8.94	8.67		
	Maximum	11.24	11.33	10.04	10.18	9.60	9.67	9.88	9.70		
	C.V.(%)	4.42	4.25	1.44	2.58	1.66	1.59	3.39	4.10		
	No. Specimens	6		6		6		6			
	No. Prepreg Lots	3		3		3		3			

3.1.2.3 Compression, 1-axis

Material:		Fiberite 7740/T650 3K-135-8H Graphite Fabric		Compression, 1-axis G/Ep Fiberite 7740/T650 3K-135-8H Graphite Fabric [0]₈							
Resin content:		30 - 34 wt%	Comp. density:		1.50 - 1.53 g/cc						
Fiber volume:		53 - 60 vol%	Void content:		0.6 to 3.9 %						
Ply thickness:		0.0141 - 0.0155 in.									
Ply range:		8 plies									
Test method:		SRM 1-94, D695-91 (mod)		Modulus calculation:		linear fit from 1000 - 3000 $\mu\epsilon$					
Normalized by:		0.0150 in. ply thickness									
		CTD (B)		RTD (A)		ETD (G)		ETW (F)			
Test Temperature [°F]		-65		75		180		180			
Moisture Conditioning		dry		dry		dry		63-66 days, .71-.78% wt gain			
Equilibrium at T, RH		as fabricated		as fabricated		as fabricated		145 F, 85 %			
Source code		BDKXXXXB		BDKXXXXA		BDKXXXXG		BDKXXXXF			
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F_1^{cu} (ksi)	Mean	101.61	103.09	102.55	103.18	80.32	80.03	56.16	56.35		
	Minimum	93.44	95.00	95.54	96.16	66.85	65.70	43.39	44.15		
	Maximum	107.85	109.53	111.41	113.08	88.16	88.62	69.43	68.54		
	C.V.(%)	5.46	5.59	4.57	4.91	6.03	6.16	12.38	11.48		
	B-value	83.49	85.60	86.73	88.03	67.93	68.28	47.89	48.45		
	A-value	73.41	75.88	76.31	78.06	59.77	60.55	42.11	42.94		
	No. Specimens	6		18		18		30			
No. Prepreg Lots	1		3		3		3				
E_1^c (Msi)	Mean	9.40	9.61	9.40	9.43	9.42	9.53	9.63	9.73		
	Minimum	9.35	9.54	8.94	9.05	8.88	8.81	8.83	8.92		
	Maximum	9.46	9.69	9.86	9.86	10.02	10.69	10.62	10.65		
	C.V.(%)	0.80	1.12	3.31	3.62	5.01	7.18	6.77	6.75		
	No. Specimens	2		6		6		6			
	No. Prepreg Lots	1		3		3		3			

3.1.2.4 Compression, 2-axis

Material: Fiberite 7740/T650 3K-135-8H Graphite Fabric										Compression, 2-axis G/Ep Fiberite 7740/T650 3K-135-8H Graphite Fabric [0]₈							
Resin content: 37 - 39 wt%		Comp. density: 1.52 - 1.53 g/cc		Fiber volume: 52 - 59 vol%		Void content: 1.1 to 3.9 %		Ply thickness: 0.0145 - 0.0154 in.		Ply range: 8 plies							
Test method: SRM 1-94, D695-91 (mod)		Modulus calculation: linear fit from 1000 - 3000 $\mu\epsilon$		Normalized by: 0.0150 in. ply thickness		CTD (B)		RTD (A)		ETD (G)		ETW (F)					
Test Temperature [°F]		-65		75		180		180									
Moisture Conditioning		dry		dry		dry		63-66 days, .68-.80% wt gain									
Equilibrium at T, RH		as fabricated		as fabricated		as fabricated		145 F, 85 %									
Source code		BDWXXXXB		BDWXXXXA		BDWXXXXG		BDWXXXXF									
		Normalized		Measured		Normalized		Measured		Normalized		Measured					
F₂^{cu} (ksi)		112.50		112.73		106.56		105.92		78.23		77.47		50.02		50.10	
Mean		106.44		105.93		97.63		97.57		68.20		67.97		41.59		41.14	
Minimum		119.27		119.72		115.82		115.86		88.08		86.42		58.05		58.18	
Maximum		5.16		5.55		5.14		4.87		7.02		6.74		8.41		8.31	
C.V.(%)		96.70		97.21		93.61		93.31		68.72		69.12		44.19		44.39	
B-value		87.91		88.58		85.08		85.00		62.46		62.17		40.14		40.41	
A-value		6		18		18		29		6		29		6		29	
No. Specimens		1		3		3		3		3		3		3		3	
No. Prepreg Lots		9.28		9.57		9.29		9.28		9.23		9.24		9.53		9.52	
Mean		9.24		9.48		8.96		8.86		8.68		8.78		9.08		9.14	
Minimum		9.33		9.65		9.48		9.64		9.62		9.83		10.02		10.27	
Maximum		0.62		1.27		2.22		3.07		3.75		4.44		3.57		4.31	
C.V.(%)		2		6		6		6		6		6		6		6	
No. Specimens		1		3		3		3		3		3		3		3	
No. Prepreg Lots																	
E₂^c (Msi)																	

3.1.2.5 Shear, 12 axis

Material: Fiberite 7740/T650 3K-135-8H Graphite Fabric Resin content: 31 - 36 wt% Comp. density: 1.51 - 1.53 g/cc Fiber volume: 54 - 60 vol% Void content: 1.7 to 4.0 % Ply thickness: 0.0143 - 0.0154 in. Ply range: 9 plies Test method: D5379-93 Modulus calculation: linear fit from 1000 - 6000 $\mu\epsilon$ Normalized by: N/A						Shear, 12-axis G/Ep Fiberite 7740/T650 3K-135-8H Graphite Fabric [(0/90)₂/0/(90/0)₂]				
	CTD (B)		RTD (A)		ETD (G)		ETW (F)			
Test Temperature [°F]	-65		75		180		180			
Moisture Conditioning	dry		dry		dry		64 days, .68-.76% wt gain			
Equilibrium at T, RH	as fabricated		as fabricated		as fabricated		145 F, 85 %			
Source code	BDNXXXXB		BDNXXXXA		BDNXXXXG		BDNXXXXF			
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₁₂^{SU} (ksi)	Mean	22.99	18.09		13.07		8.86			
	Minimum	22.21	17.43		12.23		7.85			
	Maximum	24.32	19.10		14.38		10.19			
	C.V.(%)	3.57	2.69		4.14		6.51			
	B-value	20.74	16.57		11.97		8.15			
	A-value	19.49	15.57		11.24		7.65			
	No. Specimens	6	20		18		30			
No. Prepreg Lots	1	3		3		3				
G₁₂^S (Msi)	Mean	0.79	0.63		0.42		0.33			
	Minimum	0.75	0.54		0.38		0.31			
	Maximum	0.83	0.67		0.49		0.35			
	C.V.(%)	7.06	7.19		8.75		4.15			
	No. Specimens	2	6		6		6			
	No. Prepreg Lots	1	3		3		3			

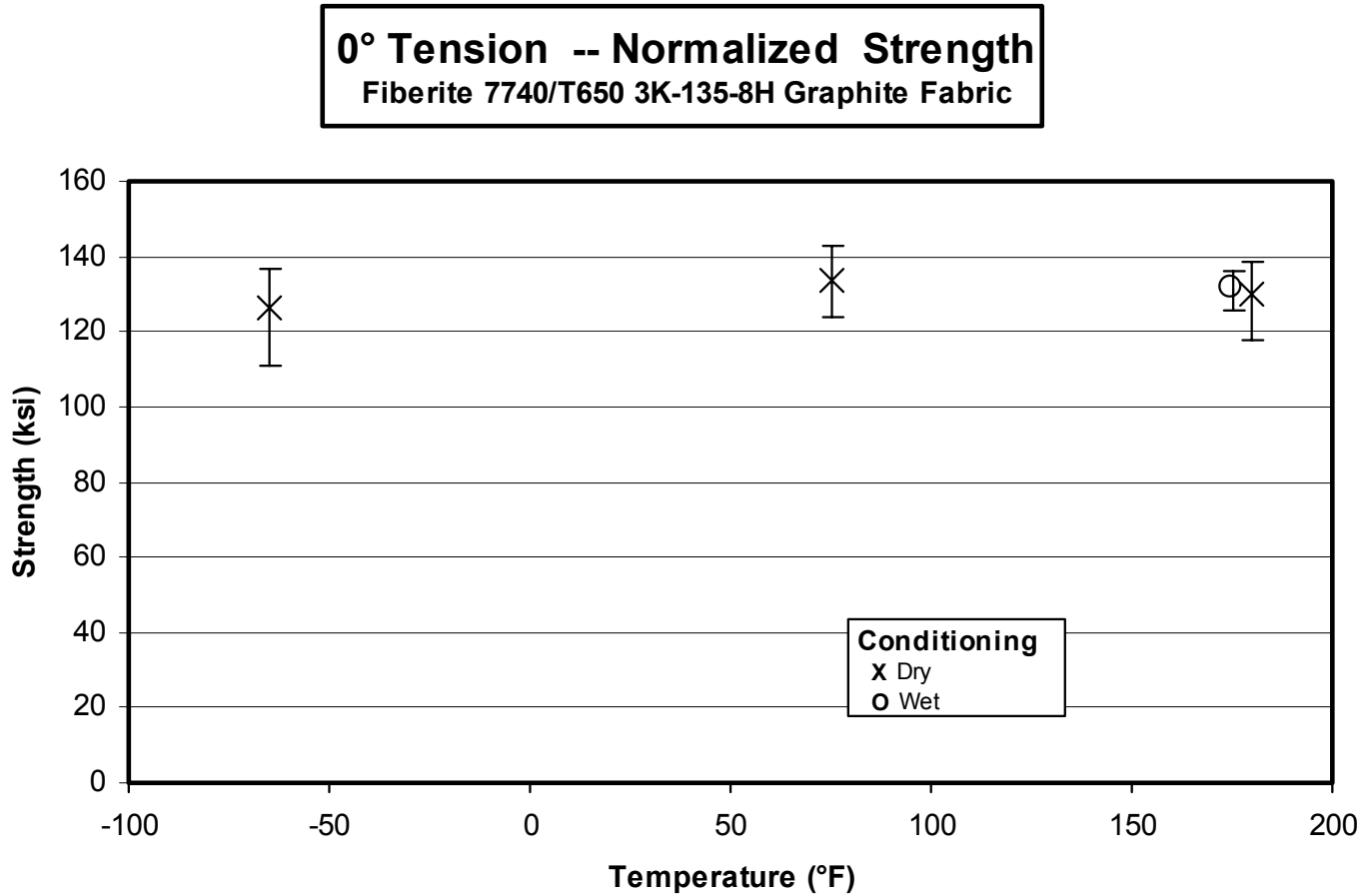
3.1.2.6 Shear, 13 axis

Material: Fiberite 7740/T650 3K-135-8H Graphite Fabric						Shear, 13-axis G/Ep Fiberite 7740/T650 3K-135-8H Graphite Fabric [0]₇							
Resin content: 31 - 39 wt%		Comp. density: 1.52 - 1.53 g/cc		Fiber volume: 52 - 59 vol%		Void content: 1.1 to 2.2 %		Ply thickness: 0.0141 - 0.0169 in.		Ply range: 7 plies			
Test method: D2344-89		Modulus calculation: N/A		Normalized by: N/A		CTD (B)		RTD (A)		ETD (G)		ETW (F)	
Test Temperature [°F]				75									
Moisture Conditioning				dry									
Equilibrium at T, RH				as fabricated									
Source code				BDQXXXXA									
		Normalized		Measured		Normalized		Measured		Normalized		Measured	
Mean				10.39									
Minimum				9.60									
Maximum				11.23									
C.V.(%)				3.85									
F₁₃^{su}													
(ksi)													
B-value				9.60									
A-value				9.03									
No. Specimens				18									
No. Prepreg Lots				3									

NOTES: These values represent the apparent interlaminar shear properties and are to be used for quality control purposes only. Do not use these values for interlaminar shear strength design values.

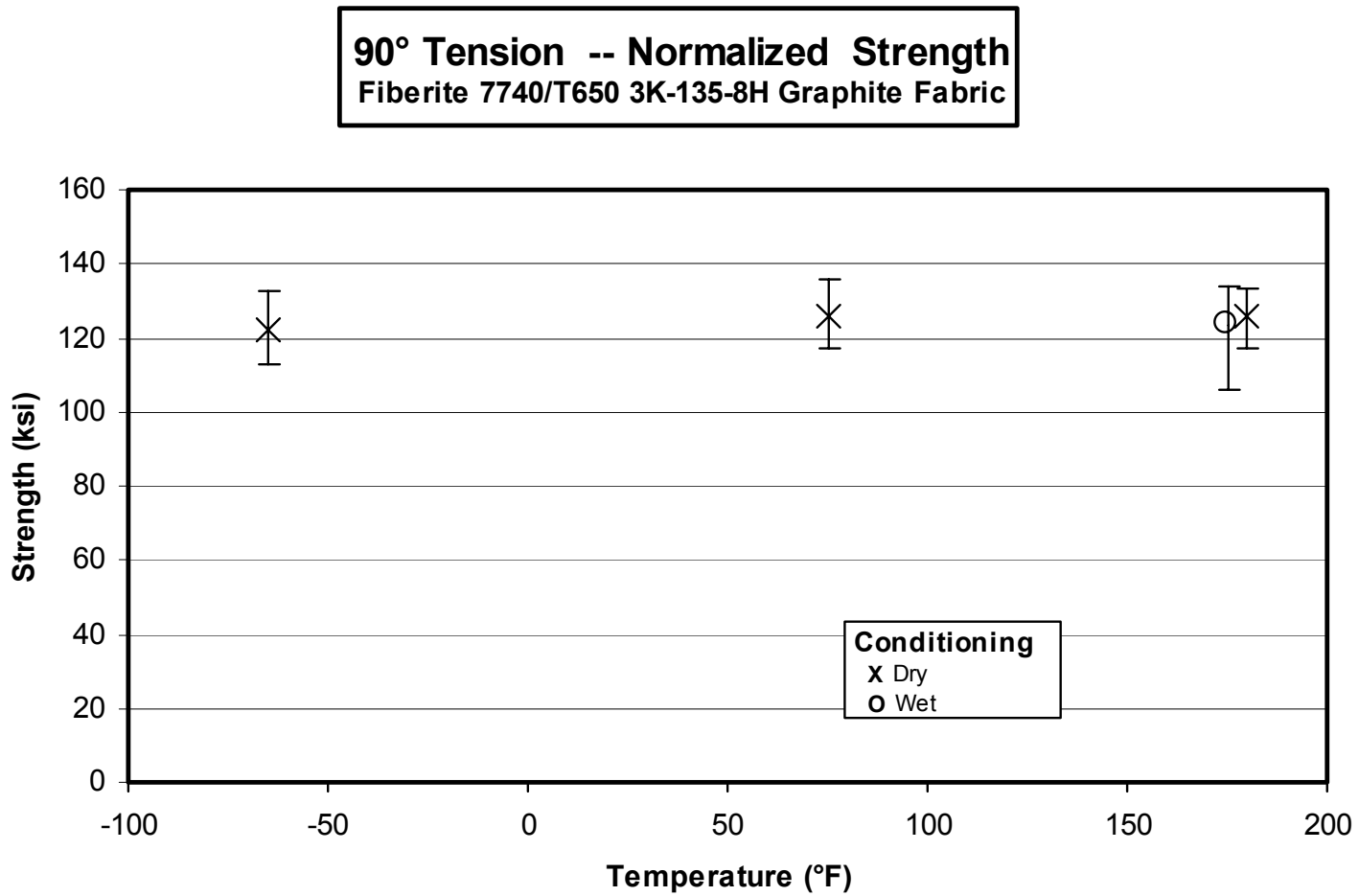
3.1.3 Individual Test Charts

3.1.3.1 Tension, 1-axis



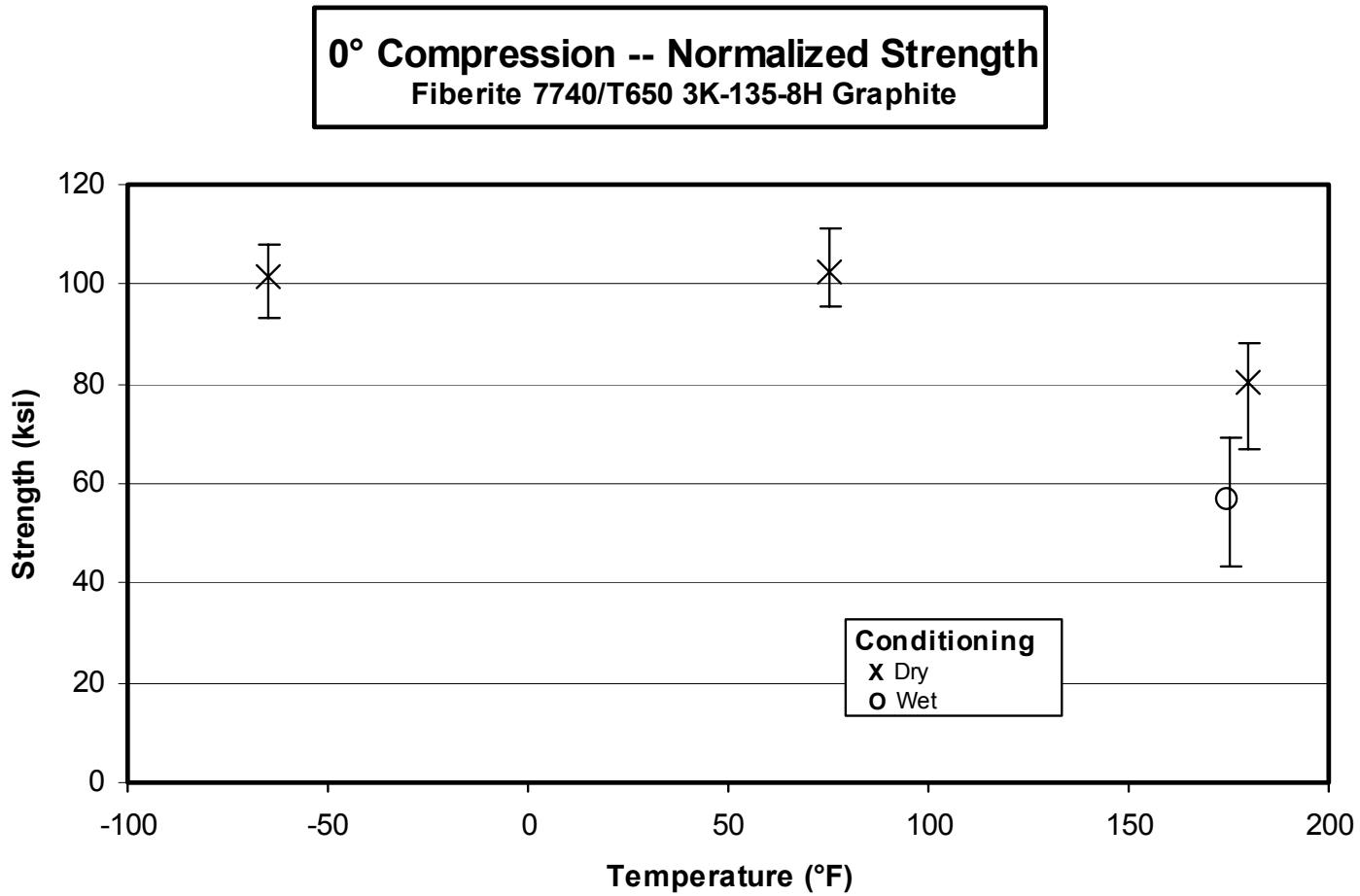
NOTE: The symbols represent the 'pooled' average of all tests, and the bars represent the upper and lower limit of the data. The 180° dry and wet data has been staggered for clarity

3.1.3.2 Tension, 2-axis



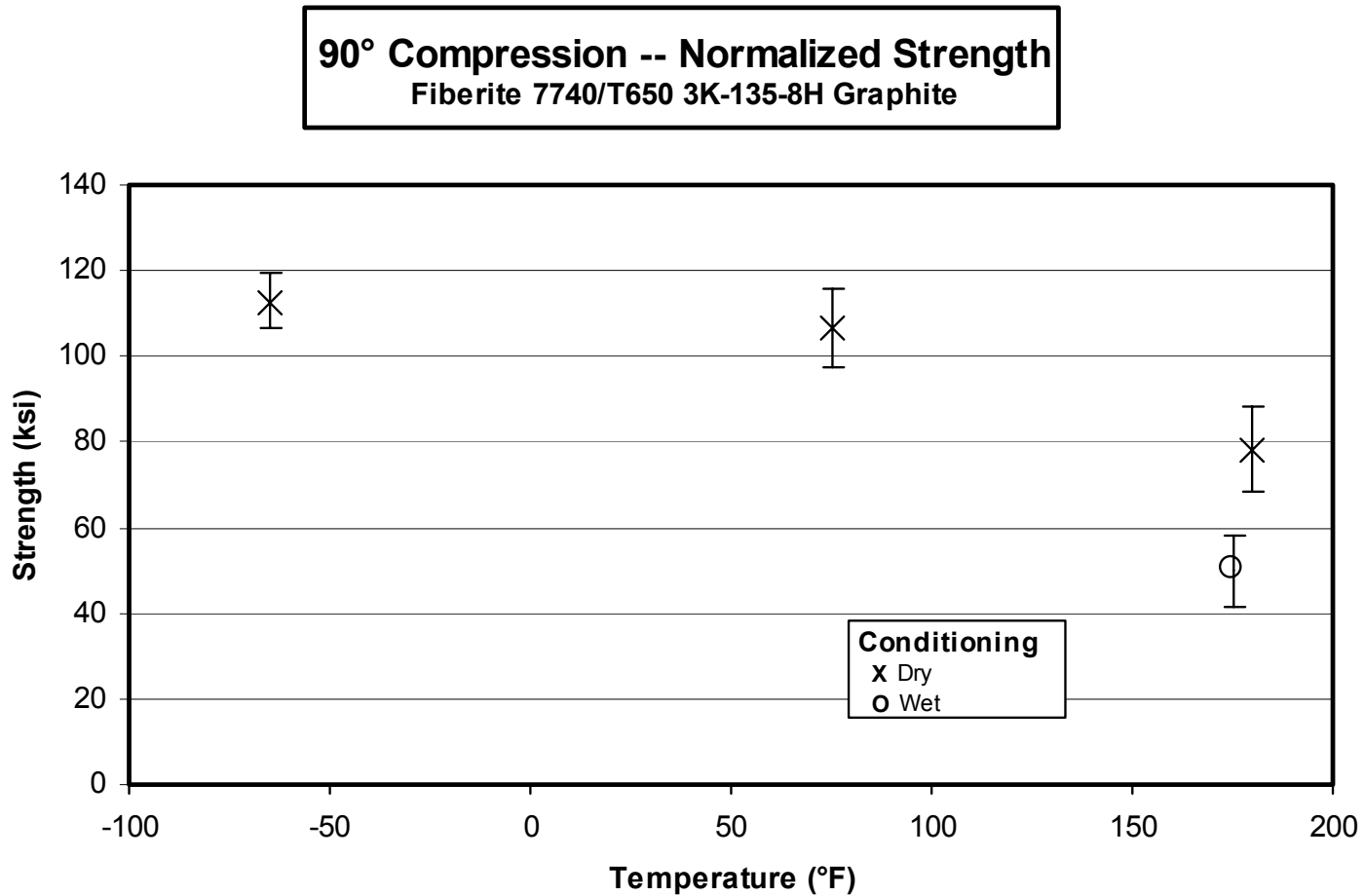
NOTE: The symbols represent the 'pooled' average of all tests, and the bars represent the upper and lower limit of the data. The 180° dry and wet data has been staggered for clarity.

3.1.3.3 Compression, 1-axis



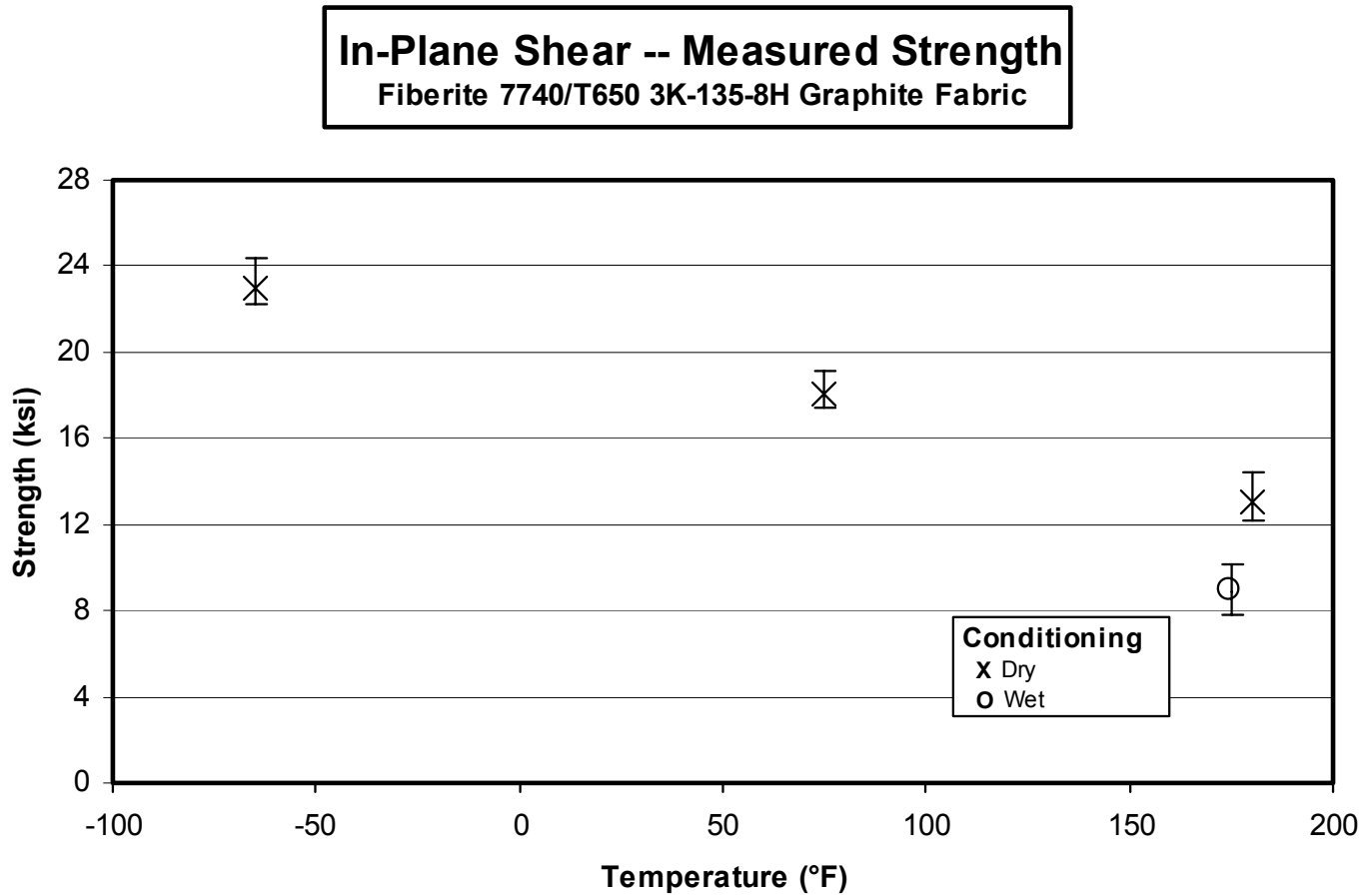
NOTE: The symbols represent the 'pooled' average of all tests, and the bars represent the upper and lower limit of the data. The 180° dry and wet data has been staggered for clarity

3.1.3.4 Compression, 2-axis



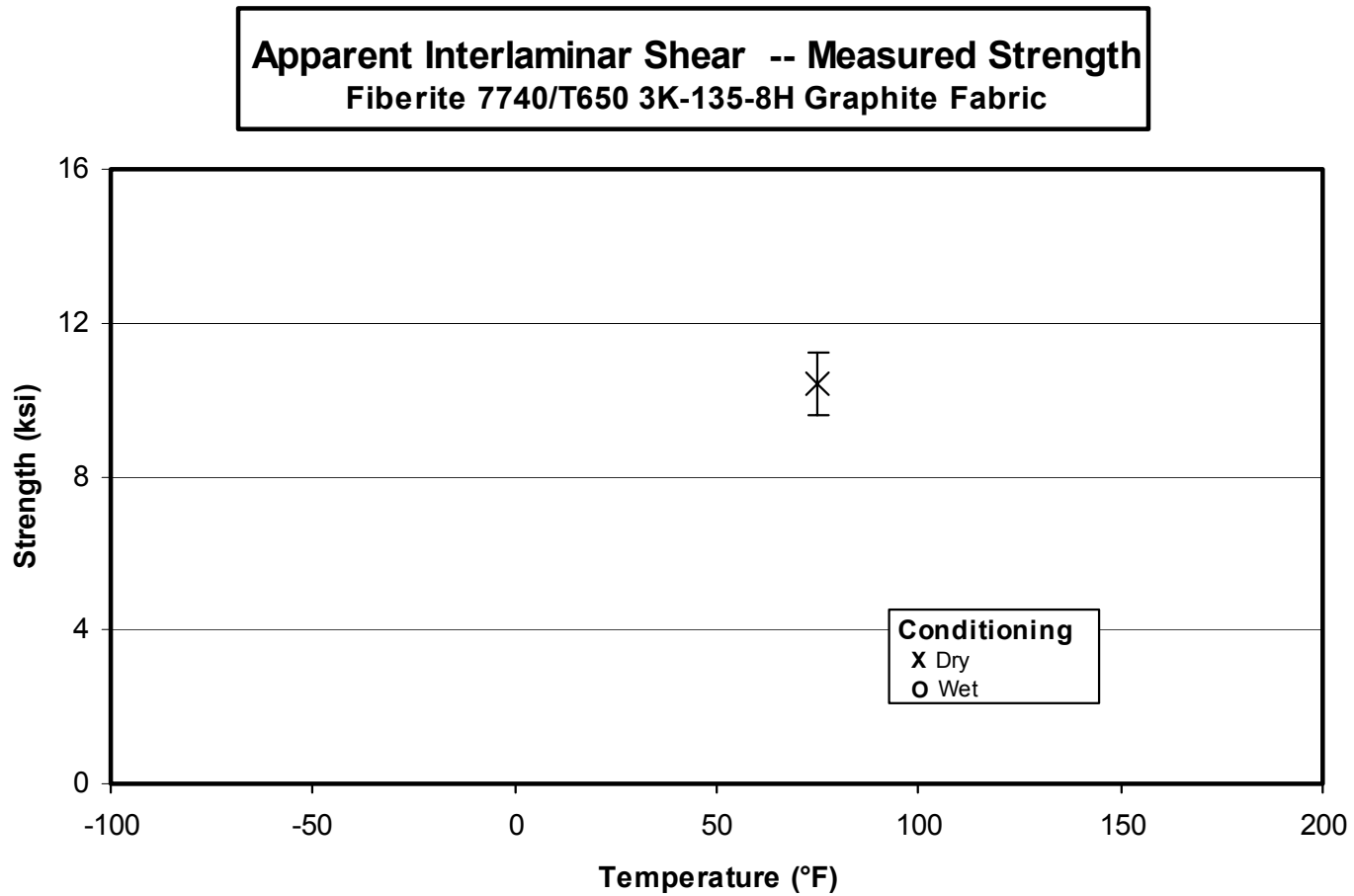
NOTE: The symbols represent the 'pooled' average of all tests, and the bars represent the upper and lower limit of the data. The 180° dry and wet data has been staggered for clarity.

3.1.3.5 Shear, 12 axis



NOTE: The symbols represent the 'pooled' average of all tests, and the bars represent the upper and lower limit of the data. The 180° dry and wet data has been staggered for clarity.

3.1.3.6 Shear, 13 axis



NOTE: The symbols represent the 'pooled' average of all tests, and the bars represent the upper and lower limit of the data.

3.2 Raw Data

Specimen Naming Convention

Test coupons were identified using an eight-digit specimen code, with the significance of each digit delineated below. A representative sample ID is shown for reference purposes.

B D J 2 1 2 5 F

1st Character: Fabricator

'B' designates Cessna

2nd Character: Material System

'D' designates T650 3K-135-8H / 7740

3rd Character: Test Type

'J' designates 0° Tension
Strength and Modulus, other
test types will be clearly labeled
at the top of each sheet

4th Character: Prepreg Batch ID

See Table 2.1 for Fiberite Batch ID /
Sample Batch ID correlation.

5th Character: Panel Number

The panel(s) fabricated for a specific test method.

6th Character: Subpanel Number

The sub-panel(s) cut from each panel, with subpanel
numbers labeled increasing from reference edge.

7th Character: Sample Number

The sample(s) cut from each subpanel, with sample
numbers labeled increasing from reference edge.

8th Character: Test Condition

'A' --- RTD

'B' --- CTD

'F' --- ETW

'G' --- ETD

See Table 1.5.1 for condition parameters.

3.2.1 Raw Data Spreadsheets and Scatter Charts

0° Tension -- (RTD) Strength & Modulus Fiberite 7740/T650 3K-135-8H Graphite Fabric

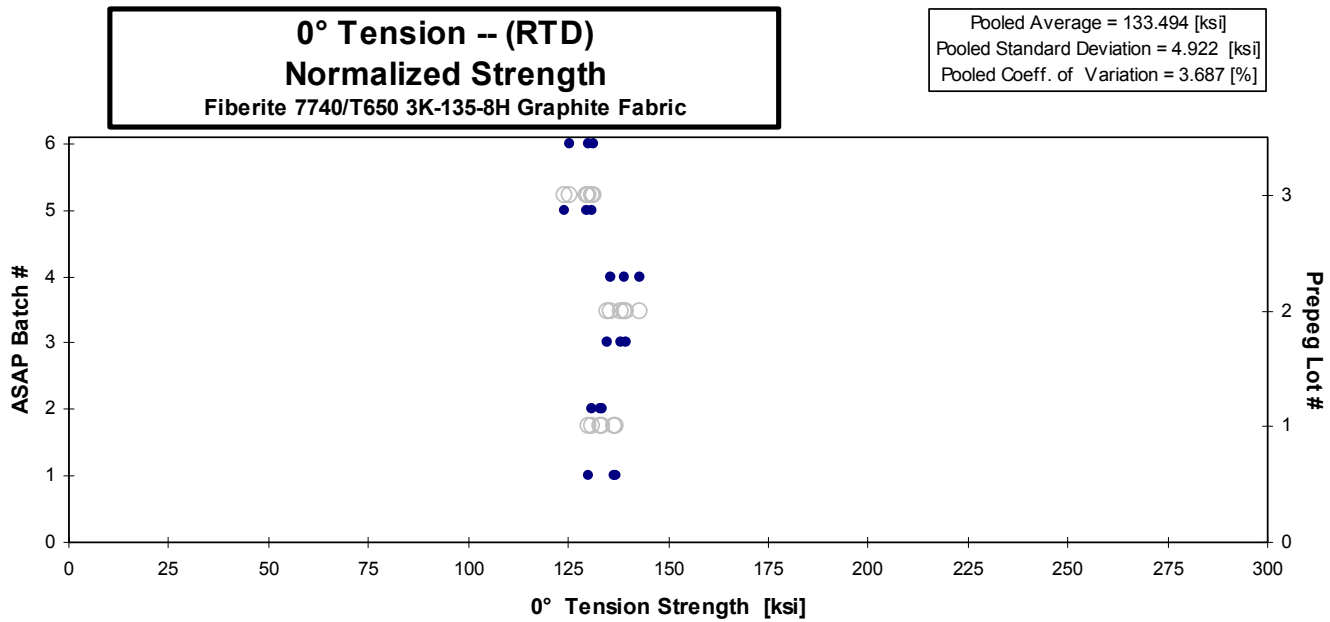
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDJ12X1A	1	1	1	133.721	10.122	0.056	0.102	7
BDJ12X2A	1	1	1	138.173			0.104	7
BDJ12X3A	1	1	1	137.221			0.104	7
BDJ14X1A	2	1	2	134.527	10.059	0.052	0.104	7
BDJ14X2A	2	1	2	136.931			0.102	7
BDJ14X3A	2	1	2	132.648			0.104	7
BDJ21X6A	1	2	3	133.952	9.568	0.052	0.108	7
BDJ21X7A	1	2	3	136.739			0.107	7
BDJ21X8A	1	2	3	132.941			0.106	7
BDJ23X6A	2	2	4	131.080	9.863	0.046	0.109	7
BDJ23X7A	2	2	4	138.635			0.108	7
BDJ23X8A	2	2	4	135.439			0.108	7
BDJ31X6A	1	3	5	127.783	10.047	0.043	0.107	7
BDJ31X7A	1	3	5	122.940			0.106	7
BDJ31X8A	1	3	5	130.269			0.105	7
BDJ33X6A	2	3	6	128.737	10.029	0.053	0.106	7
BDJ33X7A	2	3	6	123.953			0.106	7
BDJ33X8A	2	3	6	129.618			0.107	7

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01461	130.219	9.857
0.01485	136.770	
0.01492	136.459	
0.01486	133.245	9.963
0.01463	133.519	
0.01481	130.942	
0.01550	138.396	9.885
0.01533	139.713	
0.01520	134.714	
0.01551	135.533	10.198
0.01545	142.816	
0.01538	138.900	
0.01524	129.791	10.205
0.01514	124.053	
0.01505	130.745	
0.01516	130.106	10.136
0.01518	125.449	
0.01522	131.531	

Average 132.517 9.948 0.050
Standard Dev. 4.617 0.205 0.005
Coeff. of Var. [%] 3.484 2.064 9.877
Min. 122.940 9.568 0.043
Max. 138.635 10.122 0.056
Number of Spec. 18 6 6

Average_{norm} 0.01511 133.494 10.041
Standard Dev._{norm} 4.922 0.158
Coeff. of Var. [%]_{norm} 3.687 1.571
Min. 0.0146 124.053 9.857
Max. 0.0155 142.816 10.205
Number of Spec. 18 6



**0° Tension -- (CTD)
 Strength & Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDJ12X5B	1	1	1	136.980	10.178	0.076	0.104	7
BDJ12X6B	1	1	1	119.187			0.104	7
BDJ12X7B	1	1	1	128.021			0.105	7
BDJ14X5B	2	1	2	132.471	10.051	0.046	0.104	7
BDJ14X6B	2	1	2	135.418			0.104	7
BDJ14X7B	2	1	2	136.185			0.103	7
BDJ22X5B	1	2	3	129.792	10.112	0.069	0.108	7
BDJ22X6B	1	2	3	128.645			0.108	7
BDJ22X7B	1	2	3	127.855			0.108	7
BDJ24X5B	2	2	4	126.556	9.650	0.051	0.108	7
BDJ24X6B	2	2	4	128.052			0.107	7
BDJ24X7B	2	2	4	138.673			0.103	7
BDJ32X6B	1	3	5	119.991	10.063	0.061	0.105	7
BDJ32X7B	1	3	5	111.896			0.104	7
BDJ32X8B	1	3	5	114.552			0.105	7
BDJ34X6B	2	3	6	116.994			0.104	7
BDJ34X8B	2	3	6	115.406			0.106	7
BDJ34X9B	2	3	6	117.637			0.105	7

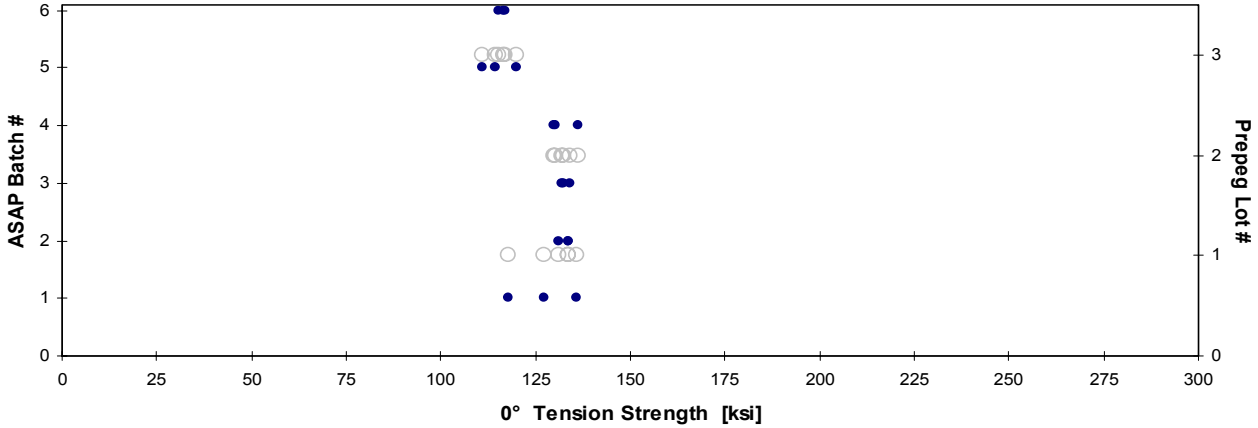
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01486	135.675	10.081
0.01483	117.843	
0.01493	127.452	
0.01487	131.356	9.966
0.01481	133.677	
0.01471	133.548	
0.01548	133.953	10.437
0.01543	132.301	
0.01547	131.833	
0.01537	129.650	9.886
0.01526	130.308	
0.01476	136.471	
0.01500	119.972	10.062
0.01490	111.167	
0.01499	114.479	
0.01479	115.360	
0.01518	116.780	
0.01493	117.114	

Average	125.795	10.011	0.060
Standard Dev.	8.485	0.208	0.012
Coeff. of Var. [%]	6.745	2.076	20.418
Min.	111.896	9.650	0.046
Max.	138.673	10.178	0.076
Number of Spec.	18	5	5

Average_{norm}	0.01503	126.052	10.086
Standard Dev._{norm}		8.580	0.211
Coeff. of Var. [%]_{norm}		6.807	2.092
Min.	0.0147	111.167	9.886
Max.	0.0155	136.471	10.437
Number of Spec.		18	5

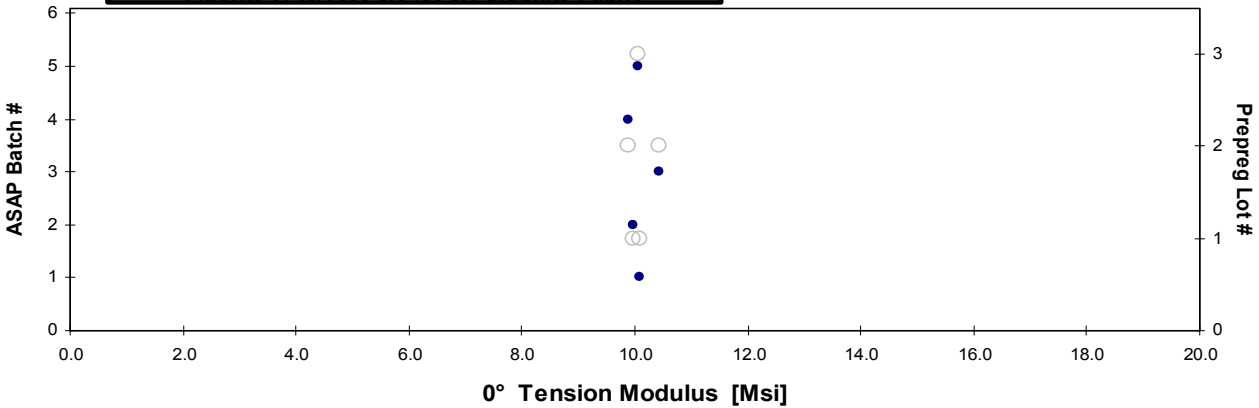
**0° Tension -- (CTD)
 Normalized Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 126.052 [ksi]
 Pooled Standard Deviation = 8.580 [ksi]
 Pooled Coeff. of Variation = 6.807 [%]



**0° Tension -- (CTD)
 Normalized Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 10.086 [Msi]
 Pooled Standard Deviation = 0.211 [Msi]
 Pooled Coeff. of Variation = 2.092 [%]



0° Tension -- (ETW)
Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

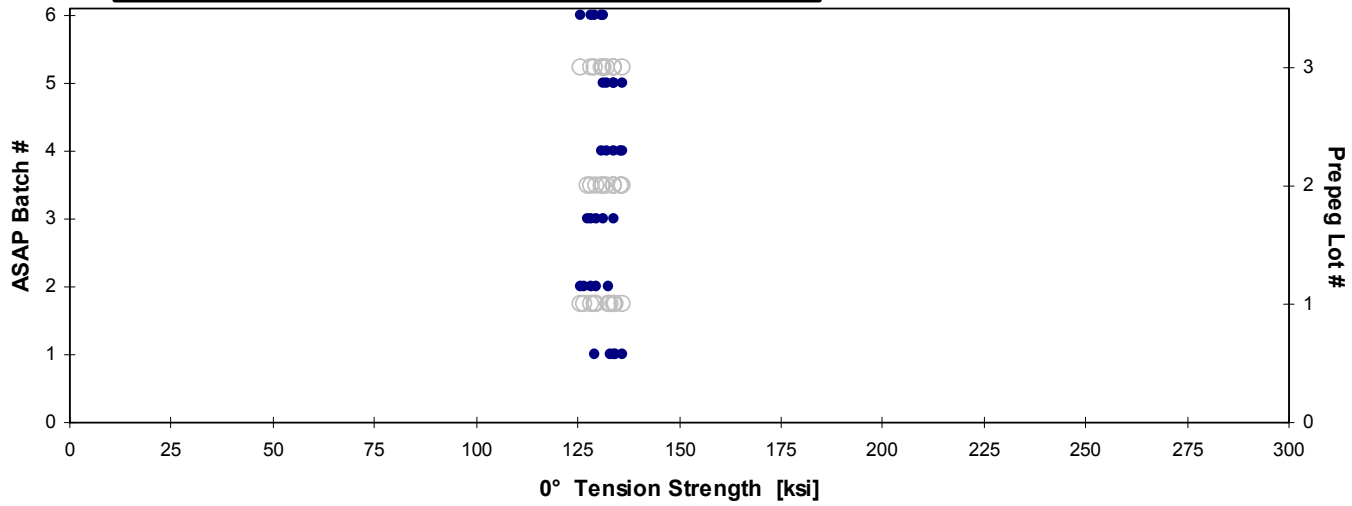
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
BDJ11X5F	1	1	1	135.069	9.893	0.036	0.104	7	0.01488	133.997	9.815
BDJ11X6F	1	1	1	136.604			0.105	7	0.01496	136.235	
BDJ11X7F	1	1	1	136.630			0.103	7	0.01475	134.331	
BDJ11X8F	1	1	1	135.739			0.103	7	0.01472	133.175	
BDJ11X9F	1	1	1	132.625			0.102	7	0.01464	129.404	
BDJ13X5F	2	1	2	128.534	9.719	0.028	0.105	7	0.01501	128.595	9.723
BDJ13X6F	2	1	2	127.650			0.104	7	0.01490	126.819	
BDJ13X7F	2	1	2	125.857			0.105	7	0.01498	125.677	
BDJ13X8F	2	1	2	133.019			0.105	7	0.01497	132.724	
BDJ13X9F	2	1	2	131.933			0.103	7	0.01475	129.755	
BDJ21X1F	1	2	3	126.400	9.494	0.035	0.106	7	0.01514	127.604	9.585
BDJ21X2F	1	2	3	129.699			0.106	7	0.01518	131.263	
BDJ21X3F	1	2	3	131.040			0.107	7	0.01535	134.097	
BDJ21X4F	1	2	3	124.308			0.108	7	0.01548	128.254	
BDJ21X5F	1	2	3	126.050			0.108	7	0.01544	129.711	
BDJ23X1F	2	2	4	132.357	9.360	0.031	0.108	7	0.01536	135.550	9.586
BDJ23X2F	2	2	4	130.727			0.109	7	0.01561	136.039	
BDJ23X3F	2	2	4	129.186			0.109	7	0.01553	133.779	
BDJ23X4F	2	2	4	128.689			0.108	7	0.01542	132.284	
BDJ23X5F	2	2	4	127.175			0.108	7	0.01545	131.011	
BDJ31X1F	1	3	5	131.200	10.289	0.024	0.105	7	0.01500	131.179	10.288
BDJ31X2F	1	3	5	137.840			0.104	7	0.01481	136.112	
BDJ31X3F	1	3	5	132.716			0.106	7	0.01513	133.854	
BDJ31X4F	1	3	5	131.368			0.106	7	0.01510	132.223	
BDJ31X5F	1	3	5	134.110			0.105	7	0.01499	134.046	
BDJ33X1F	2	3	6	131.466	9.928	0.041	0.105	7	0.01496	131.090	9.899
BDJ33X2F	2	3	6	134.154			0.103	7	0.01467	131.236	
BDJ33X3F	2	3	6	129.888			0.104	7	0.01492	129.167	
BDJ33X4F	2	3	6	126.691			0.106	7	0.01521	128.461	
BDJ33X5F	2	3	6	124.297			0.106	7	0.01517	125.698	

Average	130.767	9.781	0.032	Average_{norm}	0.01508	131.446	9.816
Standard Dev.	3.731	0.333	0.006	Standard Dev._{norm}		3.073	0.263
Coeff. of Var. [%]	2.853	3.409	18.834	Coeff. of Var. [%]_{norm}		2.338	2.675
Min.	124.297	9.360	0.024	Min._{norm}	0.0146	125.677	9.585
Max.	137.840	10.289	0.041	Max._{norm}	0.0156	136.235	10.288
Number of Spec.	30	6	6	Number of Spec.		30	6

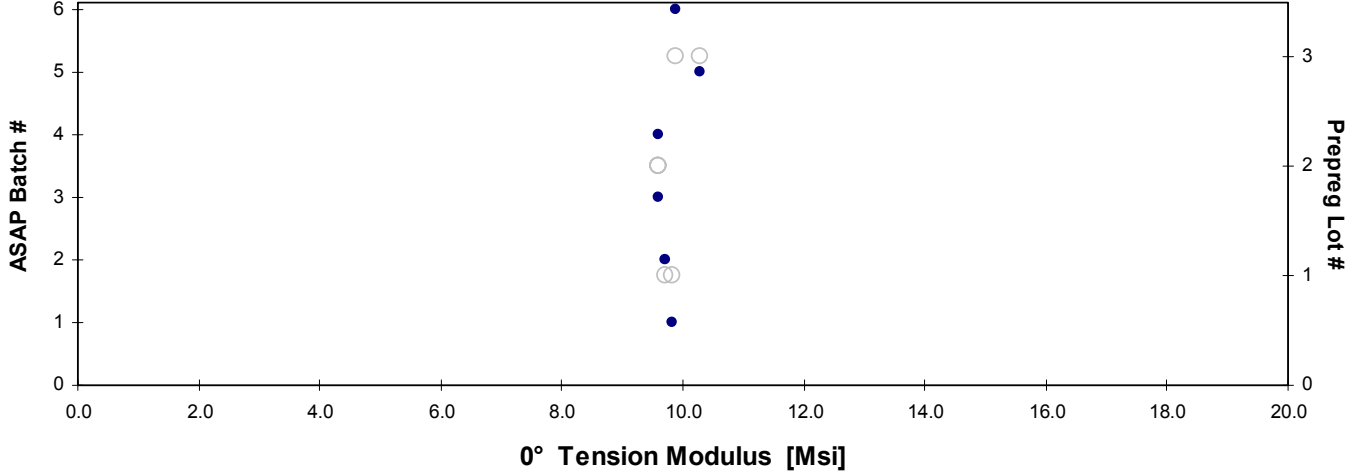
**0° Tension -- (ETW)
 Normalized Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 131.446 [ksi]
 Pooled Standard Deviation = 3.073 [ksi]
 Pooled Coeff. of Variation = 2.338 [%]



**0° Tension -- (ETW)
 Normalized Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 9.816 [Msi]
 Pooled Standard Deviation = 0.263 [Msi]
 Pooled Coeff. of Variation = 2.675 [%]



0° Tension -- (ETD)
Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDJ11X1G	1	1	1	139.769	10.054	0.040	0.103	7
BDJ11X2G	1	1	1	141.042			0.103	7
BDJ11X3G	1	1	1	138.180			0.104	7
BDJ13X1G	2	1	2	134.234	10.195	0.032	0.102	7
BDJ13X2G	2	1	2	136.404			0.104	7
BDJ13X3G	2	1	2	136.449			0.104	7
BDJ22X1G	1	2	3	134.299	9.581	0.028	0.107	7
BDJ22X2G	1	2	3	137.304			0.105	7
BDJ22X3G	1	2	3	131.389			0.106	7
BDJ24X2G	2	2	4	131.635	9.557	0.020	0.108	7
BDJ24X3G	2	2	4	123.708			0.108	7
BDJ24X8G	2	2	4	132.799			0.107	7
BDJ32X1G	1	3	5	121.746	10.222	0.040	0.105	7
BDJ32X2G	1	3	5	122.392			0.105	7
BDJ32X3G	1	3	5	125.203			0.103	7
BDJ34X1G	2	3	6	118.959	9.858	0.023	0.104	7
BDJ34X2G	2	3	6	123.771			0.104	7
BDJ34X3G	2	3	6	118.022			0.105	7

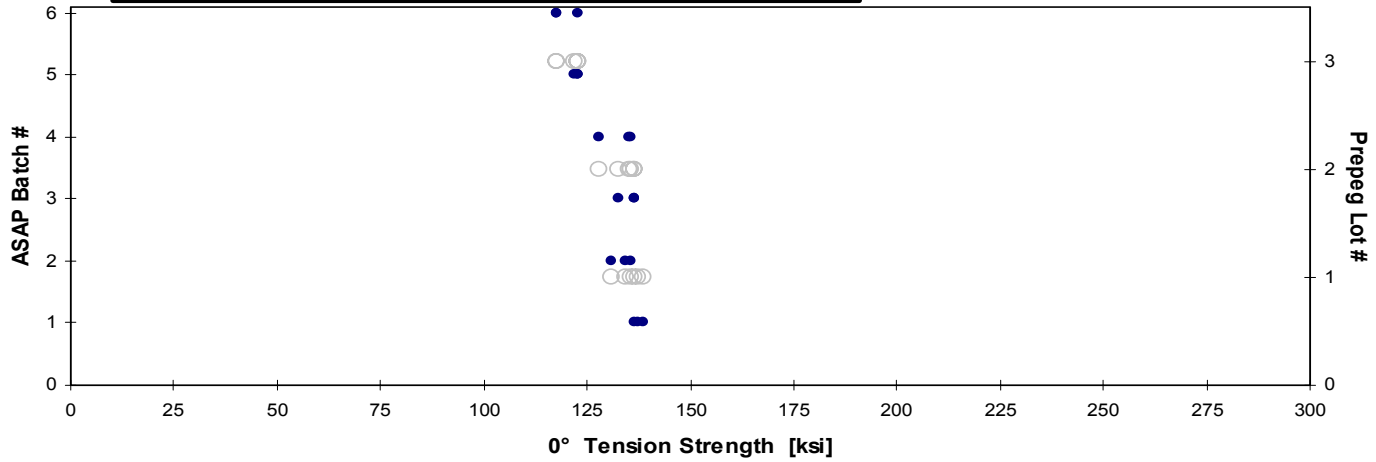
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01465	136.464	9.817
0.01476	138.804	
0.01490	137.303	
0.01463	130.889	9.941
0.01479	134.521	
0.01493	135.778	
0.01526	136.623	9.747
0.01493	136.693	
0.01514	132.599	
0.01545	135.584	9.843
0.01549	127.753	
0.01528	135.244	
0.01504	122.094	10.251
0.01505	122.820	
0.01471	122.818	
0.01486	117.883	9.769
0.01488	122.809	
0.01495	117.610	

Average 130.406 9.911 0.030
 Standard Dev. 7.510 0.295 0.009
 Coeff. of Var. [%] 5.759 2.974 28.121
 Min. 118.022 9.557 0.020
 Max. 141.042 10.222 0.040
 Number of Spec. 18 6 6

Average_{norm} 0.01498 130.238 9.895
 Standard Dev._{norm} 7.288 0.187
 Coeff. of Var. [%]_{norm} 5.596 1.892
 Min. 0.0146 117.610 9.747
 Max. 0.0155 138.804 10.251
 Number of Spec. 18 6

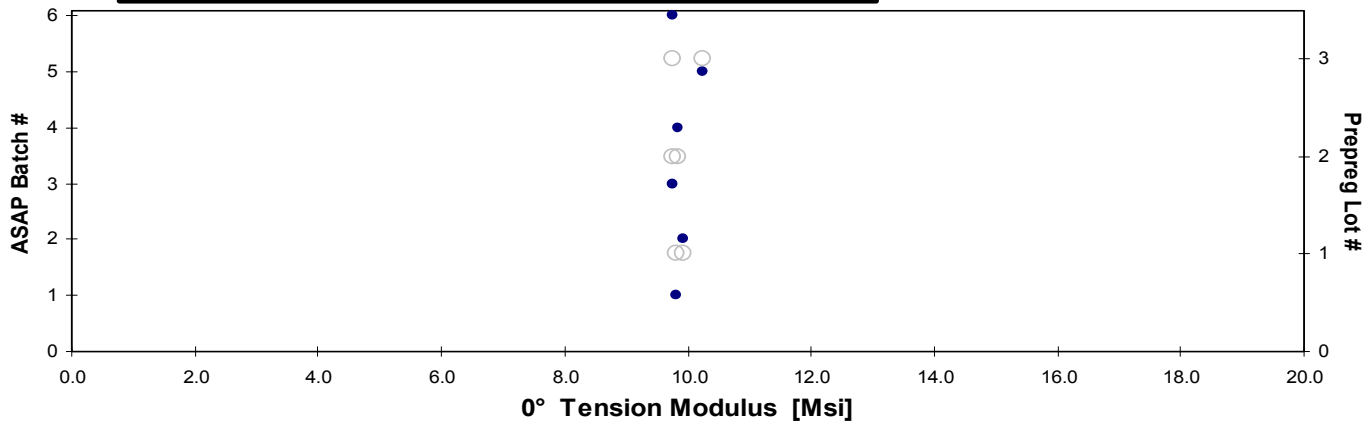
**0° Tension -- (ETD)
 Normalized Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 130.238 [ksi]
 Pooled Standard Deviation = 7.288 [ksi]
 Pooled Coeff. of Variation = 5.596 [%]



**0° Tension -- (ETD)
 Normalized Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 9.895 [Msi]
 Pooled Standard Deviation = 0.187 [Msi]
 Pooled Coeff. of Variation = 1.892 [%]



**90° Tension-- (RTD)
 Strength & Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

normalizing t_{ply}
 [in]

0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDU12X1A	1	1	1	119.760	10.176	0.103	7
BDU12X2A	1	1	1	120.597		0.104	7
BDU12X3A	1	1	1	123.191		0.104	7
BDU14X1A	2	1	2	131.497	10.050	0.102	7
BDU14X2A	2	1	2	127.730		0.105	7
BDU14X3A	2	1	2	121.694		0.104	7
BDU21X6A	1	2	3	126.203	9.546	0.108	7
BDU21X7A	1	2	3	129.937		0.108	7
BDU21X8A	1	2	3	122.987		0.106	7
BDU23X6A	2	2	4	129.936	9.906	0.106	7
BDU23X7A	2	2	4	133.727		0.107	7
BDU23X8A	2	2	4	133.589		0.105	7
BDU32X1A	1	3	5	117.174	9.763	0.105	7
BDU32X2A	1	3	5	121.342		0.103	7
BDU32X3A	1	3	5	123.525		0.107	7
BDU34X5A	2	3	6	123.829	9.580	0.106	7
BDU34X6A	2	3	6	120.981		0.107	7
BDU34X7A	2	3	6	127.640		0.105	7

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01478	118.011	10.028
0.01489	119.716	
0.01480	121.509	
0.01460	128.011	9.784
0.01498	127.547	
0.01482	120.264	
0.01548	130.230	9.851
0.01539	133.278	
0.01520	124.627	
0.01521	131.751	10.045
0.01524	135.892	
0.01506	134.098	
0.01501	117.248	9.769
0.01477	119.455	
0.01525	125.564	
0.01519	125.401	9.702
0.01524	122.921	
0.01502	127.782	

Average **125.297** **9.837**
 Standard Dev. **4.938** **0.253**
 Coeff. of Var. [%] **3.941** **2.577**
 Min. **117.174** **9.546**
 Max. **133.727** **10.176**
 Number of Spec. **18** **6**

Average_{norm} **0.01505** **125.739** **9.863**
 Standard Dev._{norm} **5.757** **0.142**
 Coeff. of Var. [%]_{norm} **4.579** **1.444**
 Min. **0.0146** **117.248** **9.702**
 Max. **0.0155** **135.892** **10.045**
 Number of Spec. **18** **6**

**90° Tension-- (CTD)
 Strength & Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

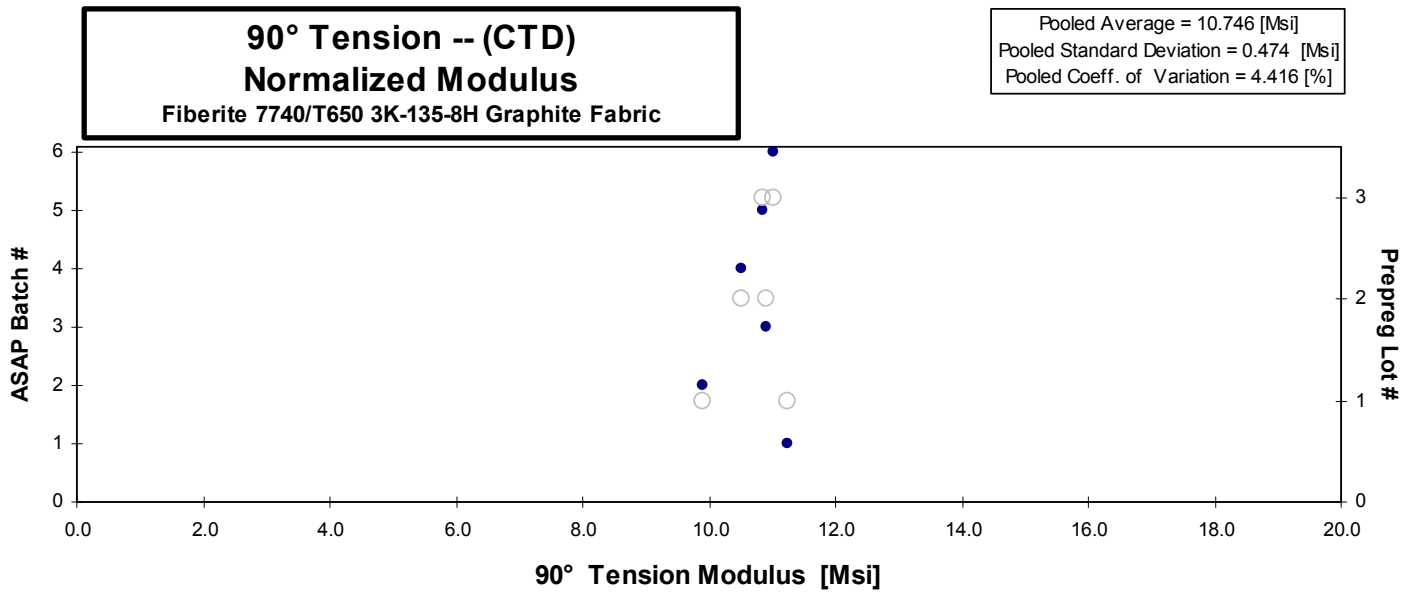
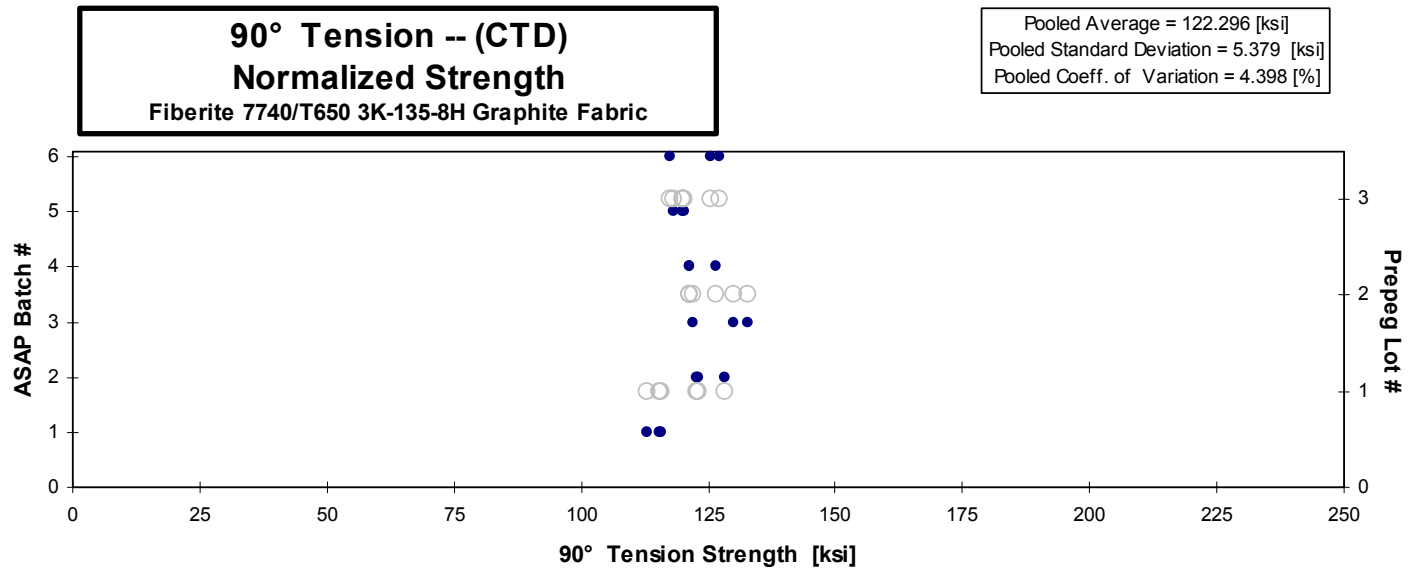
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDU12X5B	1	1	1	116.364	11.333	0.104	7
BDU12X6B	1	1	1	113.681		0.104	7
BDU12X7B	1	1	1	116.322		0.105	7
BDU14X5B	2	1	2	130.931	10.105	0.103	7
BDU14X6B	2	1	2	122.990		0.105	7
BDU14X7B	2	1	2	123.179		0.104	7
BDU24X5B	2	2	3	118.148	10.580	0.108	7
BDU24X6B	2	2	3	130.395		0.107	7
BDU24X7B	2	2	3	125.101		0.109	7
BDU22X5B	1	2	4	122.510	10.190	0.108	7
BDU22X6B	1	2	4	116.496		0.109	7
BDU22X7B	1	2	4	116.356		0.110	7
BDU33X6B	2	3	5	117.350	10.799	0.106	7
BDU33X7B	2	3	5	118.724		0.106	7
BDU33X8B	2	3	5	117.663		0.107	7
BDU31X6B	1	3	6	124.415	10.788	0.107	7
BDU31X7B	1	3	6	115.832		0.106	7
BDU31X8B	1	3	6	123.503		0.107	7

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01488	115.404	11.239
0.01491	113.032	
0.01494	115.879	
0.01470	128.291	9.901
0.01501	123.068	
0.01493	122.573	
0.01548	121.937	10.919
0.01530	132.982	
0.01561	130.165	
0.01550	126.574	10.528
0.01563	121.397	
0.01565	121.379	
0.01509	118.077	10.866
0.01521	120.363	
0.01530	120.016	
0.01533	127.121	11.022
0.01521	117.450	
0.01526	125.620	

Average **120.553** **10.632**
 Standard Dev. **5.043** **0.452**
 Coeff. of Var. [%] **4.183** **4.247**
 Min. **113.681** **10.105**
 Max. **130.931** **11.333**
 Number of Spec. **18** **6**

Average_{norm} **0.01522** **122.296** **10.746**
 Standard Dev._{norm} **5.379** **0.474**
 Coeff. of Var. [%]_{norm} **4.398** **4.416**
 Min. **0.0147** **113.032** **9.901**
 Max. **0.0156** **132.982** **11.239**
 Number of Spec. **18** **6**



90° Tension-- (ETW)
Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabricite

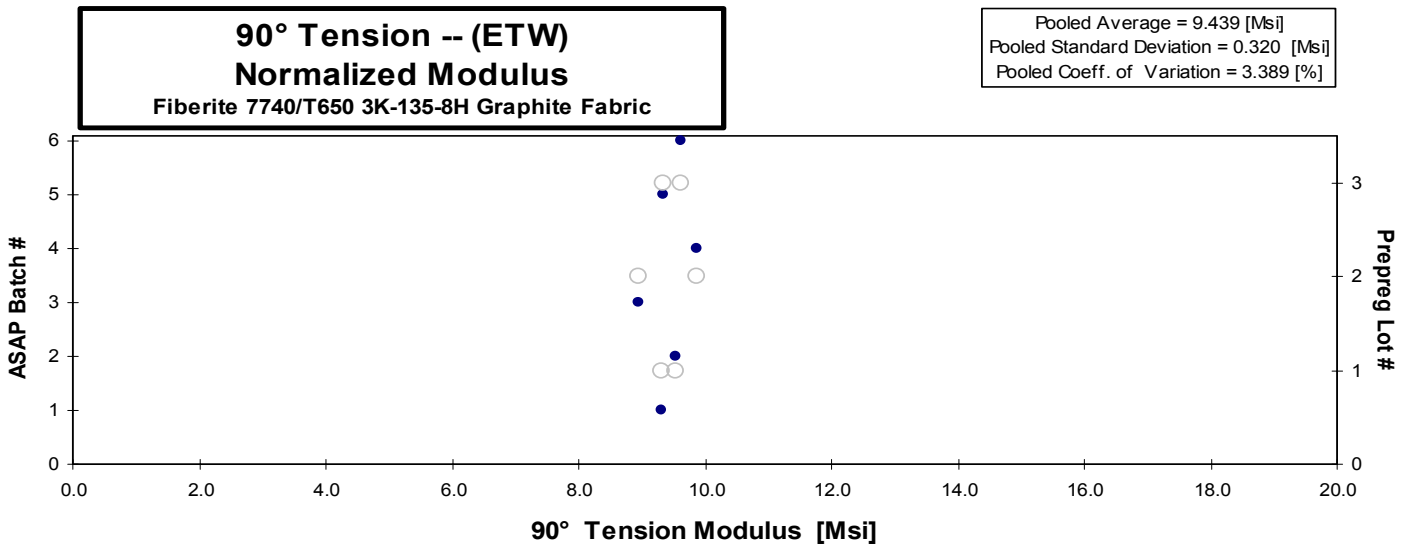
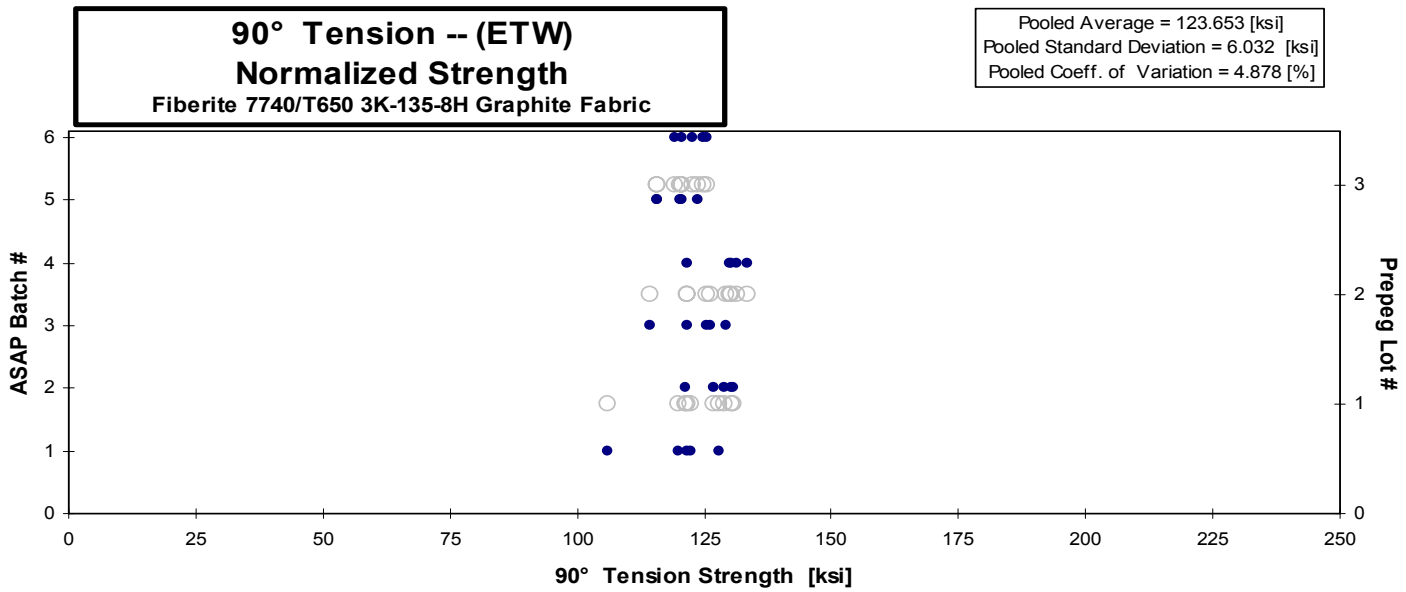
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDU11X1F	1	1	1	109.996		0.101	7
BDU11X2F	1	1	1	124.566		0.103	7
BDU11X3F	1	1	1	128.413		0.105	7
BDU11X4F	1	1	1	121.993	9.343	0.105	7
BDU11X5F	1	1	1	120.888		0.104	7
BDU13X1F	2	1	2	126.419		0.101	7
BDU13X2F	2	1	2	135.222		0.101	7
BDU13X3F	2	1	2	131.725		0.103	7
BDU13X4F	2	1	2	131.746	9.632	0.104	7
BDU13X5F	2	1	2	127.880		0.104	7
BDU21X1F	1	2	3	114.065		0.105	7
BDU21X2F	1	2	3	124.089		0.107	7
BDU21X3F	1	2	3	121.877		0.108	7
BDU21X4F	1	2	3	117.860	8.671	0.108	7
BDU21X5F	1	2	3	125.144		0.109	7
BDU23X1F	2	2	4	123.537		0.103	7
BDU23X2F	2	2	4	127.399		0.107	7
BDU23X3F	2	2	4	130.544		0.108	7
BDU23X4F	2	2	4	129.043	9.699	0.107	7
BDU23X5F	2	2	4	127.718		0.107	7
BDU31X1F	1	3	5	115.015		0.106	7
BDU31X2F	1	3	5	116.873		0.104	7
BDU31X3F	1	3	5	122.299		0.106	7
BDU31X4F	1	3	5	118.611	9.220	0.106	7
BDU31X5F	1	3	5	119.168		0.106	7
BDU33X1F	2	3	6	126.751		0.104	7
BDU33X2F	2	3	6	123.860		0.104	7
BDU33X3F	2	3	6	120.060		0.106	7
BDU33X4F	2	3	6	118.910	9.589	0.105	7
BDU33X5F	2	3	6	122.792		0.107	7

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01445	105.946	
0.01473	122.332	
0.01495	128.005	
0.01496	121.663	9.318
0.01488	119.929	
0.01439	121.282	
0.01448	130.565	
0.01468	128.924	
0.01483	130.282	9.525
0.01487	126.784	
0.01502	114.228	
0.01525	126.157	
0.01547	125.668	
0.01547	121.527	8.941
0.01552	129.474	
0.01478	121.713	
0.01531	130.028	
0.01536	133.653	
0.01528	131.460	9.881
0.01533	130.536	
0.01508	115.617	
0.01486	115.815	
0.01518	123.775	
0.01520	120.174	9.341
0.01520	120.795	
0.01486	125.584	
0.01487	122.779	
0.01510	120.822	
0.01506	119.420	9.630
0.01523	124.664	

Average **123.482** **9.359**
 Standard Dev. **5.758** **0.384**
 Coeff. of Var. [%] **4.663** **4.100**
 Min. **109.996** **8.671**
 Max. **135.222** **9.699**
 Number of Spec. **30** **6**

Average_{norm} **0.01502** **123.653** **9.439**
 Standard Dev._{norm} **6.032** **0.320**
 Coeff. of Var. [%]_{norm} **4.878** **3.389**
 Min. **0.0144** **105.946** **8.941**
 Max. **0.0155** **133.653** **9.881**
 Number of Spec. **30** **6**



**90° Tension-- (ETD)
 Strength & Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

normalizing t_{ply}
 [in]

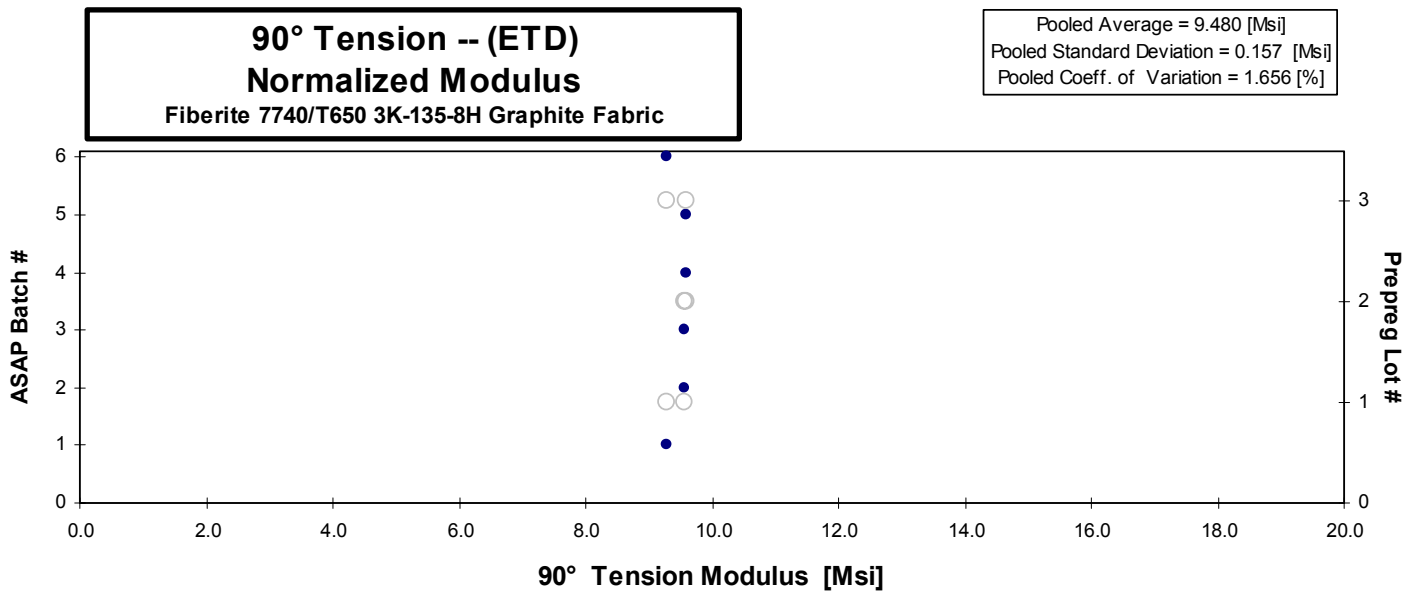
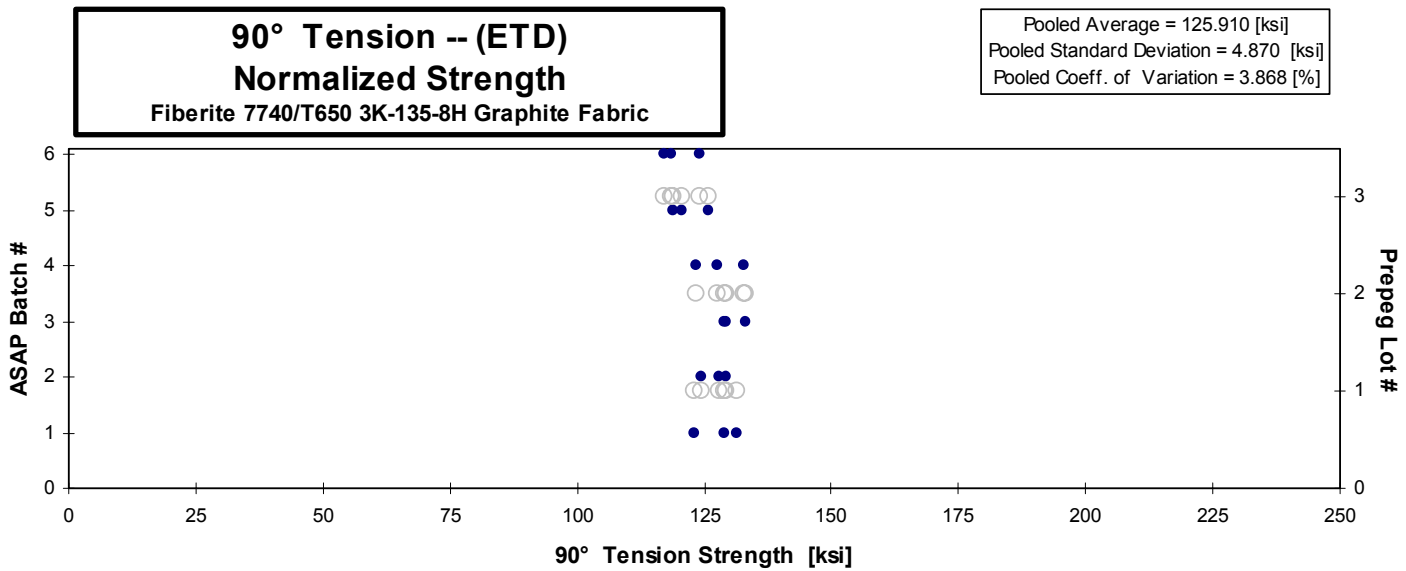
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Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDU11X6G	1	1	1	123.807	9.317	0.105	7
BDU11X7G	1	1	1	129.918		0.104	7
BDU11X8G	1	1	1	132.931		0.104	7
BDU13X6G	2	1	2	130.868	9.675	0.104	7
BDU13X7G	2	1	2	126.288		0.104	7
BDU13X8G	2	1	2	127.880		0.105	7
BDU22X1G	1	2	3	130.932	9.388	0.107	7
BDU22X2G	1	2	3	124.876		0.108	7
BDU22X3G	1	2	3	125.417		0.108	7
BDU24X1G	2	2	4	118.925	9.249	0.109	7
BDU24X2G	2	2	4	127.153		0.105	7
BDU24X3G	2	2	4	130.912		0.106	7
BDU32X5G	1	3	5	124.218	9.473	0.106	7
BDU32X6G	1	3	5	118.315		0.106	7
BDU32X7G	1	3	5	123.308		0.103	7
BDU34X1G	2	3	6	125.015	9.361	0.104	7
BDU34X2G	2	3	6	116.540		0.106	7
BDU34X3G	2	3	6	117.080		0.106	7

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01493	123.237	9.274
0.01488	128.887	
0.01484	131.538	
0.01482	129.310	9.560
0.01479	124.484	
0.01500	127.860	
0.01527	133.322	9.559
0.01550	128.999	
0.01547	129.319	
0.01557	123.436	9.600
0.01506	127.678	
0.01521	132.740	
0.01521	125.934	9.604
0.01510	119.085	
0.01469	120.744	
0.01488	123.983	9.283
0.01507	117.094	
0.01521	118.734	

Average **125.243** **9.410**
 Standard Dev. **5.007** **0.149**
 Coeff. of Var. [%] **3.998** **1.588**
 Min. **116.540** **9.249**
 Max. **132.931** **9.675**
 Number of Spec. **18** **6**

Average_{norm} **0.01508** **125.910** **9.480**
 Standard Dev._{norm} **4.870** **0.157**
 Coeff. of Var. [%]_{norm} **3.868** **1.656**
 Min. **0.0147** **117.094** **9.274**
 Max. **0.0156** **133.322** **9.604**
 Number of Spec. **18** **6**



0° Compression -- (RTD) Strength & Modulus Fiberite 7740/T650 3K-135-8H Graphite
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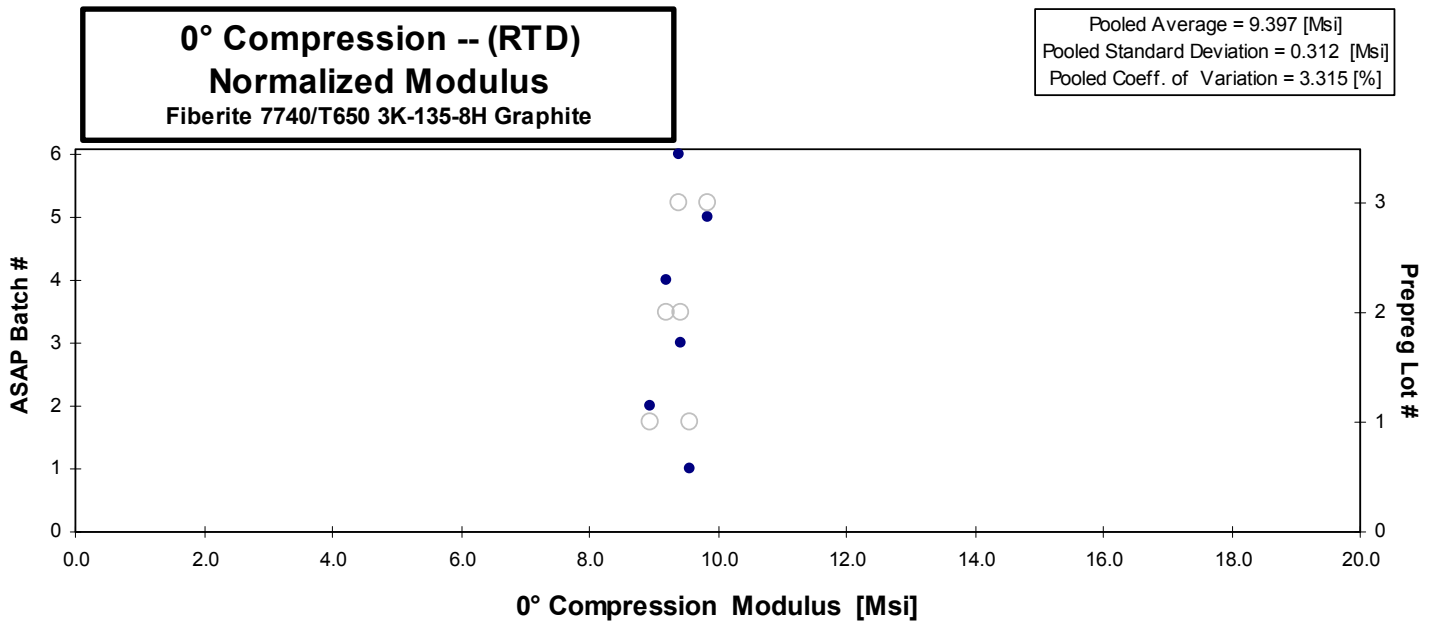
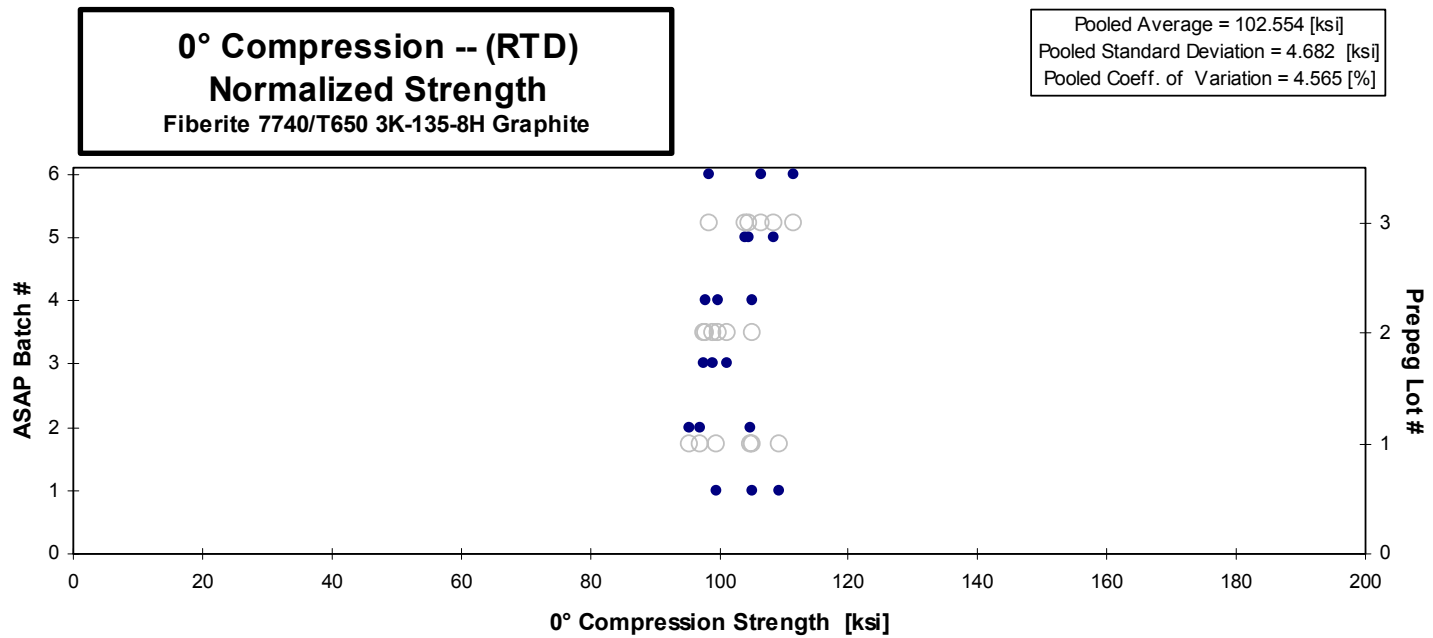
normalizing t_{ply}
 [in]
0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDK1216A	3	1	1	101.467		0.118	8
BDK1217A	3	1	1	111.790		0.117	8
BDK1218A	3	1	1	107.161		0.118	8
BDL12X6A	3	1	1		9.846	0.116	8
BDK1129A	1	1	2	105.938		0.119	8
BDK112AA	1	1	2	98.158		0.119	8
BDK112BA	1	1	2	96.467		0.119	8
BDL11X6A	1	1	2		9.047	0.119	8
BDK2216A	3	2	3	100.821		0.116	8
BDK2217A	3	2	3	102.753		0.118	8
BDK2218A	3	2	3	102.481		0.116	8
BDL22X6A	3	2	3		9.279	0.122	8
BDK2117A	2	2	4	103.475		0.122	8
BDK2118A	2	2	4	96.992		0.124	8
BDK2119A	2	2	4	96.158		0.122	8
BDL2116A	2	2	4		9.272	0.119	8
BDK3126A	3	3	5	102.631		0.122	8
BDK3128A	3	3	5	109.185		0.119	8
BDK3129A	3	3	5	104.895		0.120	8
BDL31X6A	3	3	5		9.862	0.120	8
BDK3211A	4	3	6	105.837		0.121	8
BDK3213A	4	3	6	97.897		0.121	8
BDK3214A	4	3	6	113.081		0.118	8
BDL32X6A	4	3	6		9.257	0.122	8

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01471	99.522	
0.01467	109.345	
0.01473	105.263	
0.01455		9.553
0.01484	104.791	
0.01483	97.074	
0.01486	95.542	
0.01482		8.940
0.01454	97.712	
0.01476	101.126	
0.01450	99.044	
0.01525		9.433
0.01525	105.178	
0.01546	99.963	
0.01526	97.840	
0.01489		9.206
0.01522	104.128	
0.01489	108.388	
0.01495	104.545	
0.01500		9.859
0.01511	106.631	
0.01509	98.468	
0.01478	111.408	
0.01522		9.390

Average 103.177 9.427
Standard Dev. 5.070 0.342
Coeff. of Var. [%] 4.914 3.625
Min. 96.158 9.047
Max. 113.081 9.862
Number of Spec. 18 6

Average_{norm} 0.01492 102.554 9.397
Standard Dev._{norm} 4.682 0.312
Coeff. of Var. [%]_{norm} 4.565 3.315
Min. 0.0145 95.542 8.940
Max. 0.0155 111.408 9.859
Number of Spec. 18 6



0° Compression -- (CTD) Strength & Modulus Fiberite 7740/T650 3K-135-8H Graphite
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normalizing t_{ply}
 [in]
0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thicken. [in]	# Plies in Laminate
BDK1125B	1	1	1	97.162		0.119	8
BDK1126B	1	1	1	105.642		0.119	8
BDK1127B	1	1	1	107.119		0.118	8
BDL11X9B	1	1	1		9.539	0.118	8
BDK1223B	3	1	2	104.071		0.118	8
BDK1224B	3	1	2	95.004		0.118	8
BDK1225B	3	1	2	109.534		0.118	8
BDL12X9B	3	1	2		9.690	0.117	8

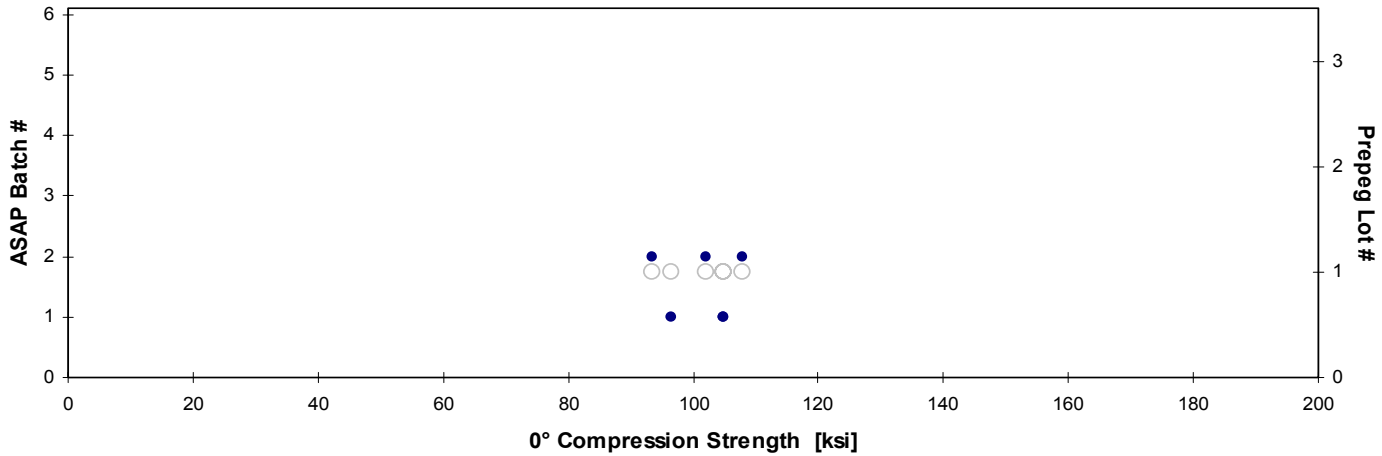
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01489	96.434	
0.01488	104.828	
0.01469	104.932	
0.01470		9.350
0.01473	102.185	
0.01475	93.441	
0.01477	107.845	
0.01464		9.456

Average	103.089	9.614
Standard Dev.	5.758	0.107
Coeff. of Var. [%]	5.585	1.116
Min.	95.004	9.539
Max.	109.534	9.690
Number of Spec.	6	2

Average _{norm}	0.01476	101.611	9.403
Standard Dev. _{norm}		5.552	0.075
Coeff. of Var. [%] _{norm}		5.464	0.800
Min.	0.0146	93.441	9.350
Max.	0.0149	107.845	9.456
Number of Spec.		6	2

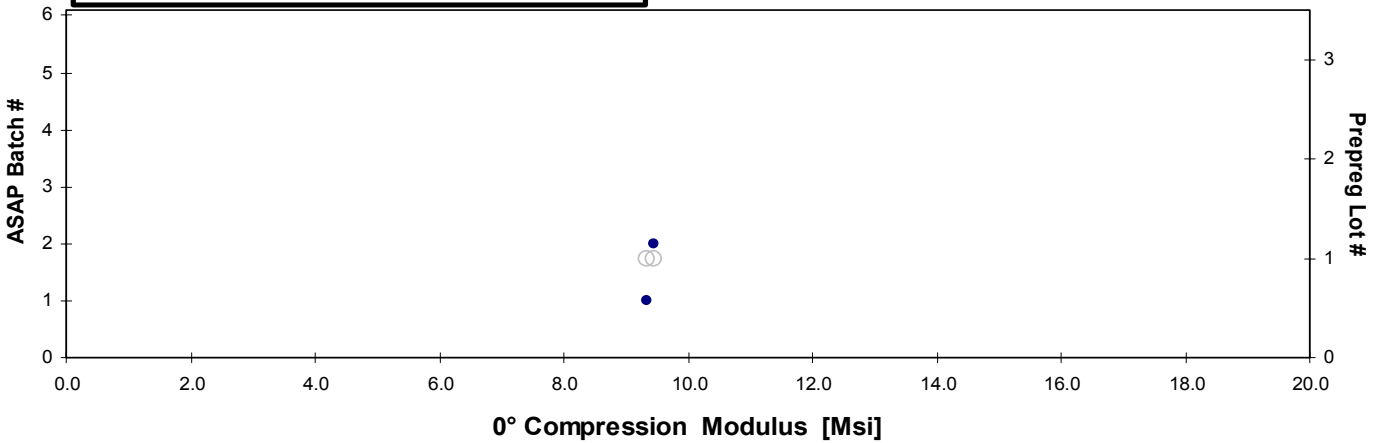
0° Compression -- (CTD)
Normalized Strength
 Fiberite 7740/T650 3K-135-8H Graphite

Pooled Average = 101.611 [ksi]
 Pooled Standard Deviation = 5.552 [ksi]
 Pooled Coeff. of Variation = 5.464 [%]



0° Compression -- (CTD)
Normalized Modulus
 Fiberite 7740/T650 3K-135-8H Graphite

Pooled Average = 9.403 [Msi]
 Pooled Standard Deviation = 0.075 [Msi]
 Pooled Coeff. of Variation = 0.800 [%]



0° Compression -- (ETW)
Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite

normalizing t_{ply}

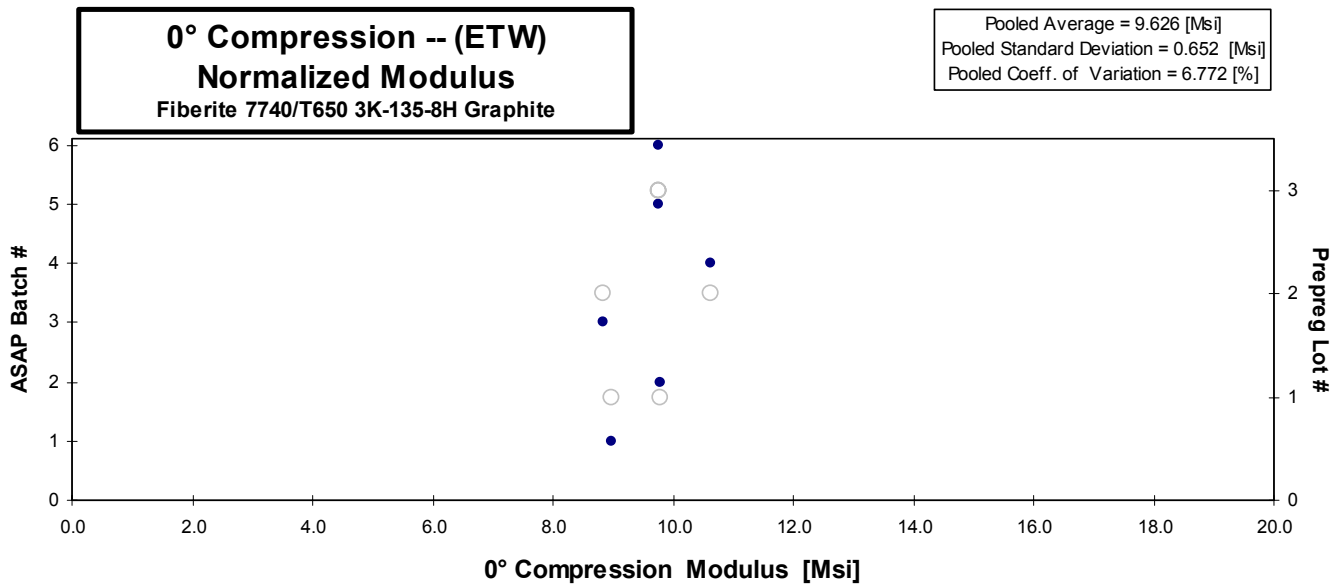
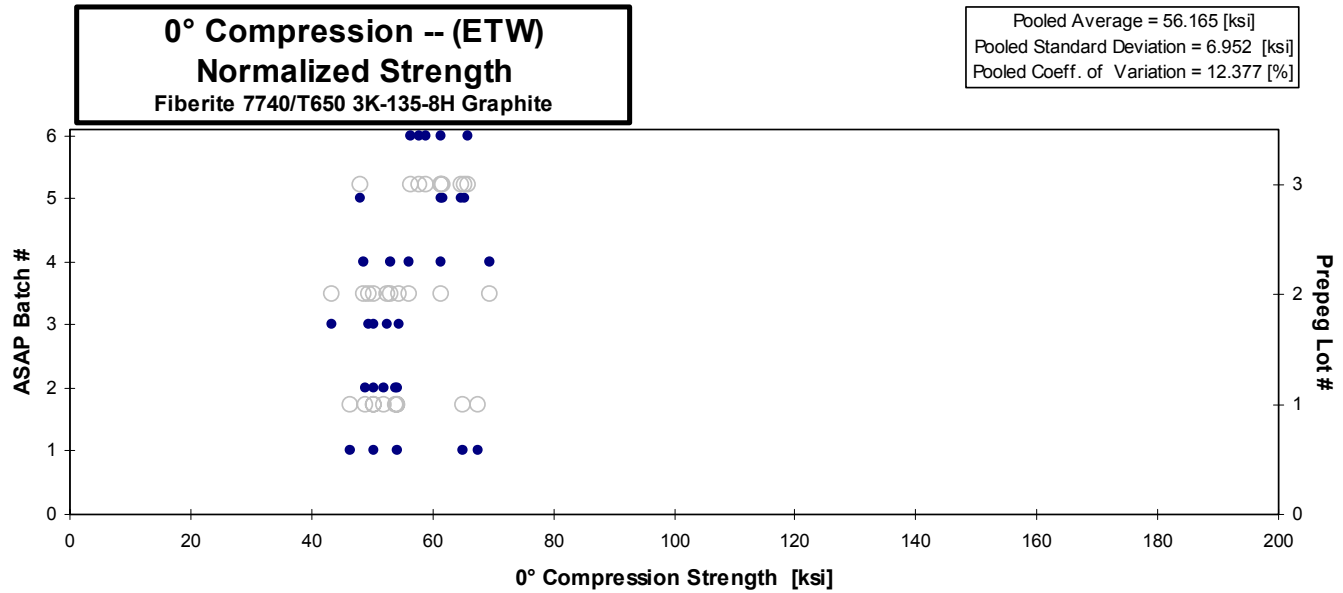
[in]

0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
BDK1111F	1	1	1	64.891		0.120	8	0.01505	65.094	
BDK1112F	1	1	1	68.540		0.118	8	0.01481	67.669	
BDK1113F	1	1	1	54.777		0.119	8	0.01483	54.138	
BDK1114F	1	1	1	47.840		0.116	8	0.01453	46.325	
BDK1115F	1	1	1	50.907		0.119	8	0.01484	50.355	
BDL11X1F	1	1	1		9.155	0.118	8	0.01469		8.969
BDK1211F	3	1	2	51.420		0.117	8	0.01465	50.209	
BDK1212F	3	1	2	54.754		0.118	8	0.01476	53.865	
BDK1213F	3	1	2	50.591		0.116	8	0.01454	49.052	
BDK1214F	3	1	2	55.517		0.117	8	0.01467	54.279	
BDK1215F	3	1	2	53.559		0.117	8	0.01460	52.119	
BDL12X1F	3	1	2		10.282	0.114	8	0.01430		9.800
BDK2211F	3	2	3	53.233		0.119	8	0.01483	52.623	
BDK2212F	3	2	3	44.146		0.118	8	0.01474	43.392	
BDK2213F	3	2	3	51.216		0.118	8	0.01474	50.341	
BDK2214F	3	2	3	50.793		0.117	8	0.01463	49.534	
BDK2215F	3	2	3	56.976		0.115	8	0.01435	54.507	
BDL2111F	2	2	3		8.919	0.119	8	0.01485		8.830
BDK2111F	2	2	4	67.274		0.124	8	0.01548	69.432	
BDK2112F	2	2	4	60.202		0.123	8	0.01534	61.557	
BDK2113F	2	2	4	54.471		0.124	8	0.01551	56.321	
BDK2114F	2	2	4	47.578		0.123	8	0.01532	48.589	
BDK2115F	2	2	4	51.702		0.124	8	0.01544	53.231	
BDL22X1F	3	2	4		10.652	0.120	8	0.01495		10.619
BDK3121F	3	3	5	63.403		0.123	8	0.01532	64.751	
BDK3122F	3	3	5	60.734		0.122	8	0.01520	61.531	
BDK3123F	3	3	5	62.131		0.119	8	0.01493	61.833	
BDK3124F	3	3	5	48.570		0.119	8	0.01488	48.185	
BDK3125F	3	3	5	65.198		0.120	8	0.01503	65.320	
BDL31X1F	3	3	5		9.741	0.120	8	0.01504		9.767
BDK3215F	4	3	6	56.417		0.120	8	0.01502	56.500	
BDK3217F	4	3	6	58.774		0.121	8	0.01507	59.056	
BDK3218F	4	3	6	57.500		0.121	8	0.01508	57.811	
BDK321AF	4	3	6	61.586		0.120	8	0.01495	61.394	
BDK321BF	4	3	6	65.888		0.120	8	0.01501	65.929	
BDL32X1F	4	3	6		9.625	0.122	8	0.01523		9.773

Average **56.353** **9.729**
 Standard Dev. **6.470** **0.656**
 Coeff. of Var. [%] **11.481** **6.747**
 Min. **44.146** **8.919**
 Max. **68.540** **10.652**
 Number of Spec. **30** **6**

Average_{norm} **0.01492** **56.165** **9.626**
 Standard Dev._{norm} **6.952** **0.652**
 Coeff. of Var. [%]_{norm} **12.377** **6.772**
 Min. **0.0143** **43.392** **8.830**
 Max. **0.0155** **69.432** **10.619**
 Number of Spec. **30** **6**



**0° Compression -- (ETD)
 Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite**

normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDK1121G	1	1	1	82.162		0.117	8
BDK1123G	1	1	1	77.893		0.119	8
BDK1124G	1	1	1	77.762		0.119	8
BDL11XCG	1	1	1		10.695	0.112	8
BDK1227G	3	1	2	79.382		0.118	8
BDK1228G	3	1	2	80.772		0.118	8
BDK1229G	3	1	2	78.180		0.118	8
BDL12XCG	3	1	2		9.424	0.118	8
BDK2221G	3	2	3	80.984		0.123	8
BDK2222G	3	2	3	82.296		0.123	8
BDK2223G	3	2	3	77.756		0.123	8
BDL22X9G	3	2	3		8.805	0.121	8
BDK2123G	2	2	4	80.125		0.121	8
BDK2124G	2	2	4	65.700		0.122	8
BDK2126G	2	2	4	77.724		0.123	8
BDL2119G	2	2	4		9.095	0.119	8
BDK31X5G	3	3	5	79.998		0.122	8
BDK31X6G	3	3	5	76.881		0.122	8
BDK31X7G	3	3	5	80.928		0.123	8
BDL31X9G	3	3	5		9.926	0.120	8
BDK3222G	4	3	6	86.326		0.120	8
BDK3224G	4	3	6	88.621		0.119	8
BDK3225G	4	3	6	87.002		0.119	8
BDL32X9G	4	3	6		9.212	0.122	8

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01464	80.194	
0.01482	76.936	
0.01484	76.952	
0.01406		10.024
0.01471	77.844	
0.01471	79.208	
0.01470	76.633	
0.01472		9.249
0.01538	83.059	
0.01535	84.233	
0.01534	79.538	
0.01513		8.884
0.01518	81.093	
0.01526	66.850	
0.01536	79.586	
0.01491		9.042
0.01529	81.564	
0.01527	78.275	
0.01532	82.631	
0.01504		9.951
0.01505	86.596	
0.01492	88.159	
0.01490	86.440	
0.01522		9.346

Average **80.027** **9.526**
 Standard Dev. **4.931** **0.684**
 Coeff. of Var. [%] **6.161** **7.183**
 Min. **65.700** **8.805**
 Max. **88.621** **10.695**
 Number of Spec. **18** **6**

Average_{norm} **0.01501** **80.322** **9.416**
 Standard Dev._{norm} **4.846** **0.472**
 Coeff. of Var. [%]_{norm} **6.033** **5.009**
 Min. **0.0141** **66.850** **8.884**
 Max. **0.0154** **88.159** **10.024**
 Number of Spec. **18** **6**

90° Compression -- (RTD)
Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

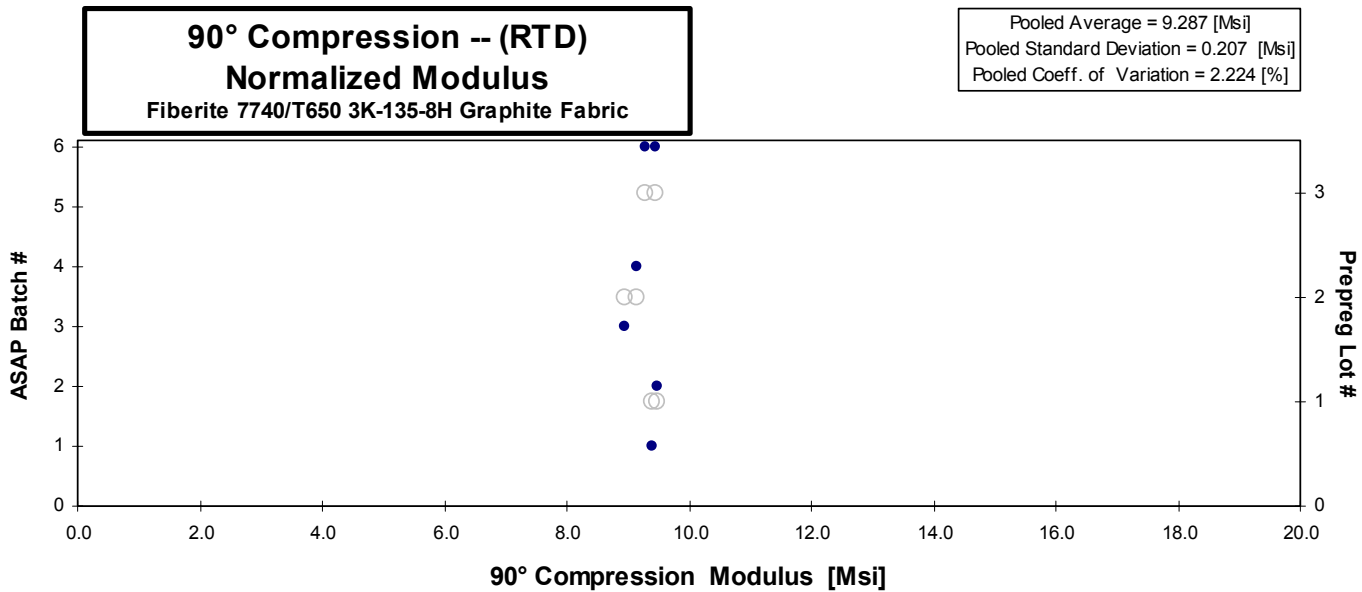
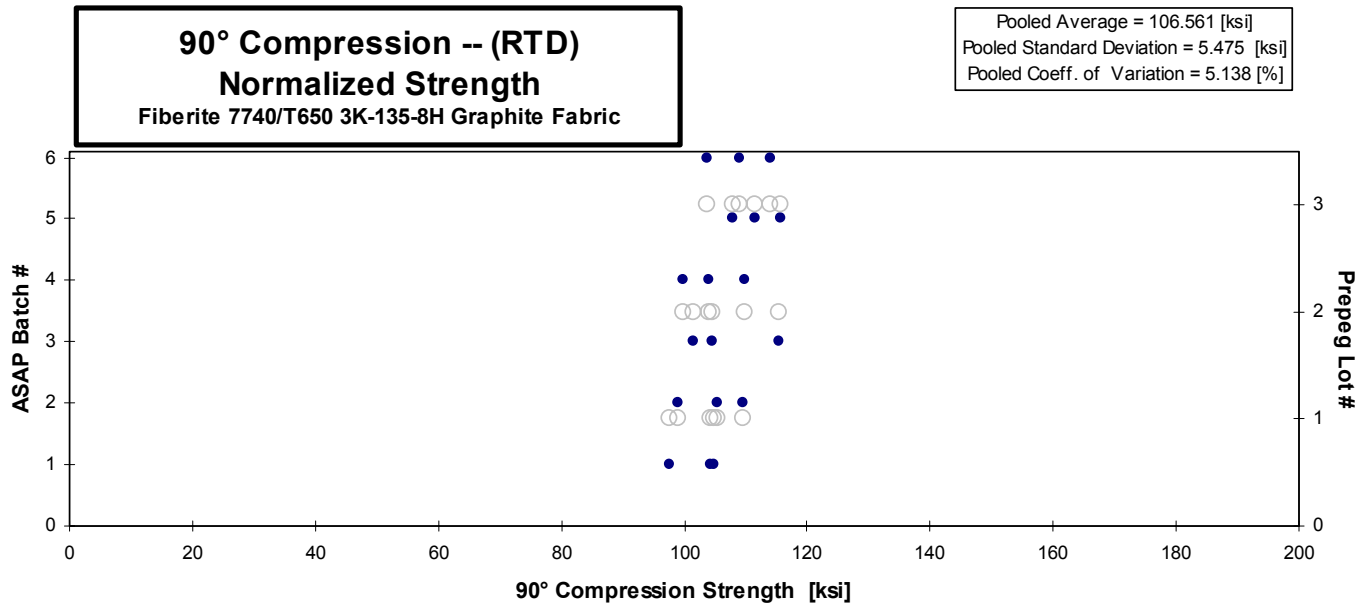
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDW1116A	1	1	1	104.777		0.120	8
BDW1117A	1	1	1	104.381		0.120	8
BDW1118A	1	1	1	97.571		0.120	8
BDZ11X6A	1	1	1		9.491	0.119	8
BDW1216A	3	1	2	100.807		0.118	8
BDW1217A	3	1	2	111.558		0.118	8
BDW1218A	3	1	2	106.991		0.118	8
BDZ12X6A	3	1	2		9.642	0.118	8
BDW2111A	2	2	3	112.733		0.123	8
BDW2112A	2	2	3	103.872		0.121	8
BDW2114A	2	2	3	99.832		0.122	8
BDZ21X6A	2	2	3		8.857	0.121	8
BDW2216A	3	2	4	102.100		0.122	8
BDW2217A	3	2	4	98.868		0.121	8
BDW2218A	3	2	4	108.216		0.122	8
BDZ22X6A	3	2	4		9.106	0.120	8
BDW3121A	3	3	5	108.601		0.123	8
BDW3122A	3	3	5	112.677		0.123	8
BDW3123A	3	3	5	106.012		0.122	8
BDW3216A	4	3	6	103.530		0.120	8
BDW3217A	4	3	6	108.220		0.121	8
BDW3218A	4	3	6	115.865		0.118	8
BDZ31X6A	4	3	6		9.408	0.121	8
BDZ32X6A	4	3	6		9.203	0.121	8

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01503	104.995	
0.01498	104.229	
0.01501	97.632	
0.01487		9.406
0.01472	98.917	
0.01473	109.536	
0.01477	105.364	
0.01476		9.485
0.01536	115.411	
0.01510	104.564	
0.01525	101.496	
0.01517		8.959
0.01528	104.015	
0.01517	99.960	
0.01523	109.861	
0.01505		9.137
0.01542	111.633	
0.01542	115.823	
0.01526	107.845	
0.01502	103.660	
0.01512	109.077	
0.01477	114.078	
0.01508		9.459
0.01512		9.278

Average 105.923 9.285
 Standard Dev. 5.159 0.285
 Coeff. of Var. [%] 4.871 3.070
 Min. 97.571 8.857
 Max. 115.865 9.642
 Number of Spec. 18 6

Average_{norm} 0.01507 106.561 9.287
 Standard Dev._{norm} 5.475 0.207
 Coeff. of Var. [%]_{norm} 5.138 2.224
 Min. 0.0147 97.632 8.959
 Max. 0.0154 115.823 9.485
 Number of Spec. 18 6



**90° Compression -- (CTD)
 Strength & Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

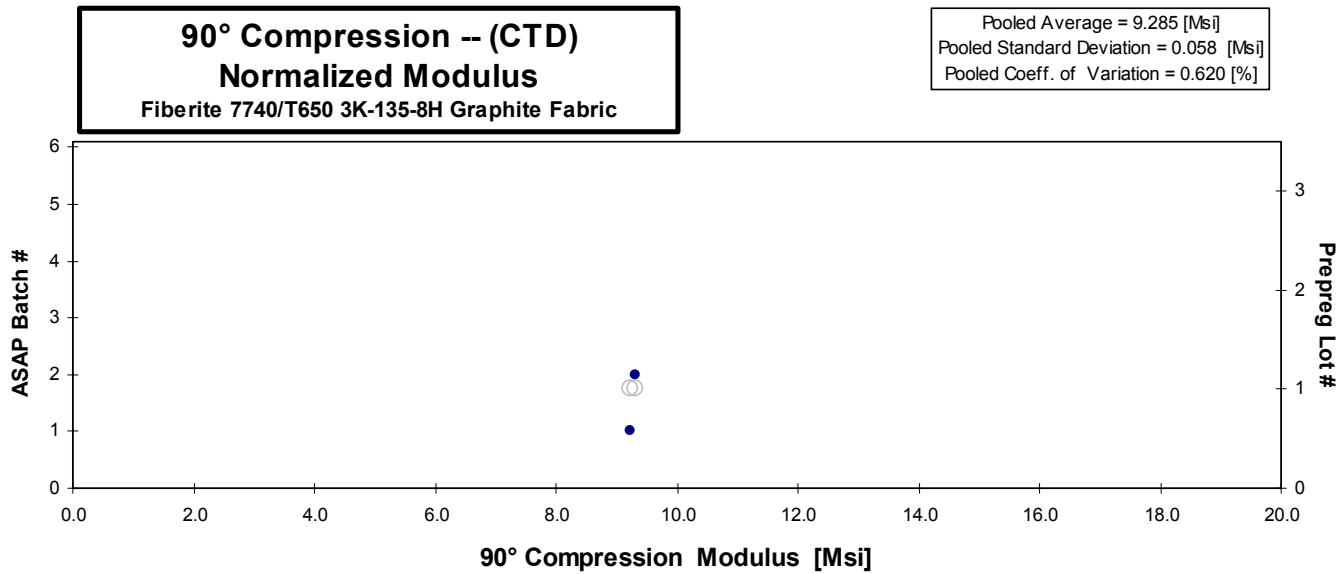
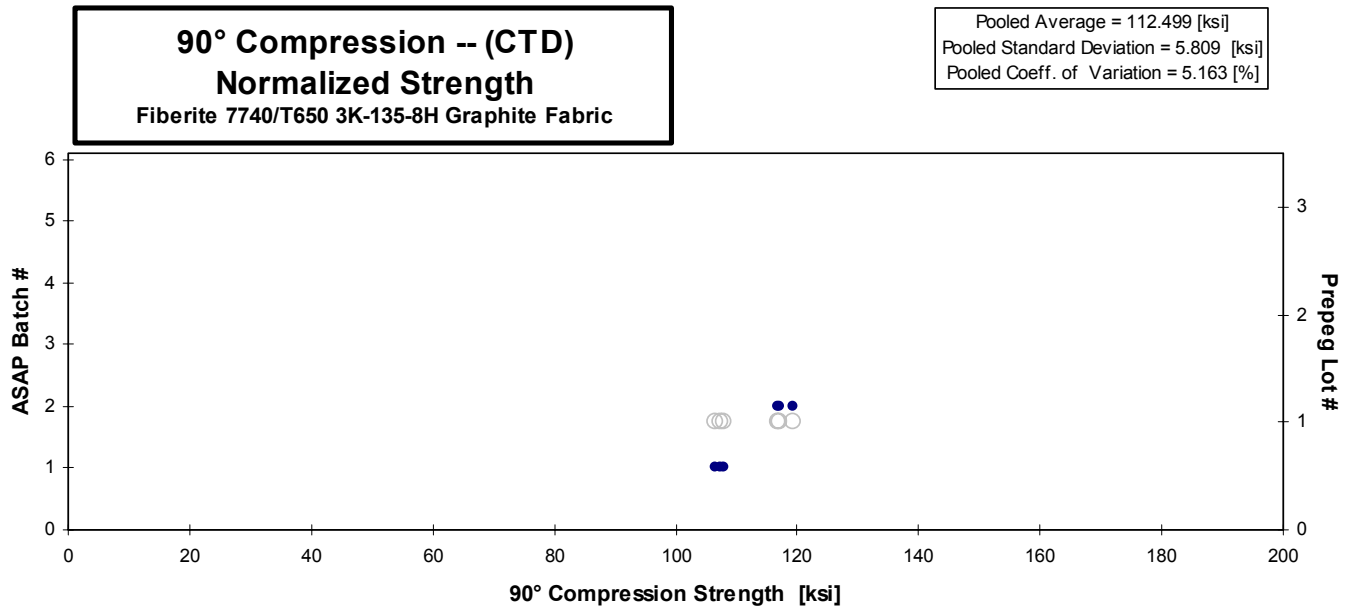
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thicken. [in]	# Plies in Laminate
BDW1127B	1	1	1	108.139		0.120	8
BDW1129B	1	1	1	107.222		0.120	8
BDW112AB	1	1	1	105.930		0.121	8
BDZ11X9B	1	1	1		9.481	0.117	8
BDW1227B	3	1	2	117.519		0.119	8
BDW1228B	3	1	2	117.833		0.119	8
BDW1229B	3	1	2	119.721		0.120	8
BDZ12X9B	3	1	2		9.653	0.116	8

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01498	107.981	
0.01503	107.401	
0.01507	106.437	
0.01463		9.244
0.01493	116.932	
0.01489	116.974	
0.01494	119.272	
0.01449		9.326

Average **112.727** **9.567**
 Standard Dev. **6.253** **0.122**
 Coeff. of Var. [%] **5.547** **1.273**
 Min. **105.930** **9.481**
 Max. **119.721** **9.653**
 Number of Spec. **6** **2**

Average_{norm} **0.01487** **112.499** **9.285**
 Standard Dev._{norm} **5.809** **0.058**
 Coeff. of Var. [%]_{norm} **5.163** **0.620**
 Min. **0.0145** **106.437** **9.244**
 Max. **0.0151** **119.272** **9.326**
 Number of Spec. **6** **2**



90° Compression -- (ETW)
Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

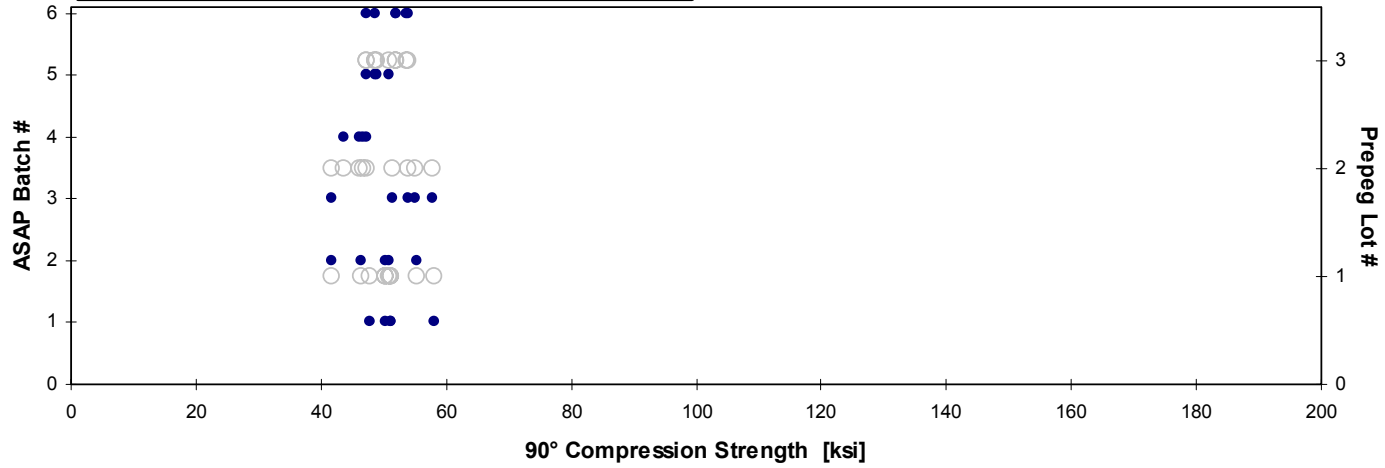
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
BDW1111F	1	1	1	58.183		0.120	8	0.01497	58.050	
BDW1112F	1	1	1	51.573		0.117	8	0.01465	50.380	
BDW1113F	1	1	1	52.084		0.118	8	0.01471	51.064	
BDW1114F	1	1	1	48.560		0.118	8	0.01478	47.852	
BDW1115F	1	1	1	51.432		0.119	8	0.01493	51.175	
BDZ11X1F	1	1	1		9.196	0.119	8	0.01481		9.081
BDW1211F	3	1	2	50.985		0.118	8	0.01480	50.316	
BDW1212F	3	1	2	42.427		0.118	8	0.01470	41.587	
BDW1213F	3	1	2	46.924		0.119	8	0.01483	46.386	
BDW1214F	3	1	2	56.386		0.118	8	0.01474	55.411	
BDW1215F	3	1	2	52.188		0.117	8	0.01464	50.938	
BDZ12X1F	3	1	2		10.269	0.117	8	0.01464		10.023
BDW2118F	2	2	3	52.869		0.123	8	0.01533	54.026	
BDW2119F	2	2	3	56.858		0.122	8	0.01529	57.971	
BDW211AF	2	2	3	54.332		0.121	8	0.01517	54.954	
BDW211BF	2	2	3	50.345		0.123	8	0.01534	51.489	
BDW211CF	2	2	3	41.144		0.121	8	0.01516	41.590	
BDZ21X1F	2	2	3		9.355	0.122	8	0.01530		9.542
BDW2211F	3	2	4	46.348		0.122	8	0.01526	47.160	
BDW2212F	3	2	4	43.464		0.121	8	0.01511	43.772	
BDW2214F	3	2	4	47.046		0.119	8	0.01487	46.644	
BDW2215F	3	2	4	45.683		0.121	8	0.01515	46.140	
BDZ22X1F	3	2	4		9.535	0.123	8	0.01533		9.741
BDW3111F	4	3	5	47.415		0.120	8	0.01494	47.217	
BDW3112F	4	3	5	51.337		0.119	8	0.01490	50.994	
BDW3113F	4	3	5	48.599		0.120	8	0.01501	48.640	
BDW3114F	4	3	5	48.743		0.121	8	0.01511	49.088	
BDZ31X1F	4	3	5		9.144	0.121	8	0.01515		9.234
BDW321AF	4	3	6	47.499		0.119	8	0.01490	47.182	
BDW3211F	4	3	6	52.334		0.120	8	0.01494	52.115	
BDW3212F	4	3	6	51.721		0.121	8	0.01509	52.045	
BDW3213F	4	3	6	53.087		0.122	8	0.01523	53.917	
BDW3214F	4	3	6	54.600		0.118	8	0.01474	53.667	
BDW3215F	4	3	6	48.799		0.120	8	0.01496	48.677	
BDZ32X1F	4	3	6		9.601	0.119	8	0.01489		9.531

Average	50.102	9.517	Average_{norm}	0.01498	50.015	9.525
Standard Dev.	4.165	0.410	Standard Dev._{norm}		4.204	0.340
Coeff. of Var. [%]	8.313	4.312	Coeff. of Var. [%]_{norm}		8.406	3.568
Min.	41.144	9.144	Min.	0.0146	41.587	9.081
Max.	58.183	10.269	Max.	0.0153	58.050	10.023
Number of Spec.	29	6	Number of Spec.		29	6

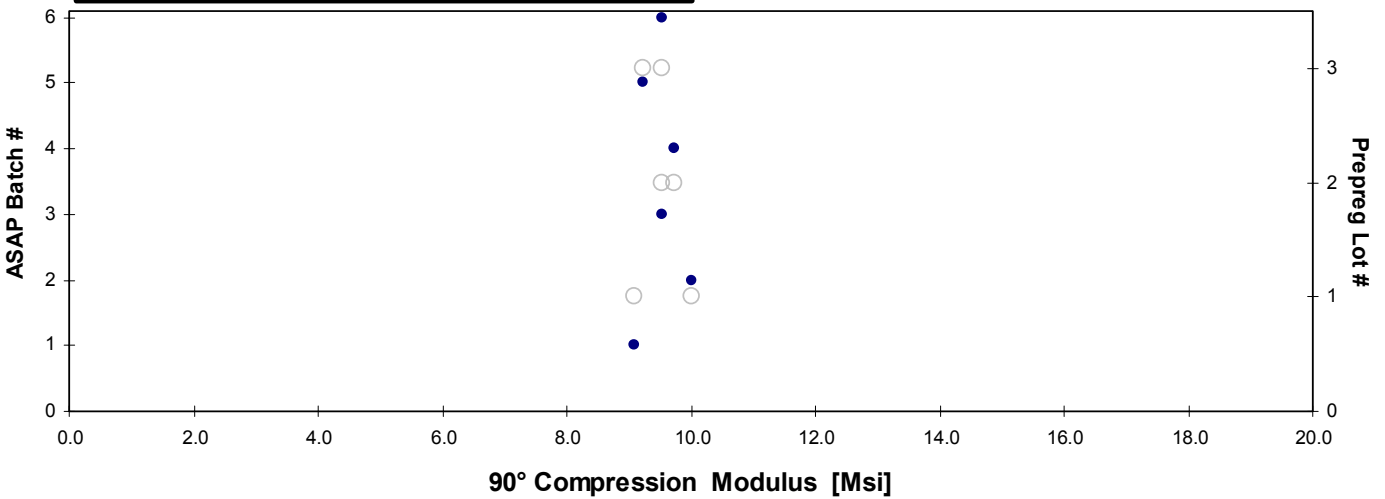
90° Compression -- (ETW)
Normalized Strength
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 50.015 [ksi]
 Pooled Standard Deviation = 4.204 [ksi]
 Pooled Coeff. of Variation = 8.406 [%]



90° Compression -- (ETW)
Normalized Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 9.525 [Msi]
 Pooled Standard Deviation = 0.340 [Msi]
 Pooled Coeff. of Variation = 3.568 [%]



90° Compression -- (ETD)
Strength & Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

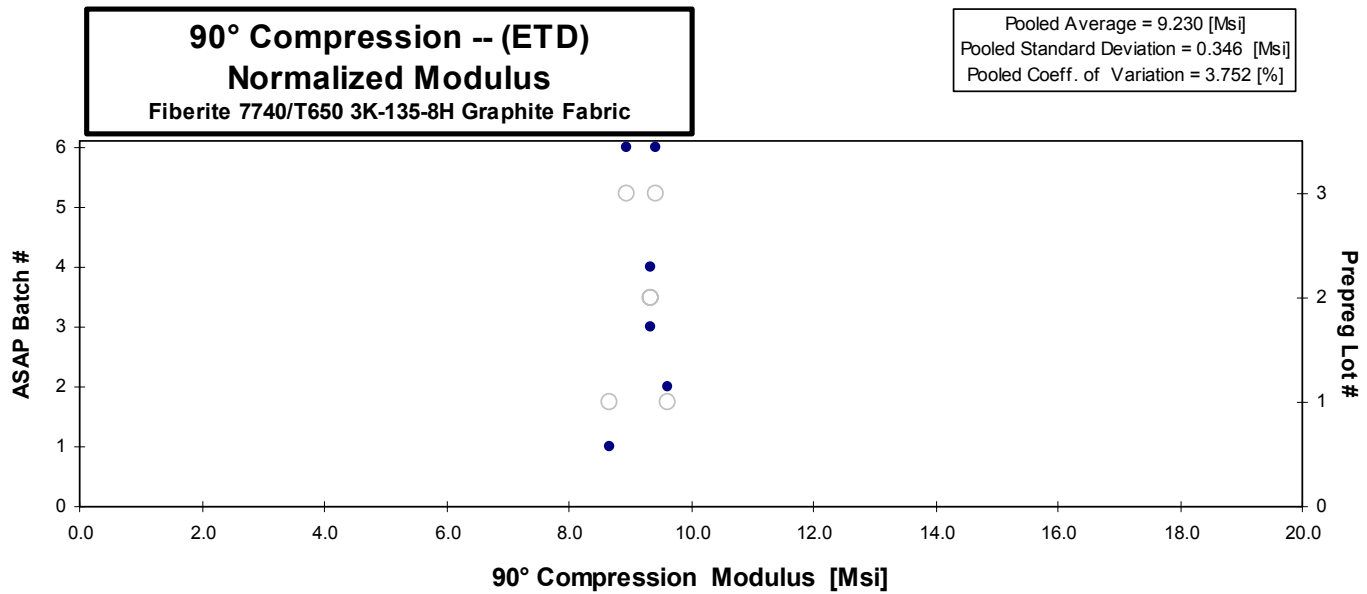
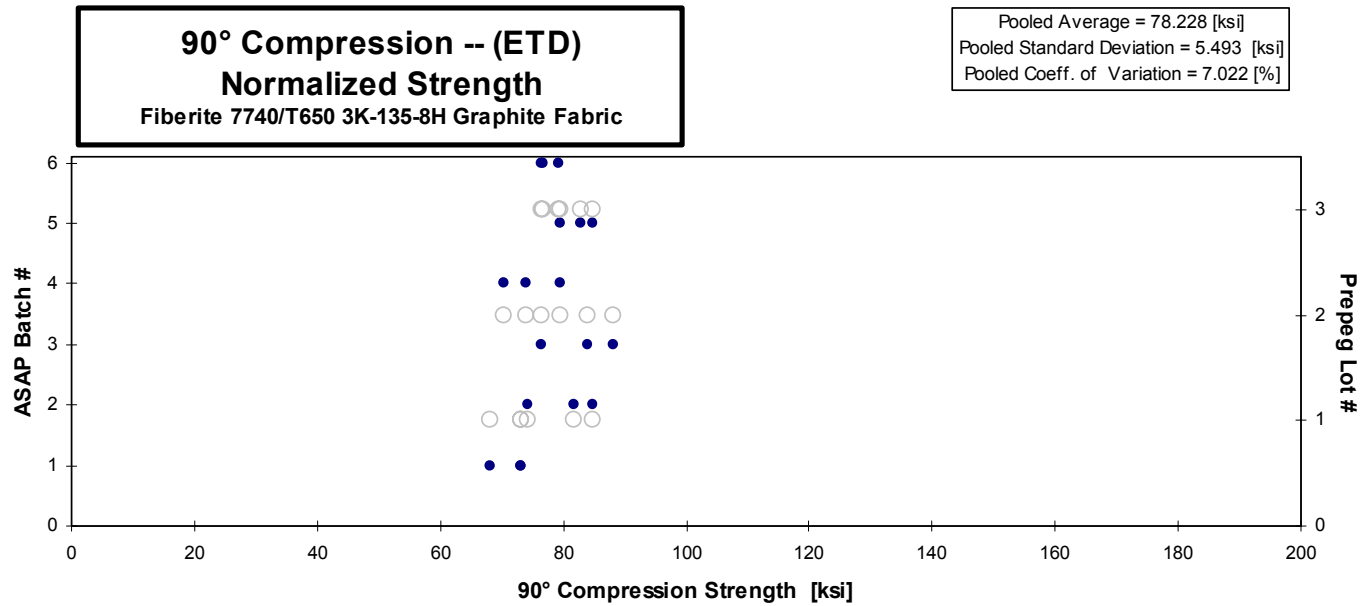
normalizing t_{ply}
 [in]
 0.0150

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
BDW1123G	1	1	1	67.975		0.120	8
BDW1124G	1	1	1	72.609		0.121	8
BDW1125G	1	1	1	72.907		0.120	8
BDZ11XCG	1	1	1		8.775	0.119	8
BDW1223G	3	1	2	74.729		0.119	8
BDW1224G	3	1	2	85.327		0.119	8
BDW1225G	3	1	2	82.319		0.119	8
BDZ12XDG	3	1	2		9.834	0.117	8
BDW2121G	2	2	3	86.420		0.122	8
BDW2122G	2	2	3	74.411		0.124	8
BDW2123G	2	2	3	82.048		0.123	8
BDZ21X9G	2	2	3		9.143	0.123	8
BDW2221G	3	2	4	69.967		0.121	8
BDW2222G	3	2	4	73.866		0.120	8
BDW2223G	3	2	4	79.925		0.119	8
BDZ22X9G	3	2	4		9.370	0.120	8
BDW3125G	3	3	5	77.532		0.123	8
BDW3126G	3	3	5	81.059		0.123	8
BDW3127G	3	3	5	82.909		0.123	8
BDW3223G	4	3	6	78.857		0.121	8
BDW3224G	4	3	6	75.970		0.121	8
BDW3225G	4	3	6	75.655		0.122	8
BDZ31X9G	4	3	6		9.488	0.119	8
BDZ32X9G	4	3	6		8.811	0.122	8

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.01505	68.201	
0.01510	73.093	
0.01503	73.059	
0.01484		8.684
0.01490	74.247	
0.01491	84.794	
0.01488	81.684	
0.01467		9.619
0.01529	88.077	
0.01544	76.597	
0.01537	84.048	
0.01533		9.343
0.01509	70.390	
0.01505	74.127	
0.01493	79.526	
0.01498		9.357
0.01540	79.616	
0.01536	83.018	
0.01535	84.861	
0.01510	79.399	
0.01513	76.603	
0.01522	76.759	
0.01491		9.431
0.01523		8.945

Average 77.471 9.237
 Standard Dev. 5.219 0.410
 Coeff. of Var. [%] 6.737 4.438
 Min. 67.975 8.775
 Max. 86.420 9.834
 Number of Spec. 18 6

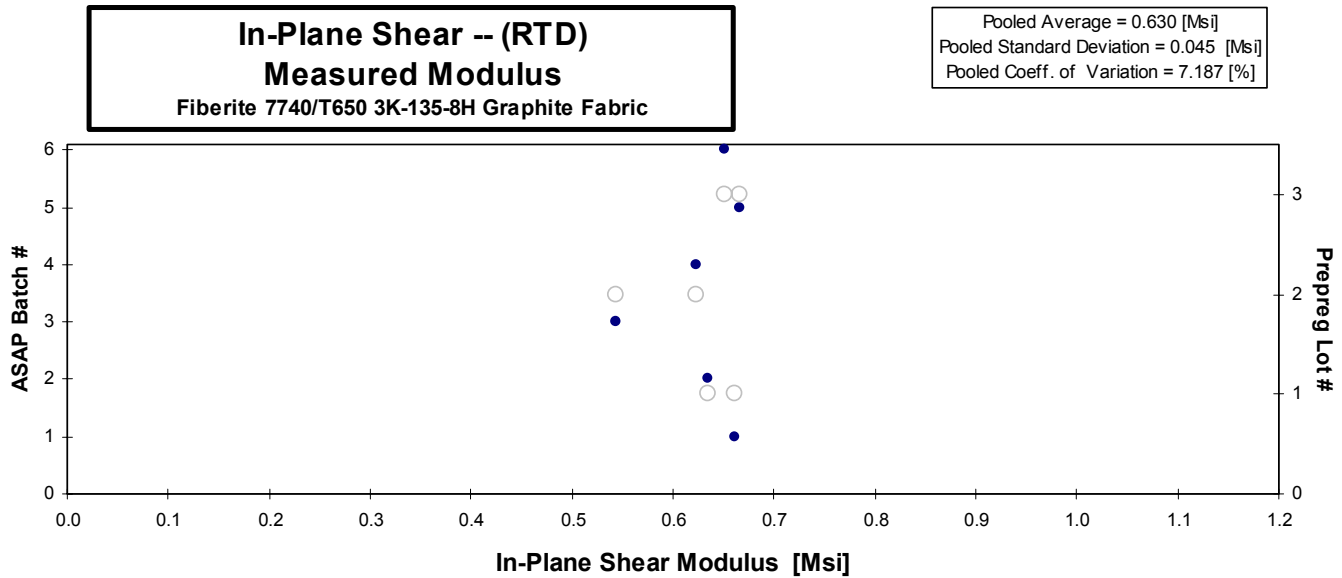
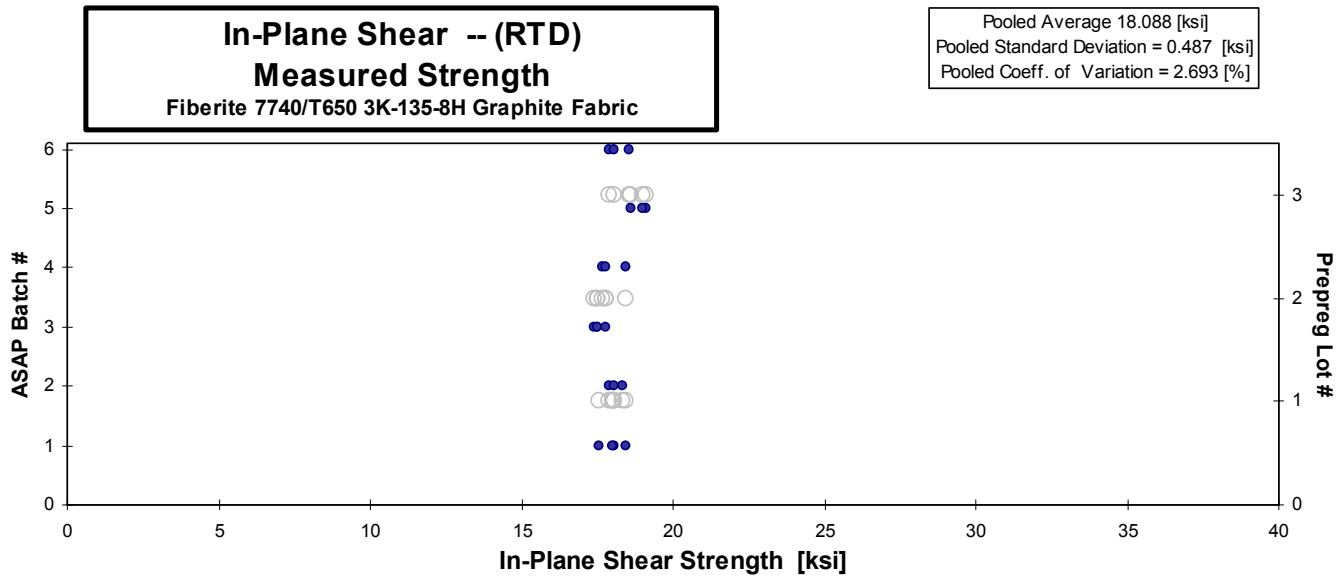
Average_{norm} 0.01511 78.228 9.230
 Standard Dev._{norm} 5.493 0.346
 Coeff. of Var. [%]_{norm} 7.022 3.752
 Min. 0.0147 68.201 8.684
 Max. 0.0154 88.077 9.619
 Number of Spec. 18 6



**In-Plane Shear -- (RTD)
 Strength & Modulus**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]
BDN1112A	1	1	1	17.548	0.661	0.133	9	0.01473
BDN1113A	1	1	1	18.075		0.132	9	0.01468
BDN1114A	1	1	1	18.010		0.133	9	0.01478
BDN1115A	1	1	1	18.454		0.133	9	0.01474
BDN1228A	4	1	2	18.319	0.635	0.133	9	0.01475
BDN1229A	4	1	2	17.875		0.133	9	0.01476
BDN122AA	4	1	2	18.064		0.132	9	0.01466
BDN2122A	2	2	3	17.791	0.544	0.136	9	0.01509
BDN2123A	2	2	3	17.520		0.134	9	0.01492
BDN2124A	2	2	3	17.427		0.133	9	0.01481
BDN2125A	2	2	3	17.522		0.136	9	0.01508
BDN2226A	3	2	4	18.437	0.624	0.133	9	0.01480
BDN2229A	3	2	4	17.698		0.138	9	0.01532
BDN222AA	3	2	4	17.775		0.137	9	0.01518
BDN3112A	3	3	5	19.103	0.667	0.138	9	0.01533
BDN3115A	3	3	5	19.012		0.136	9	0.01514
BDN3116A	3	3	5	18.629		0.135	9	0.01498
BDN3232A	4	3	6	17.900		0.133	9	0.01475
BDN3233A	4	3	6	18.565	0.651	0.135	9	0.01505
BDN3234A	4	3	6	18.044		0.134	9	0.01489

Average	18.088	0.630	0.0149
Standard Dev.	0.487	0.045	
Coeff. of Var. [%]	2.693	7.187	
Min.	17.427	0.544	Min. 0.0147
Max.	19.103	0.667	Max. 0.0153
Number of Spec.	20	6	



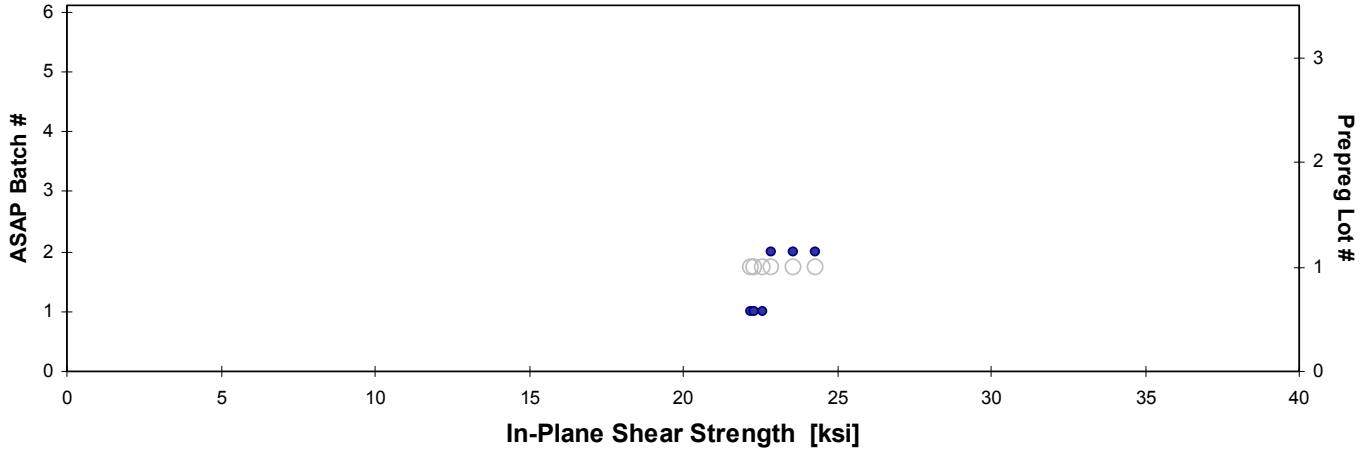
In-Plane Shear -- (CTD) Strength & Modulus Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]
BDN1135B	1	1	1	22.213	0.750	0.133	9	0.01482
BDN1136B	1	1	1	22.317		0.133	9	0.01477
BDN1137B	1	1	1	22.602		0.129	9	0.01429
BDN1213B	4	1	2	24.321	0.828	0.133	9	0.01482
BDN1214B	4	1	2	22.862		0.134	9	0.01484
BDN1215B	4	1	2	23.606		0.135	9	0.01498

Average	22.987	0.789		0.0148
Standard Dev.	0.821	0.056		
Coeff. of Var. [%]	3.574	7.063		
Min.	22.213	0.750	Min.	0.0143
Max.	24.321	0.828	Max.	0.0150
Number of Spec.	6	2		

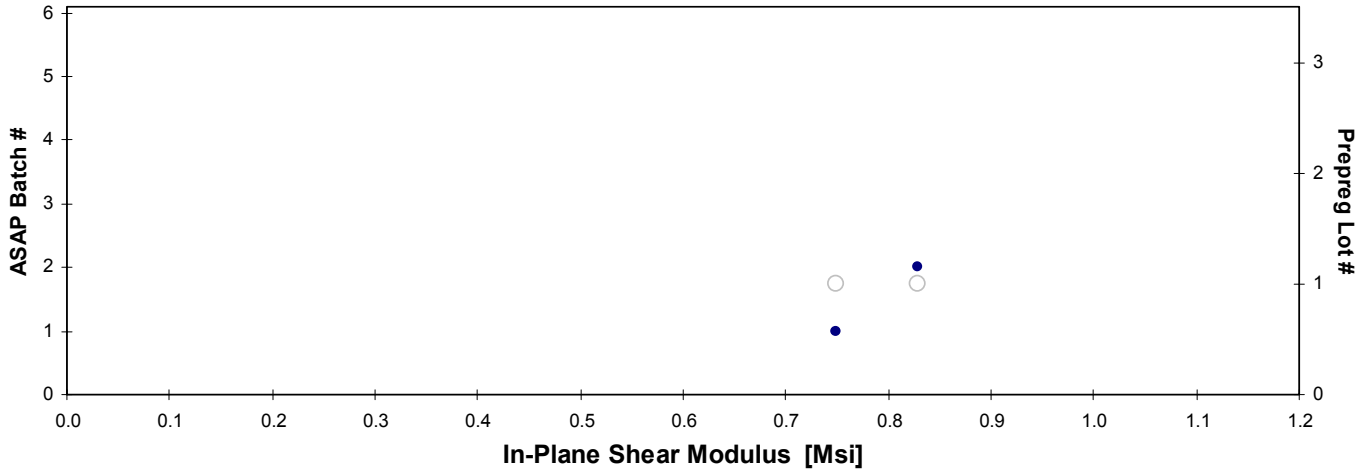
In-Plane Shear -- (CTD)
Measured Strength
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 22.987 [ksi]
 Pooled Standard Deviation = 0.821 [ksi]
 Pooled Coeff. of Variation = 3.574 [%]



In-Plane Shear -- (CTD)
Measured Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 0.789 [Msi]
 Pooled Standard Deviation = 0.056 [Msi]
 Pooled Coeff. of Variation = 7.063 [%]



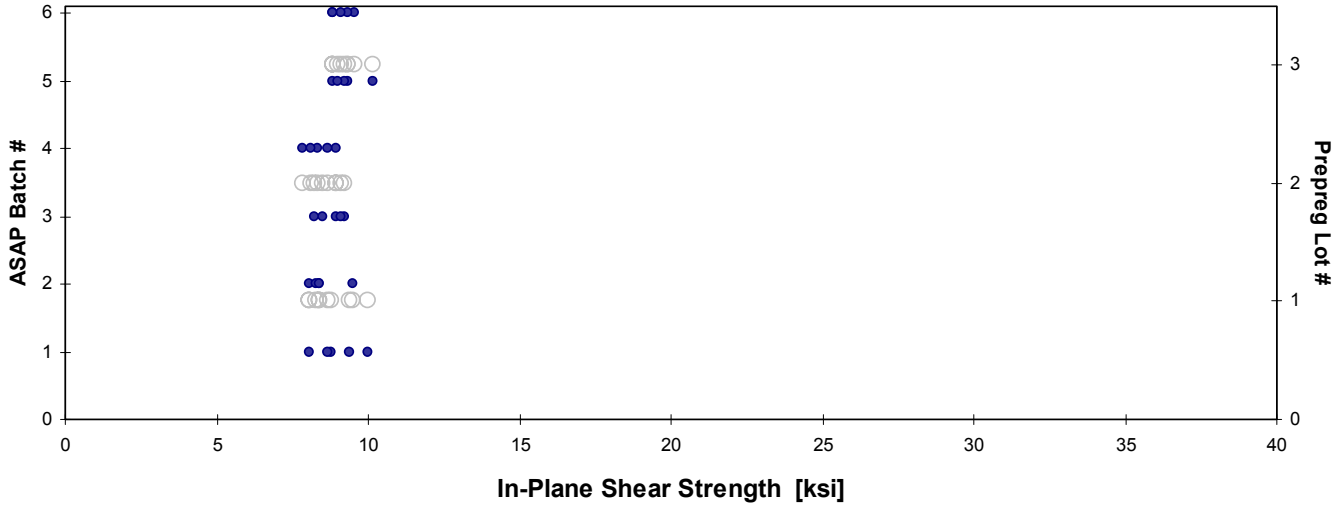
In-Plane Shear -- (ETW) Strength & Modulus Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]
BDN1121F	1	1	1	9.993	0.323	0.129	9	0.01437
BDN1124F	1	1	1	8.779		0.135	9	0.01505
BDN1127F	1	1	1	9.391		0.134	9	0.01489
BDN1128F	1	1	1	8.056		0.135	9	0.01500
BDN1129F	1	1	1	8.685		0.134	9	0.01491
BDN1223F	4	1	2	9.525	0.350	0.132	9	0.01467
BDN1224F	4	1	2	8.391		0.131	9	0.01460
BDN1225F	4	1	2	8.084		0.131	9	0.01451
BDN1226F	4	1	2	8.283		0.129	9	0.01435
BDN1227F	4	1	2	8.380		0.131	9	0.01451
BDN2126F	2	2	3	9.234	0.324	0.136	9	0.01513
BDN2127F	2	2	3	8.495		0.137	9	0.01517
BDN2128F	2	2	3	8.977		0.137	9	0.01519
BDN2129F	2	2	3	8.223		0.135	9	0.01502
BDN212AF	2	2	3	9.122		0.135	9	0.01503
BDN2211F	3	2	4	8.958	0.311	0.136	9	0.01515
BDN2213F	3	2	4	8.346		0.136	9	0.01510
BDN2214F	3	2	4	7.853		0.135	9	0.01504
BDN2216F	3	2	4	8.131		0.137	9	0.01524
BDN2217F	3	2	4	8.654		0.137	9	0.01522
BDN3117F	3	3	5	10.190	0.323	0.134	9	0.01488
BDN3119F	3	3	5	9.339		0.138	9	0.01529
BDN3127F	3	3	5	8.866		0.135	9	0.01495
BDN3129F	3	3	5	9.219		0.134	9	0.01491
BDN312AF	3	3	5	8.998		0.132	9	0.01471
BDN3226F	4	3	6	9.568	0.337	0.139	9	0.01542
BDN3227F	4	3	6	9.345		0.137	9	0.01520
BDN3228F	4	3	6	9.127		0.139	9	0.01541
BDN3229F	4	3	6	8.812		0.134	9	0.01491
BDN322AF	4	3	6	8.837		0.138	9	0.01532

Average	8.862	0.328	0.0150
Standard Dev.	0.577	0.014	
Coeff. of Var. [%]	6.512	4.148	
Min.	7.853	0.311	Min. 0.0144
Max.	10.190	0.350	Max. 0.0154
Number of Spec.	30	6	

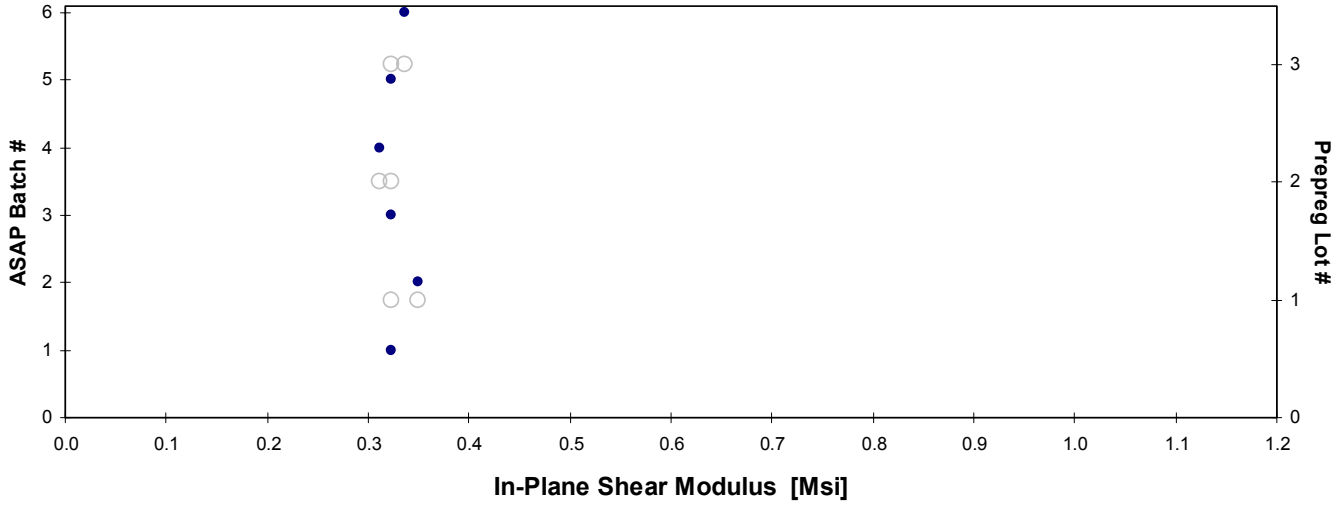
In-Plane Shear -- (ETW)
Measured Strength
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average 8.862 [ksi]
 Pooled Standard Deviation = 0.577 [ksi]
 Pooled Coeff. of Variation = 6.512 [%]



In-Plane Shear -- (ETW)
Measured Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 0.328 [Msi]
 Pooled Standard Deviation = 0.014 [Msi]
 Pooled Coeff. of Variation = 4.148 [%]



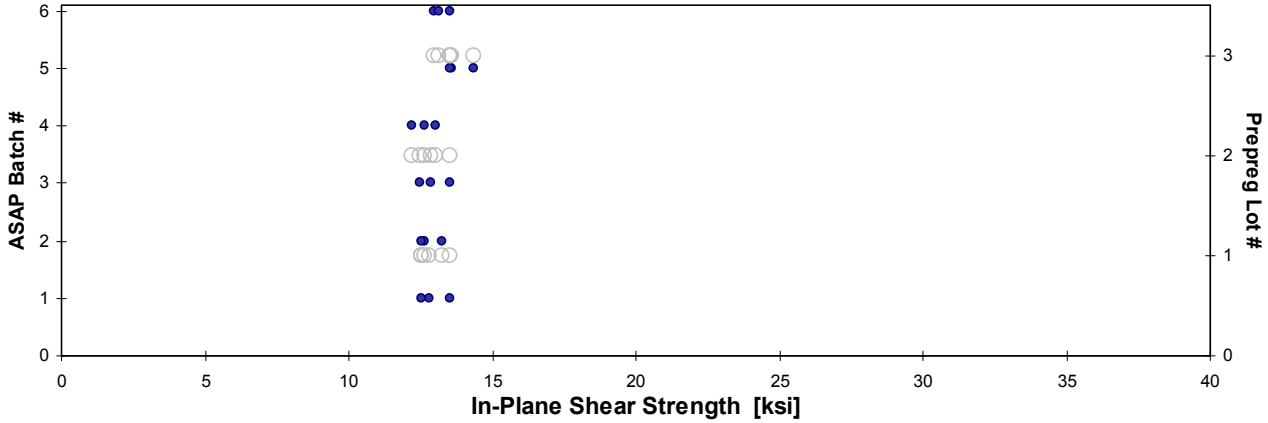
In-Plane Shear -- (ETD) Strength & Modulus Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]
BDN1131G	1	1	1	12.829	0.404	0.134	9	0.01491
BDN1132G	1	1	1	13.529		0.135	9	0.01495
BDN1133G	1	1	1	12.527		0.133	9	0.01482
BDN1217G	4	1	2	12.664	0.492	0.134	9	0.01494
BDN1218G	4	1	2	13.240		0.135	9	0.01501
BDN1219G	4	1	2	12.526		0.136	9	0.01506
BDN2111G	2	2	3	12.475	0.384	0.137	9	0.01523
BDN2113G	2	2	3	13.535		0.137	9	0.01522
BDN2114G	2	2	3	12.874		0.139	9	0.01542
BDN2223G	3	2	4	12.226	0.409	0.138	9	0.01539
BDN2224G	3	2	4	13.060		0.138	9	0.01538
BDN2225G	3	2	4	12.653		0.139	9	0.01539
BDN3122G	3	3	5	14.381		0.135	9	0.01497
BDN3123G	3	3	5	13.579	0.421	0.133	9	0.01477
BDN3124G	3	3	5	13.537		0.132	9	0.01465
BDN3235G	4	3	6	13.000	0.424	0.135	9	0.01501
BDN3236G	4	3	6	13.547		0.135	9	0.01501
BDN3237G	4	3	6	13.163		0.134	9	0.01494

Average	13.075	0.422		0.0151
Standard Dev.	0.542	0.037		
Coeff. of Var. [%]	4.142	8.746		
Min.	12.226	0.384	Min.	0.0147
Max.	14.381	0.492	Max.	0.0154
Number of Spec.	18	6		

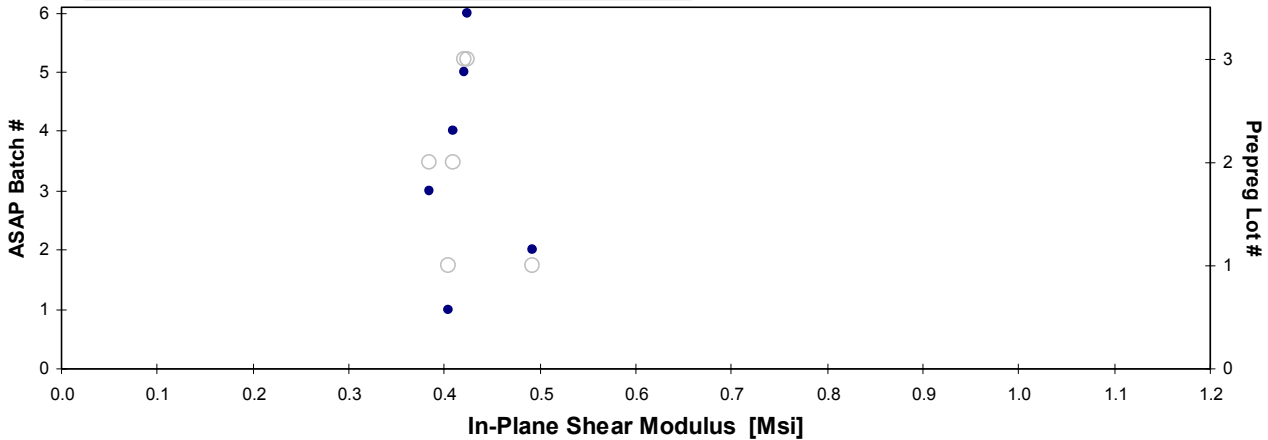
**In-Plane Shear -- (ETD)
 Measured Strength
 Fiberite 7740/T650 3K-135-8H Graphite Fabric**

Pooled Average = 13.075 [ksi]
 Pooled Standard Deviation = 0.542 [ksi]
 Pooled Coeff. of Variation = 4.142 [%]



**In-Plane Shear -- (ETD)
 Measured Modulus
 Fiberite 7740/T650 3K-135-8H Graphite Fabric**

Pooled Average = 0.422 [Msi]
 Pooled Standard Deviation = 0.037 [Msi]
 Pooled Coeff. of Variation = 8.746 [%]



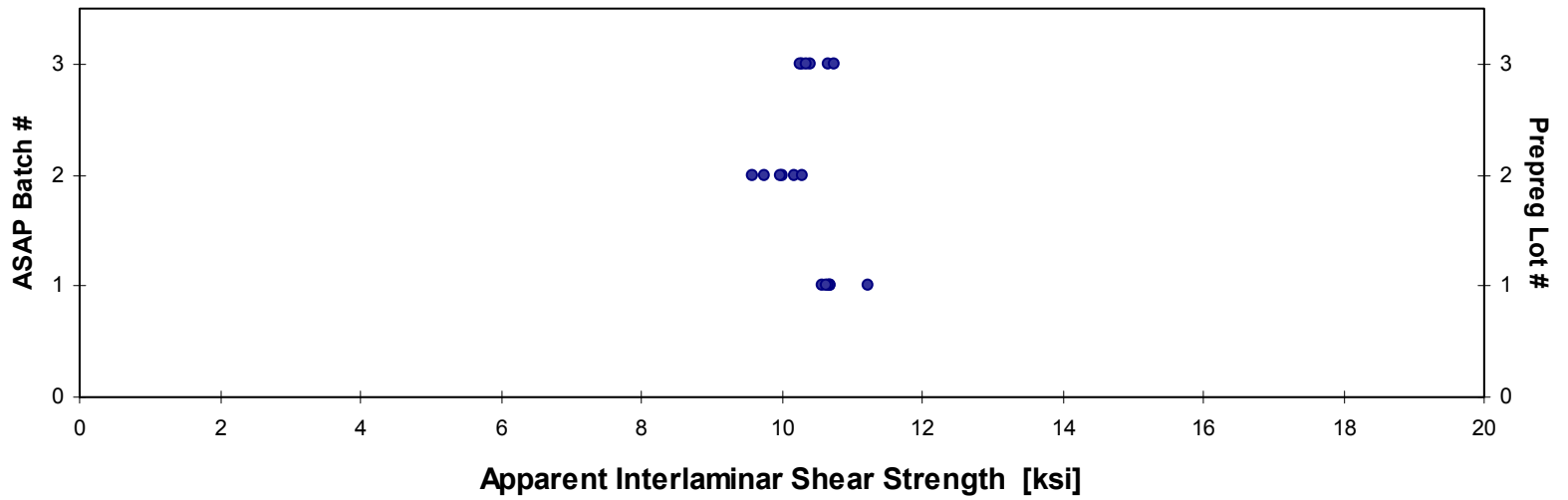
**Apparent Interlaminar Shear -- (RTD)
 Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Cure Cycle	Prepreg Lot #	ASAP Batch #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]
BDQ1111A		1	1	10.695	0.113	7	0.01616
BDQ1112A		1	1	10.595	0.119	7	0.01693
BDQ1113A		1	1	11.227	0.114	7	0.01630
BDQ1114A		1	1	10.701	0.118	7	0.01688
BDQ1115A		1	1	10.660	0.115	7	0.01636
BDQ1121A		1	1	10.651	0.113	7	0.01614
BDQ2111A		2	2	10.197	0.104	7	0.01481
BDQ2112A		2	2	9.755	0.104	7	0.01488
BDQ2113A		2	2	10.005	0.102	7	0.01458
BDQ2114A		2	2	9.598	0.101	7	0.01446
BDQ2115A		2	2	9.972	0.103	7	0.01478
BDQ2121A		2	2	10.285	0.103	7	0.01471
BDQ3111A		3	3	10.678	0.100	7	0.01426
BDQ3112A		3	3	10.296	0.101	7	0.01446
BDQ3113A		3	3	10.424	0.099	7	0.01414
BDQ3114A		3	3	10.755	0.101	7	0.01436
BDQ3115A		3	3	10.258	0.101	7	0.01442
BDQ3121A		3	3	10.351	0.100	7	0.01435

Average	10.395	0.0152
Standard Dev.	0.400	
Coeff. of Var. [%]	3.848	
Min.	9.598	Min. 0.0141
Max.	11.227	Max. 0.0169
Number of Spec.	18	

**Apparent Interlaminar Shear -- (RTD)
Measured Strength**
Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 10.395 [ksi]
Pooled Standard Deviation = 0.400 [ksi]
Pooled Coeff. of Variation = 3.848 [%]



3.2.2 Fluid Sensitivity Raw Data Spreadsheets and Scatter Charts

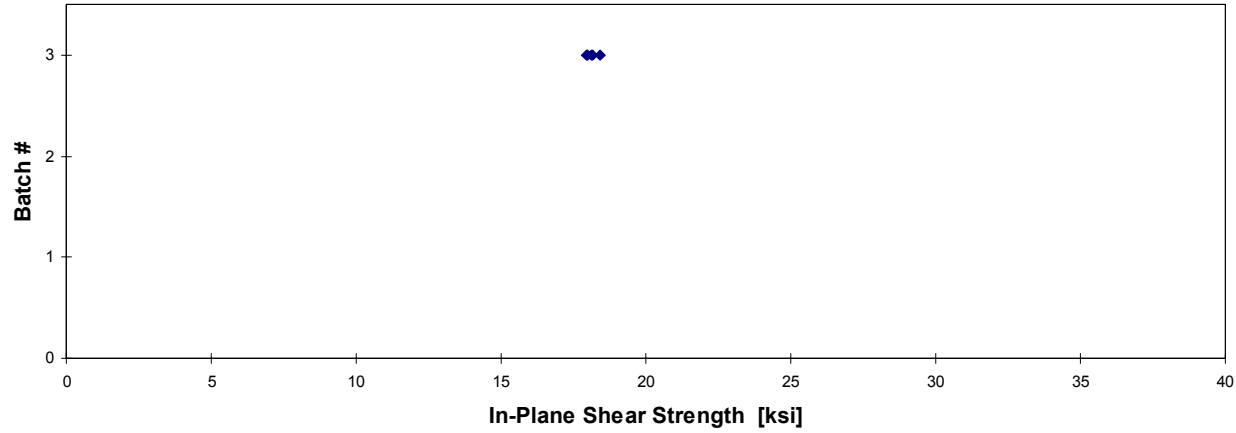
**In-Plane Shear -- (MEK - RTD)
 Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Batch Number	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]
BDN3238T	3	18.121	0.135	9	0.01502
BDN3239T	3	17.986	0.135	9	0.01504
BDN323AT	3	18.169	0.133	9	0.01477
BDN3222T	3	18.426	0.136	9	0.01514
BDN3225T	3	17.941	0.134	9	0.01487

Average	18.128	0.0150
Standard Dev.	0.191	
Coeff. of Var. [%]	1.053	
Min.	17.941	Min. 0.0148
Max.	18.426	Max. 0.0151
Number of Spec.	5	

**In-Plane Shear -- (MEK - RTD)
 Measured Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 18.128 [ksi]
 Pooled Standard Deviation = 0.191 [ksi]
 Pooled Coeff. of Variation = 1.053 [%]



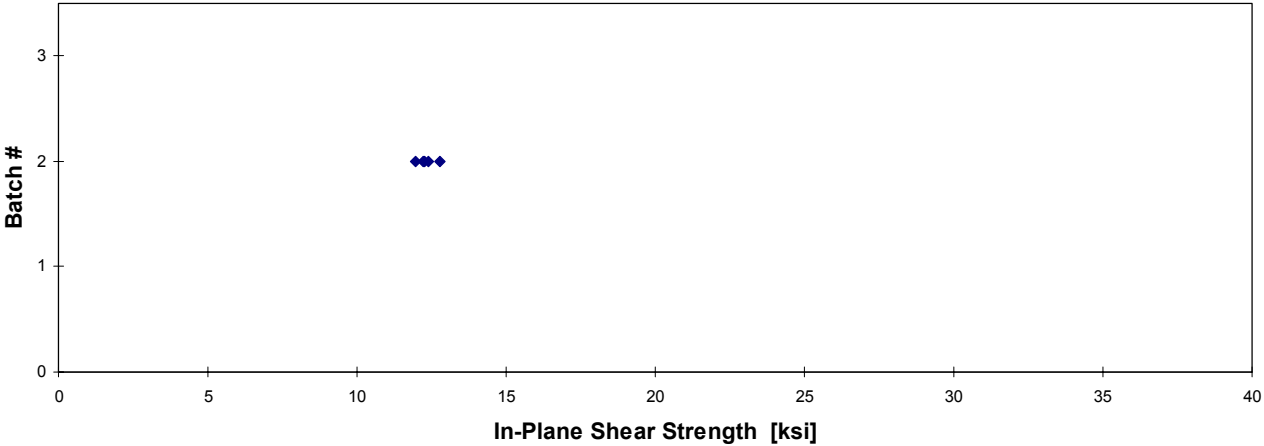
In-Plane Shear -- (JP-4 JET FUEL - ETD)
Strength
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Batch Number	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]
BDN2116R	2	12.778	0.138	9	0.01537
BDN2117R	2	12.406	0.136	9	0.01508
BDN2118R	2	12.244	0.138	9	0.01534
BDN2119R	2	12.285	0.139	9	0.01546
BDN2121R	2	11.985	0.137	9	0.01520

Average	12.340	0.0153
Standard Dev.	0.289	
Coeff. of Var. [%]	2.343	
Min.	11.985	Min. 0.0151
Max.	12.778	Max. 0.0155
Number of Spec.	5	

In-Plane Shear -- (JP-4 JET FUEL - ETD)
Measured Strength
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 12.340 [ksi]
 Pooled Standard Deviation = 0.289 [ksi]
 Pooled Coeff. of Variation = 2.343 [%]



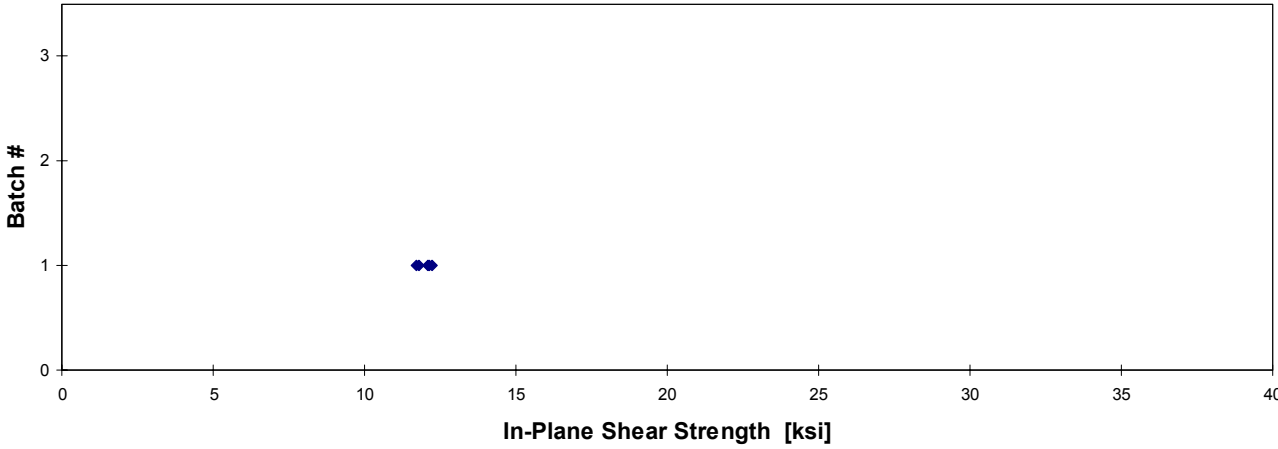
**In-Plane Shear -- (Hydraulic Fluid - ETD)
 Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Specimen Number	Batch Number	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]
BDN1117V	1	12.111	0.133	9	0.01474
BDN1118V	1	12.151	0.133	9	0.01480
BDN111AV	1	12.229	0.128	9	0.01426
BDN1139V	1	11.786	0.135	9	0.01502
BDN113AV	1	11.709	0.135	9	0.01496

Average	11.997	0.0148
Standard Dev.	0.233	
Coeff. of Var. [%]	1.945	
Min.	11.709	Min. 0.0143
Max.	12.229	Max. 0.0150
Number of Spec.	5	

**In-Plane Shear -- (Hydraulic Fluid - ETD)
 Measured Strength**
 Fiberite 7740/T650 3K-135-8H Graphite Fabric

Pooled Average = 11.997 [ksi]
 Pooled Standard Deviation = 0.233 [ksi]
 Pooled Coeff. of Variation = 1.945 [%]



Fluid Sensitivity Comparison:

Average In-Plane Shear Strength with Fluid (ksi)	Same Environment In-Plane Shear Strength without Fluid (ksi)	Worst Case Environment In-Plane Shear Strength (ksi)
MEK (RTD) 18.13	(RTD) 18.09	(ETW) 8.86

The RTD average in-plane shear strength was not reduced after exposure to MEK.

Average In-Plane Shear Strength with Fluid (ksi)	Same Environment In-Plane Shear Strength without Fluid (ksi)	Worst Case Environment In-Plane Shear Strength (ksi)
JP-4 JET FUEL (ETD) 12.34	(ETD) 13.08	(ETW) 8.86

The ETD average in-plane shear strength was reduced by 6% after exposure to JP-4 Jet Fuel. However it remained 39% higher than water exposure in ETW conditions.

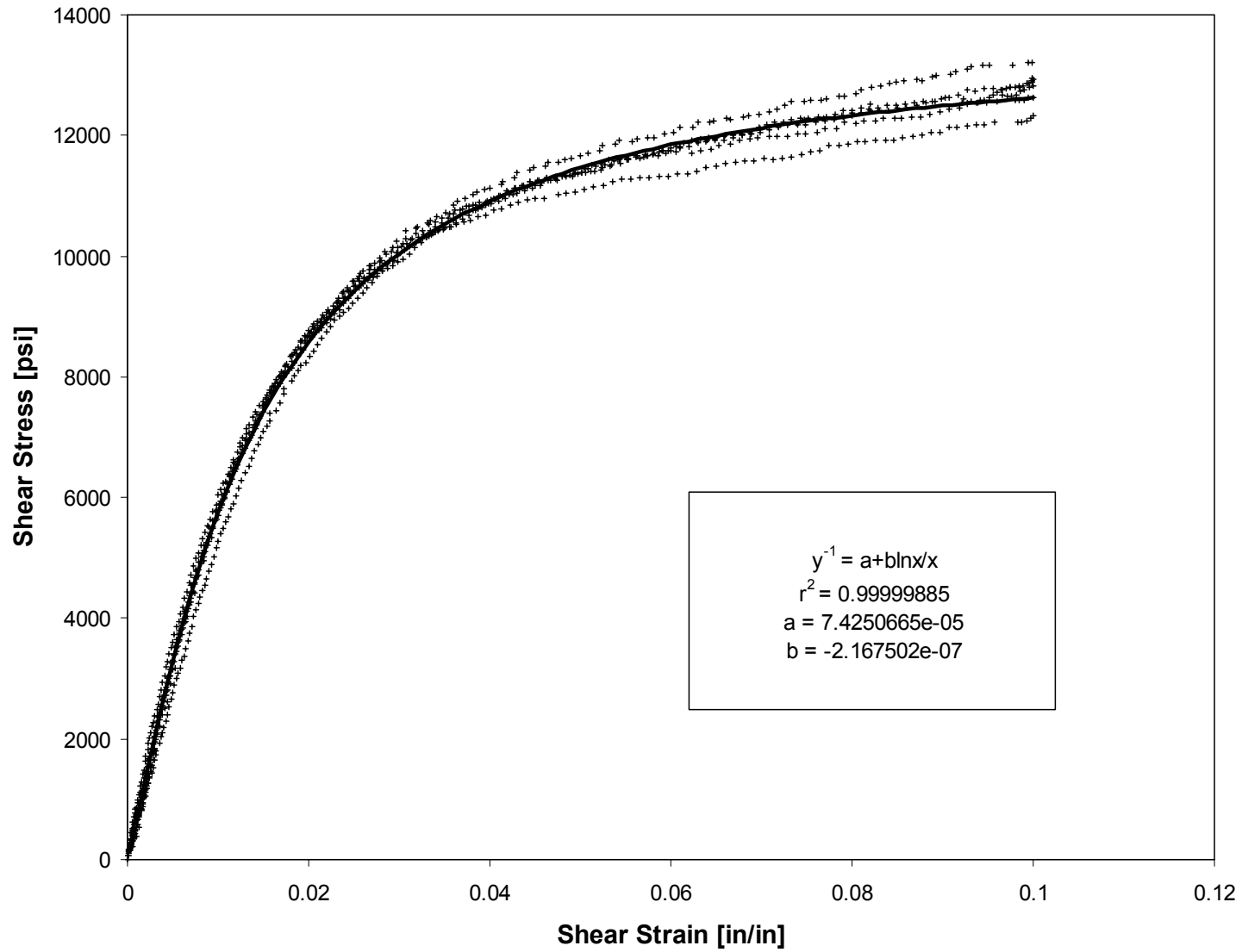
Average In-Plane Shear Strength with Fluid (ksi)	Same Environment In-Plane Shear Strength without Fluid (ksi)	Worst Case Environment In-Plane Shear Strength (ksi)
HYDRAULIC FLUID (ETD) 12.00	(ETD) 13.08	(ETW) 8.86

The ETD average in-plane shear strength was reduced by 8% after exposure to Hydraulic Fluid. However, it remained 35% higher than water exposure in ETW conditions.

3.2.3 Representative Shear Stress-Strain Curve

The following stress-strain curve is representative of the T650 3K-135-8H / 7740 prepreg system. The tension and compression stress-strain curves are not presented in graphical form. If strain design allowables from these tests are required, simple one-dimensional linear stress-strain relationships may be used to obtain corresponding strain design values. This process should approximate tensile and compressive strain behavior relatively well but may produce extremely conservative strain values in shear due to the nonlinear behavior. A more realistic approach for shear strain design allowables is to use a maximum strain value of 5% (reference MIL-HDBK-17-1E, section 5.7.6). If a nonlinear analysis of the material's shear behavior is required, the curve-fit of the shear stress-strain curve may be used. The representative shear stress-strain curve was obtained by taking the average of all the sample shear curves and determining the best-fit line through the data. The actual data points also presented on the chart to demonstrate material variability.

Shear Stress vs. Shear Strain, RTD

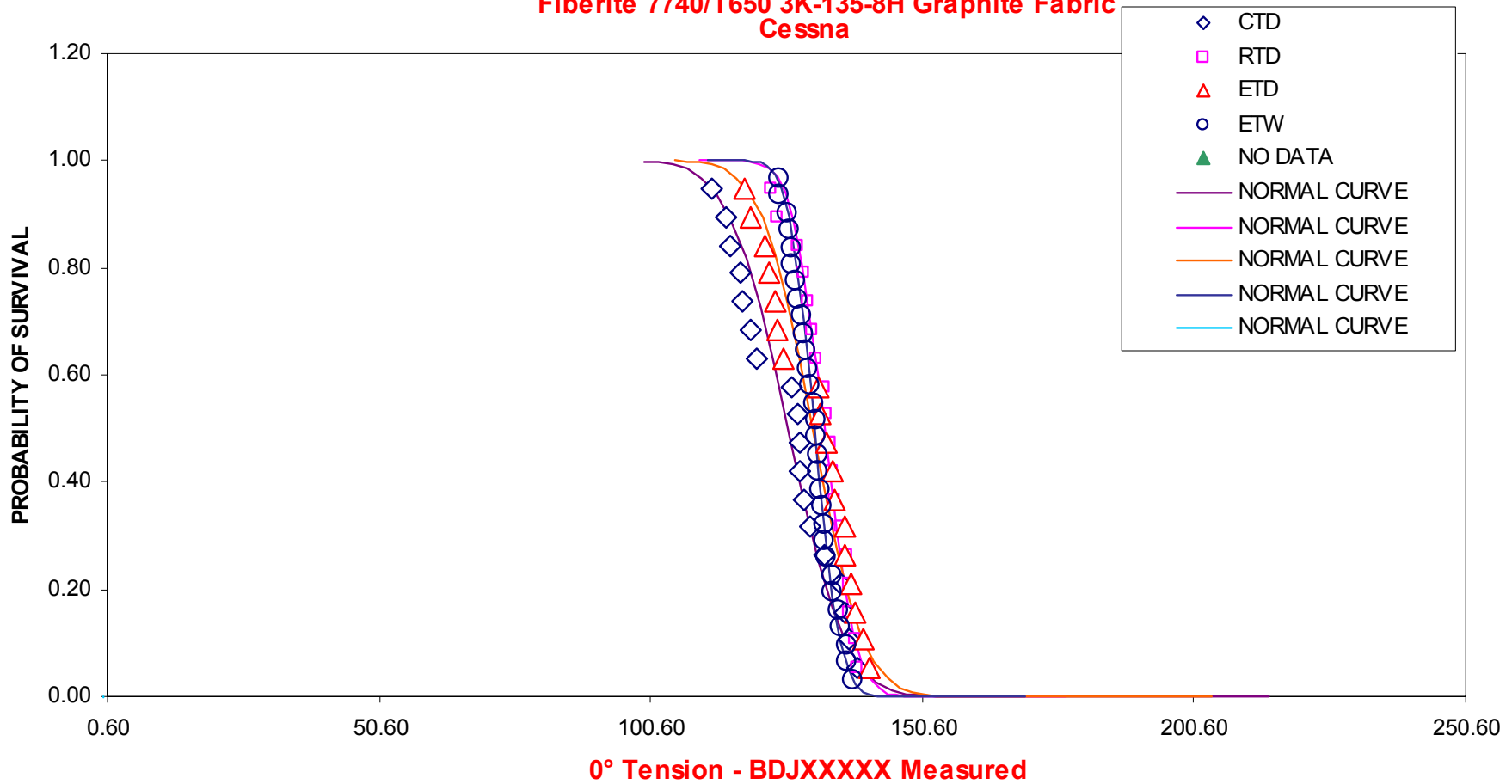


3.3 Statistical Results

3.3.1 Plot by Condition

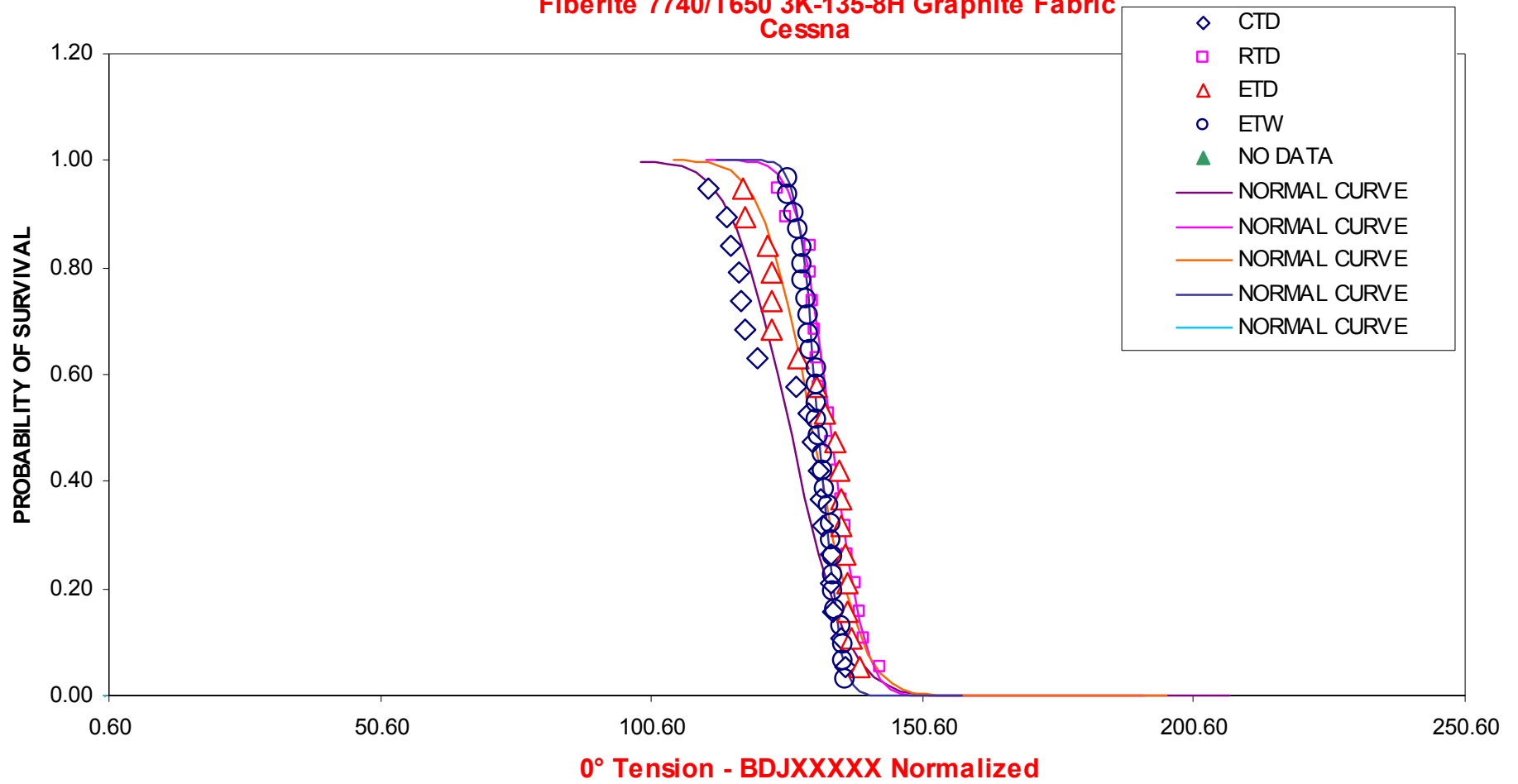
DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
 Cessna**



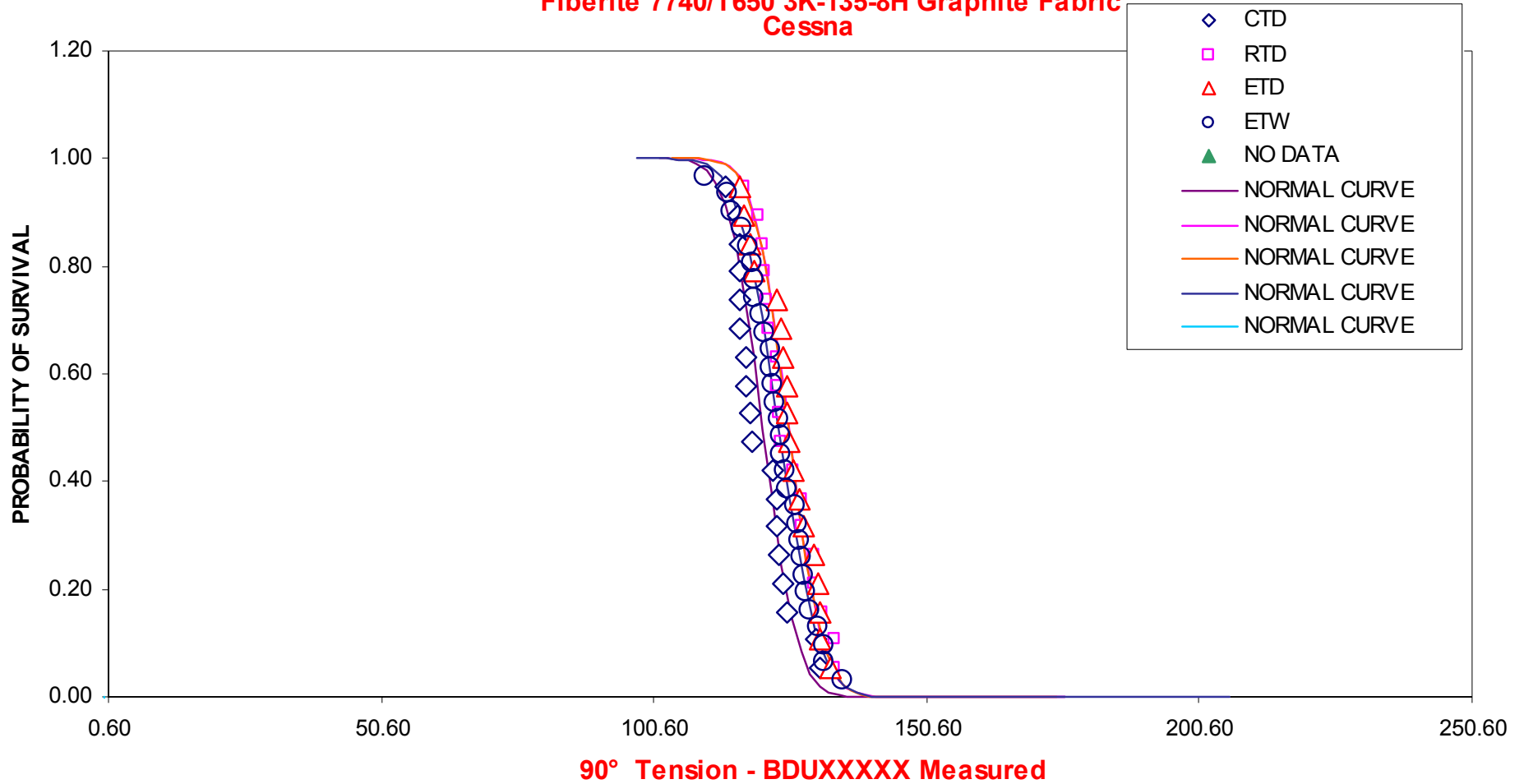
DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
Cessna**



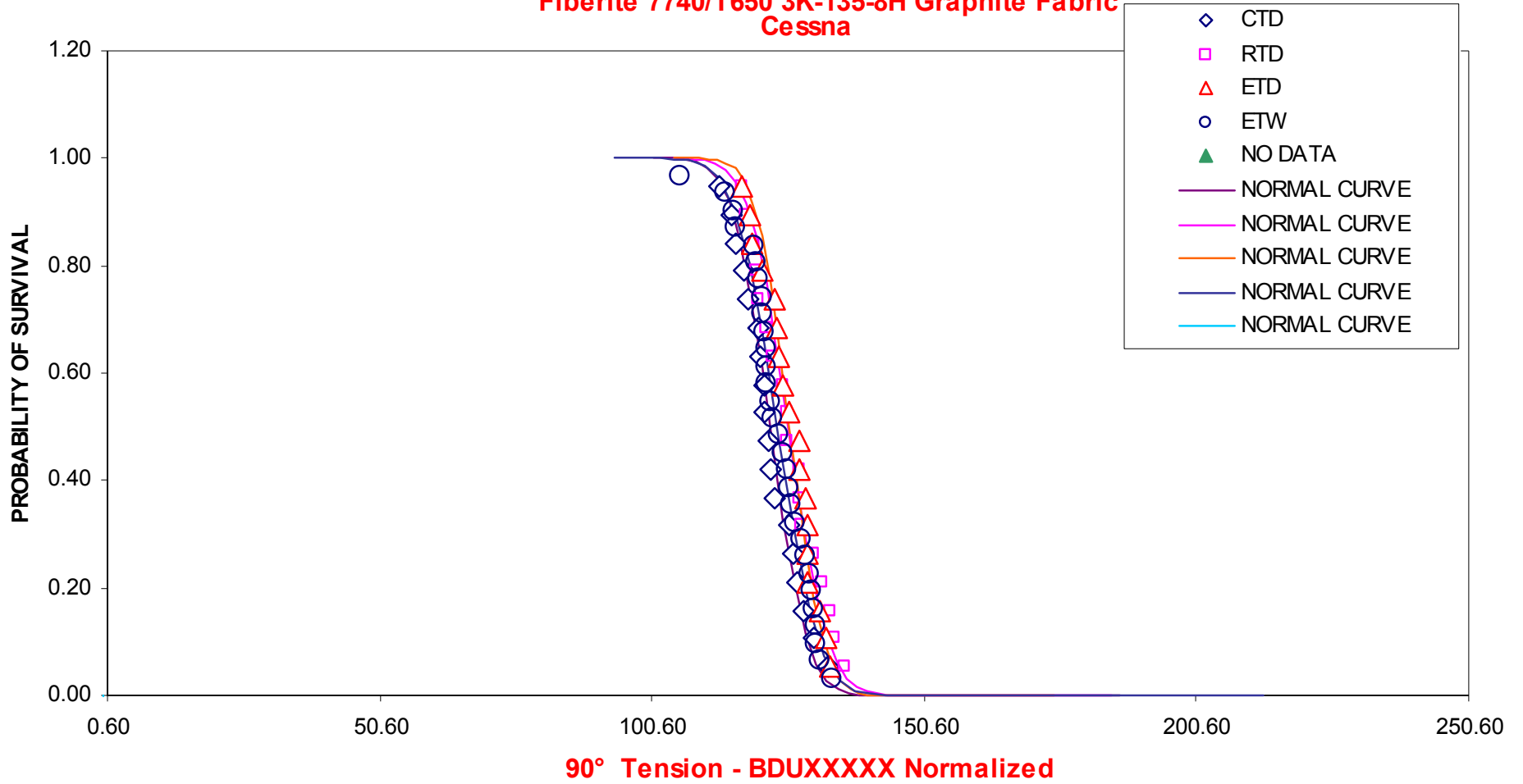
DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
Cessna**



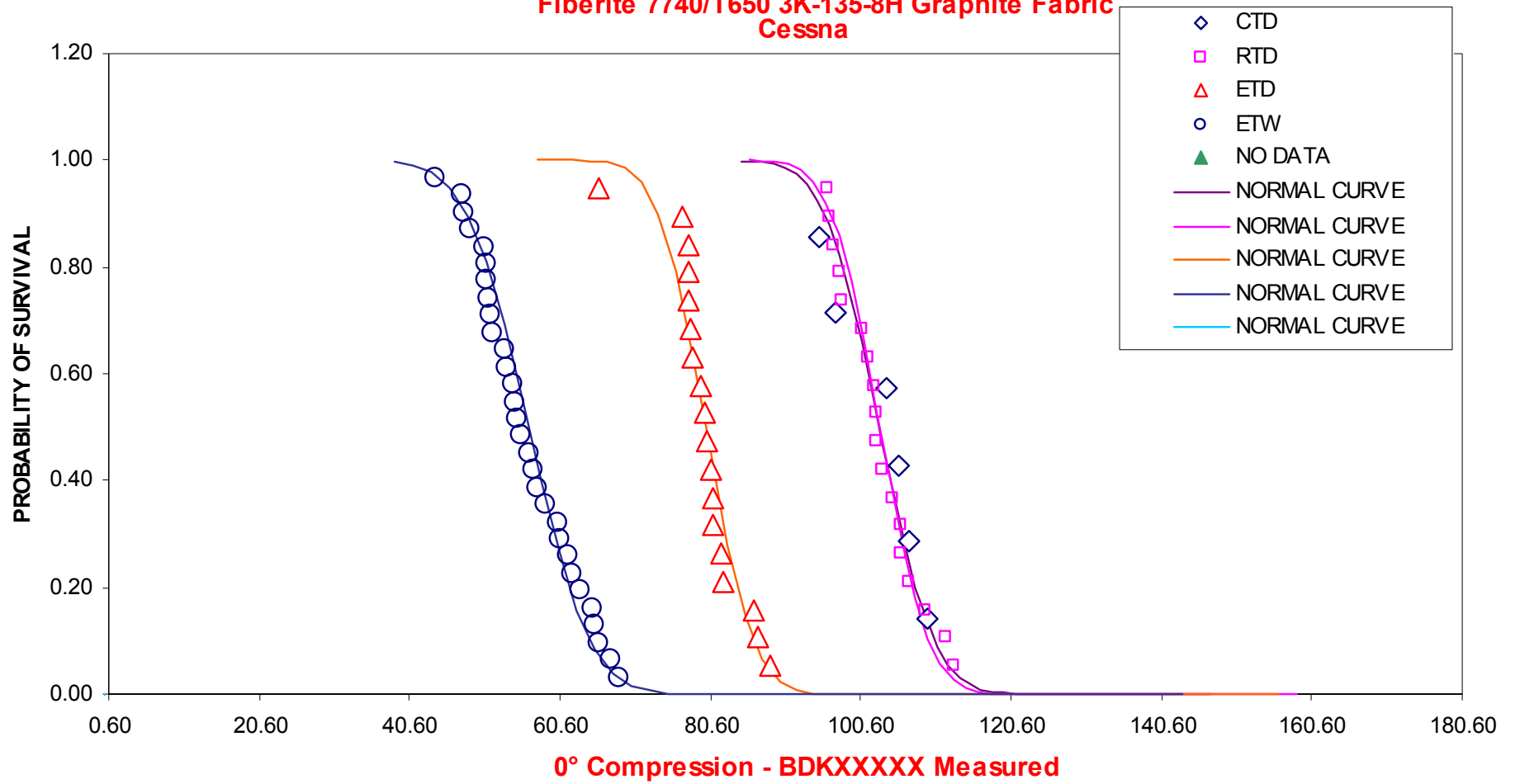
DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
Cessna**

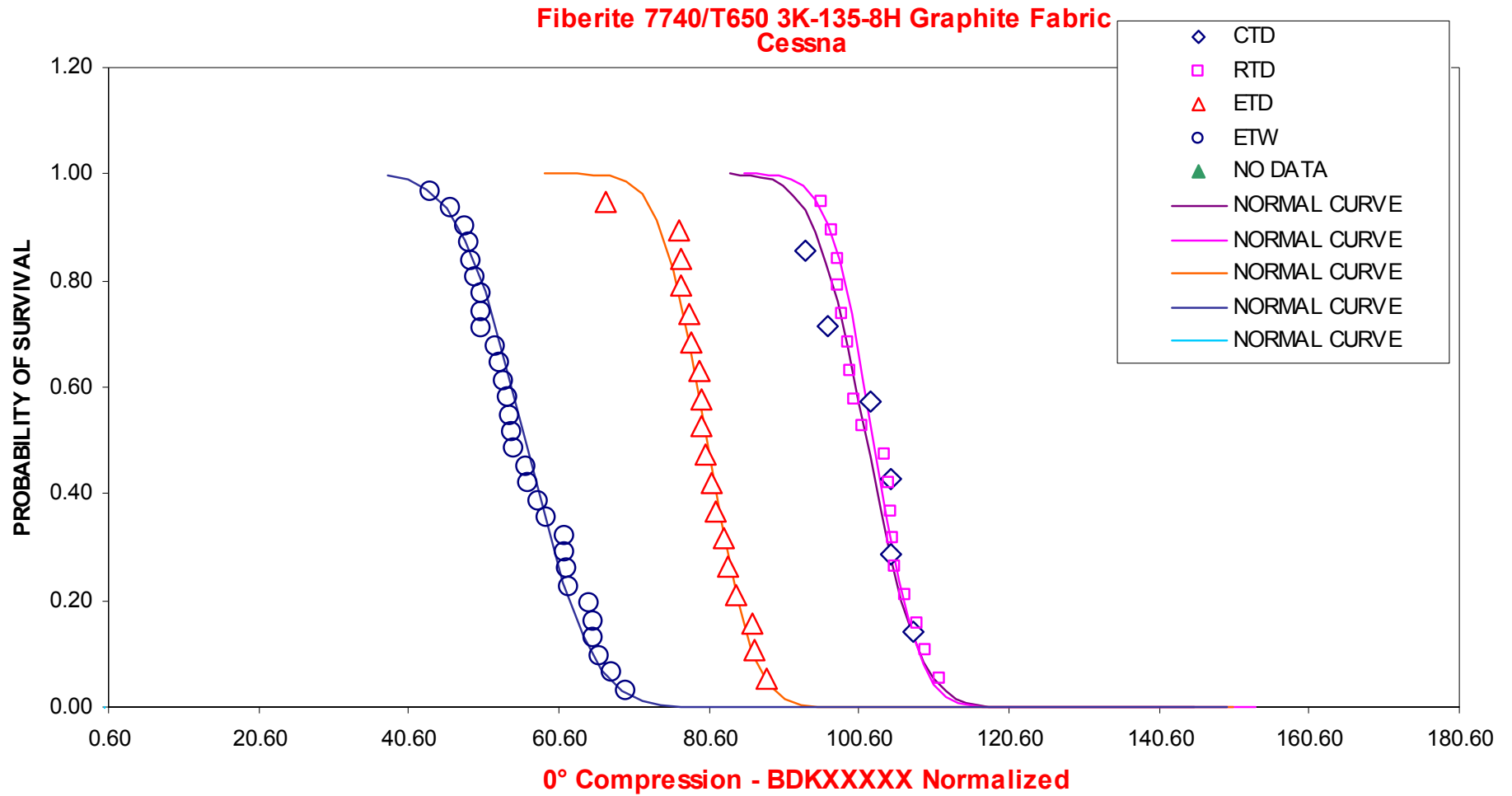


DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

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 Cessna**

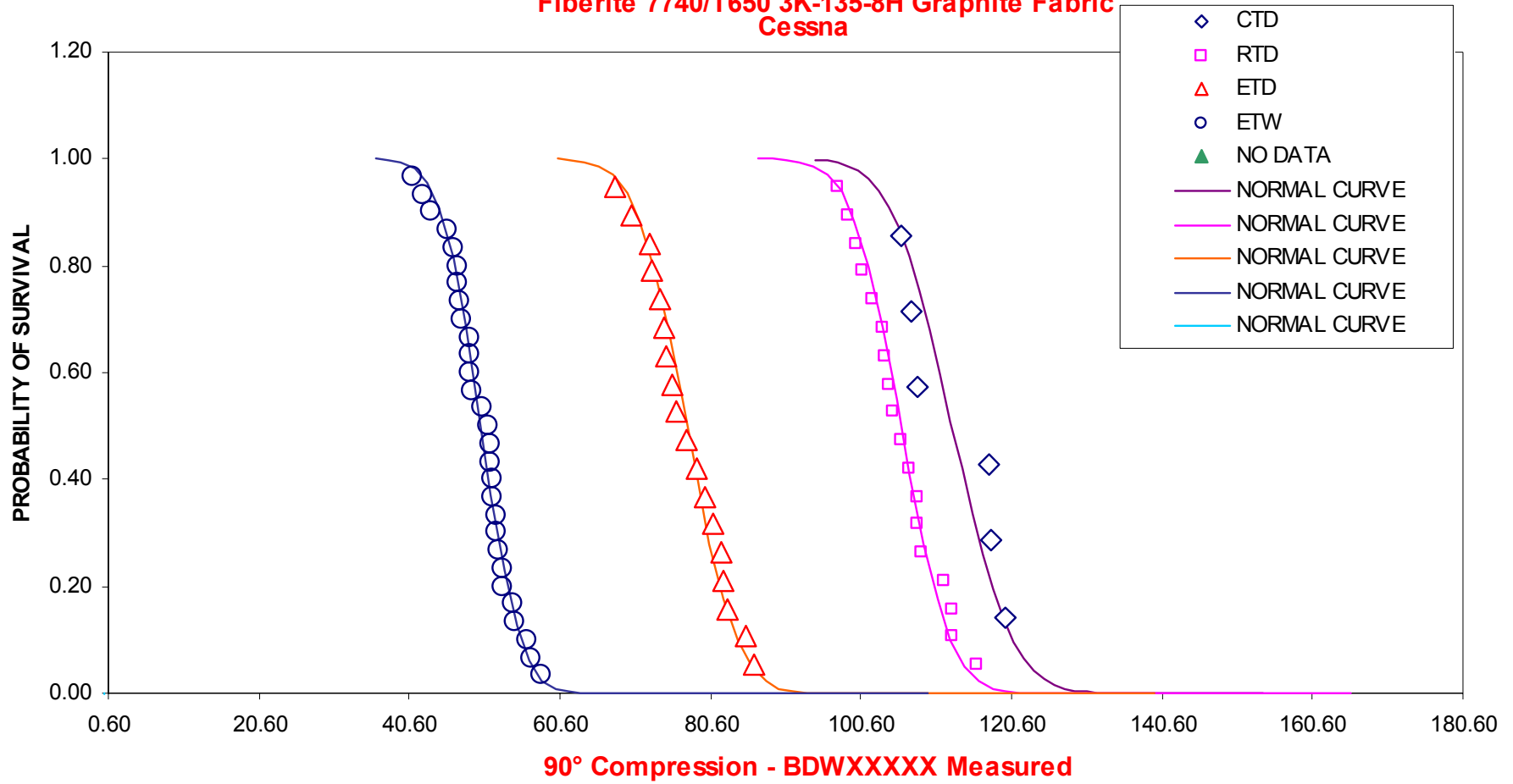


DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS



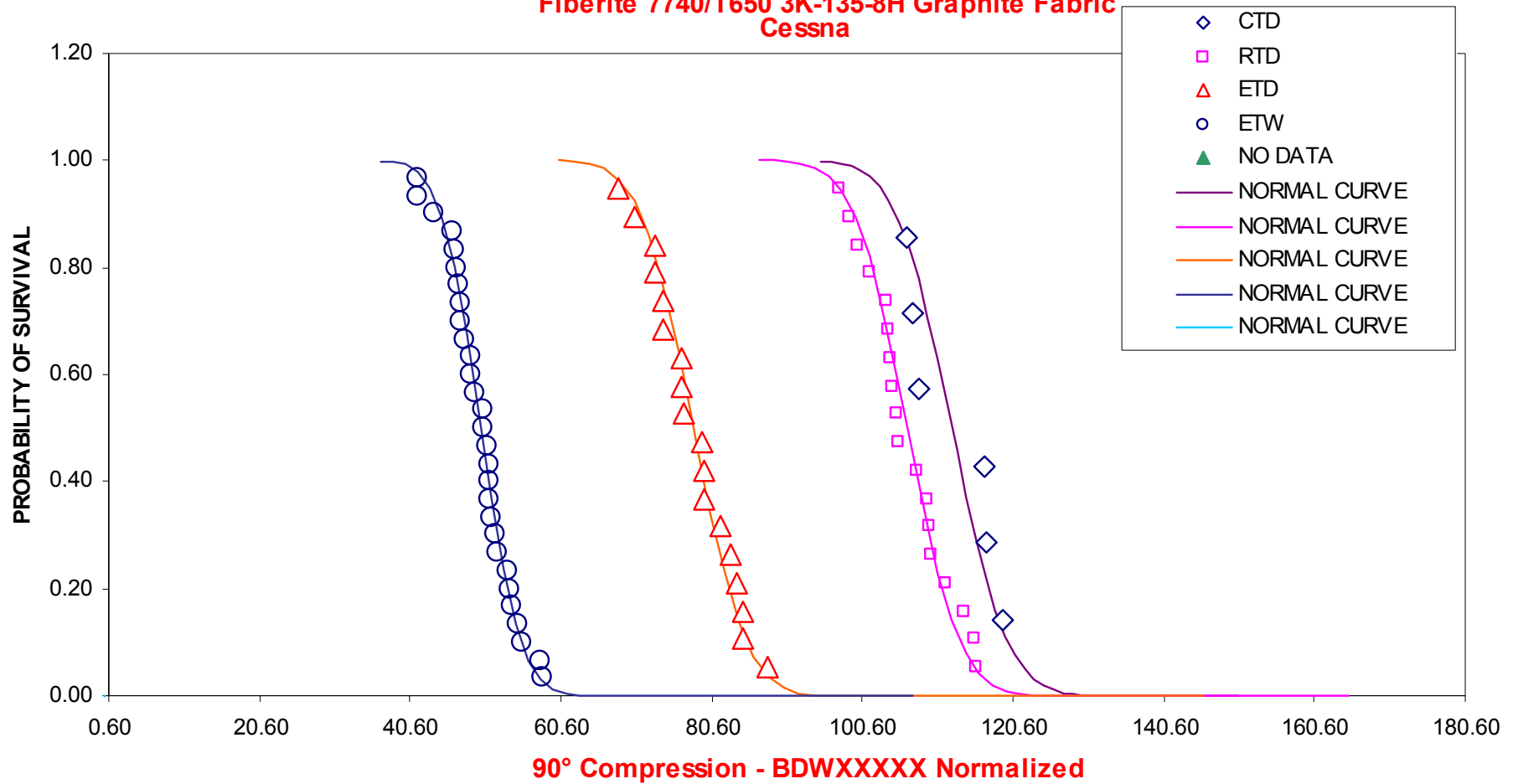
DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
 Cessna**



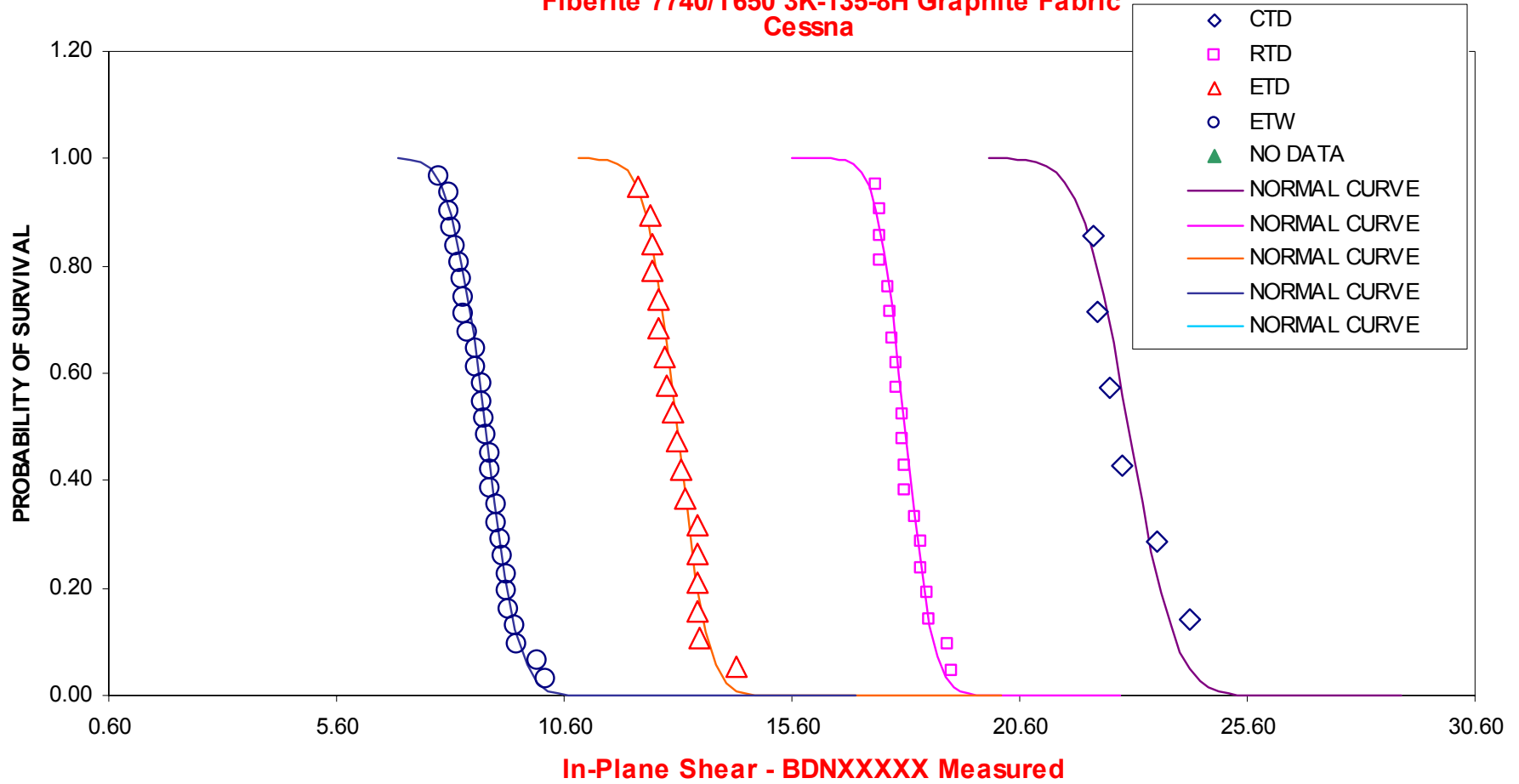
DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
 Cessna**



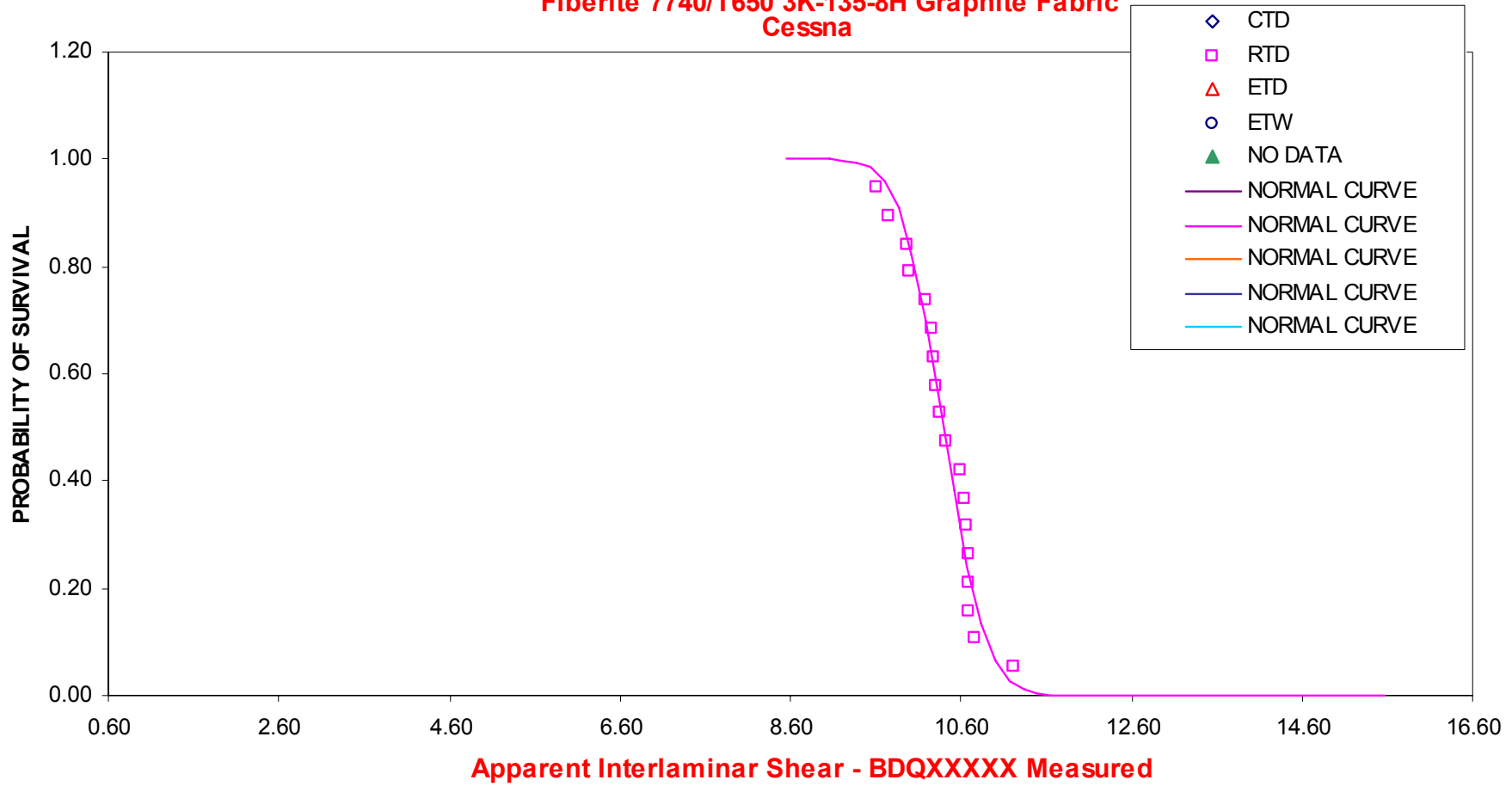
DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
Cessna**



DISTRIBUTION OF GROUPED DATA FOR DIFFERENT TEST CONDITIONS

**Fiberite 7740/T650 3K-135-8H Graphite Fabric
 Cessna**



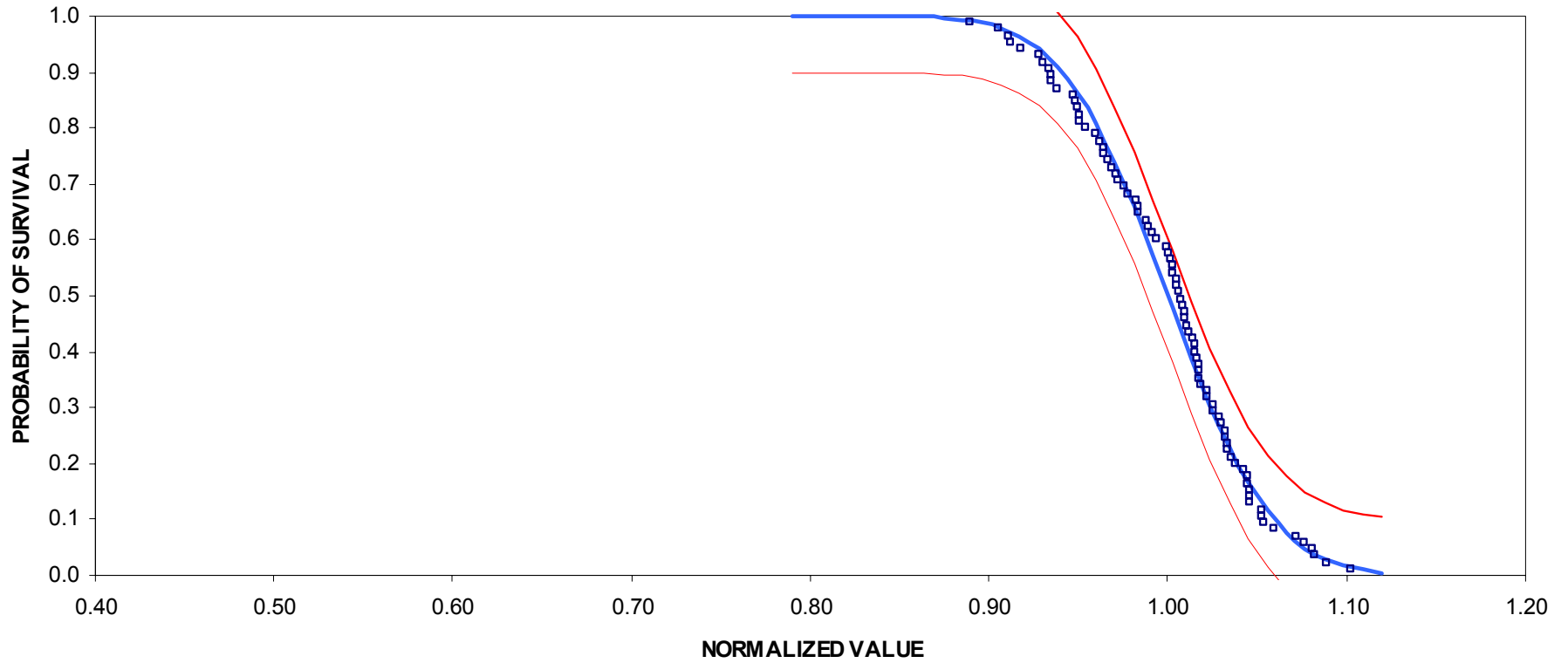
3.3.2 Plot of Pooled Data

DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric

Cessna

0° Tension - BDJXXXXX Measured

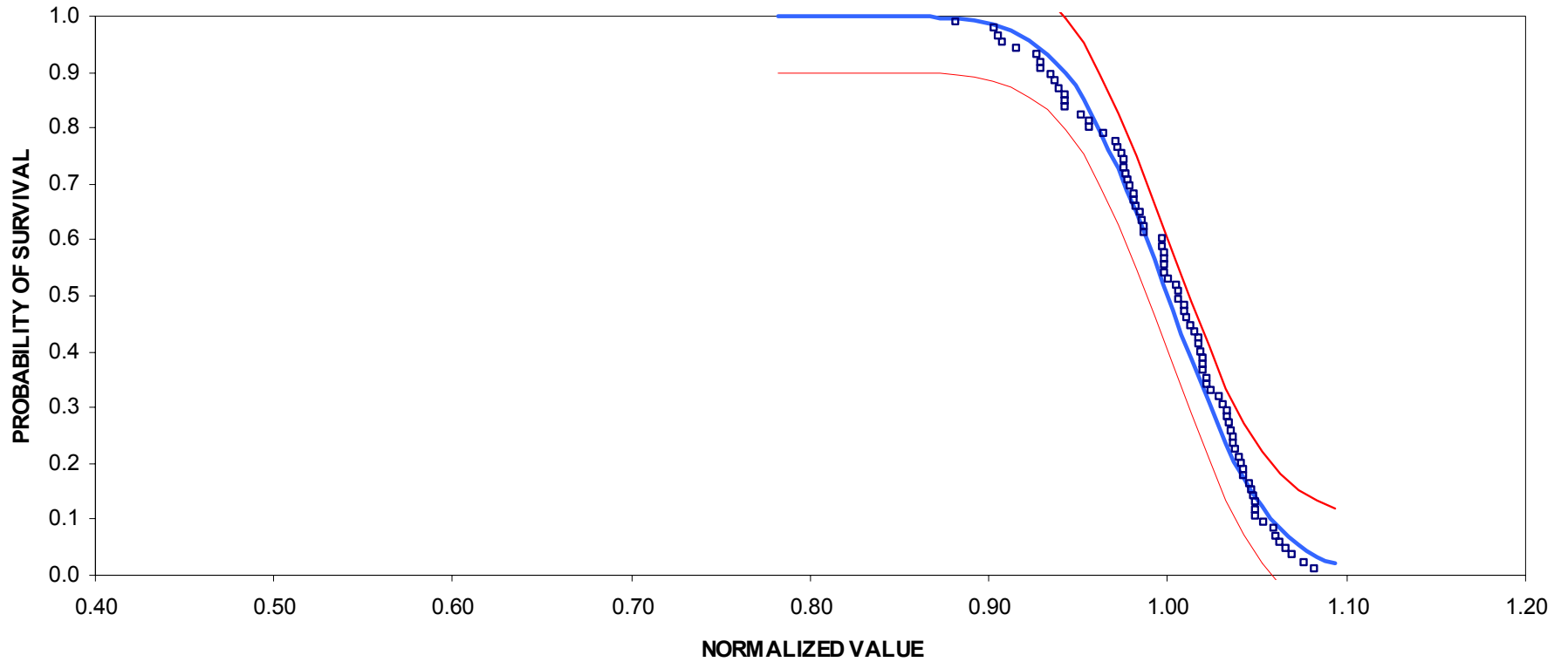


DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric

Cessna

0° Tension - BDJXXXXX Normalized

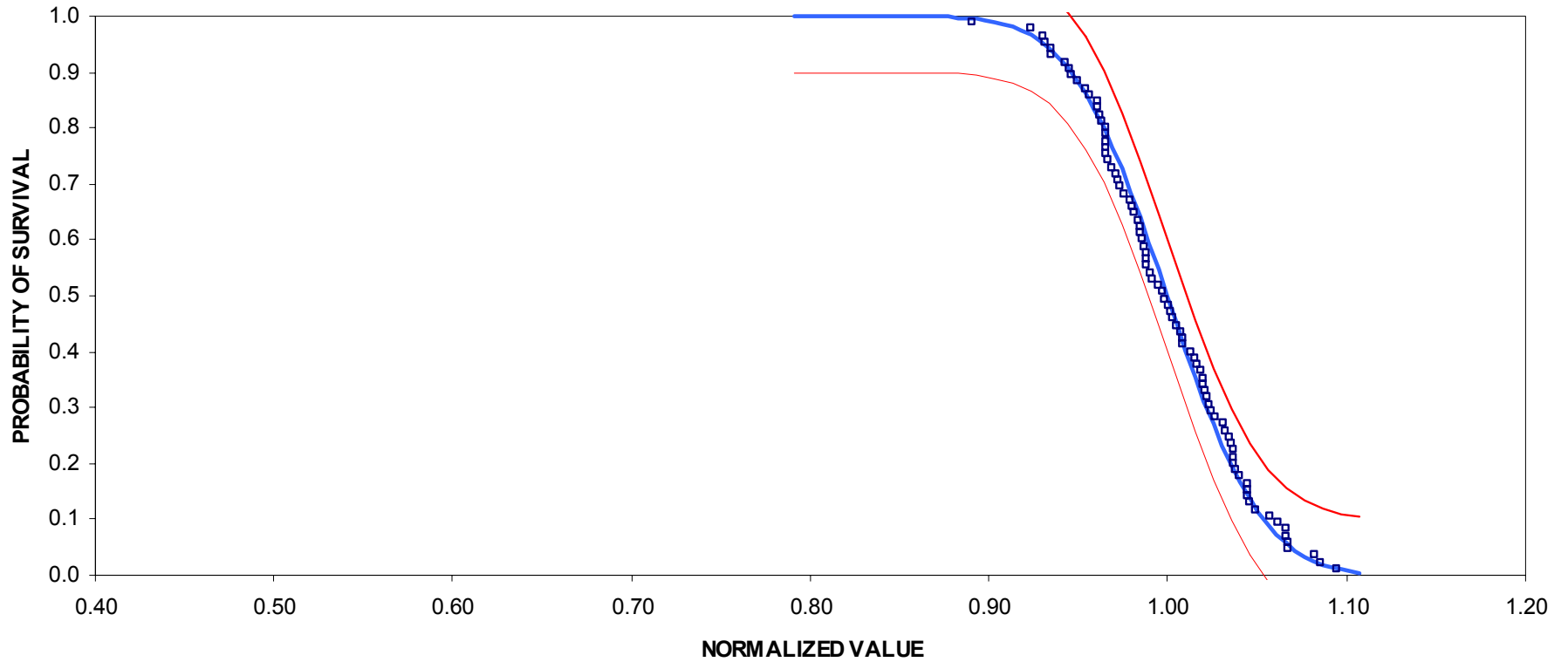


DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric

Cessna

90° Tension - BDUXXXX Measured

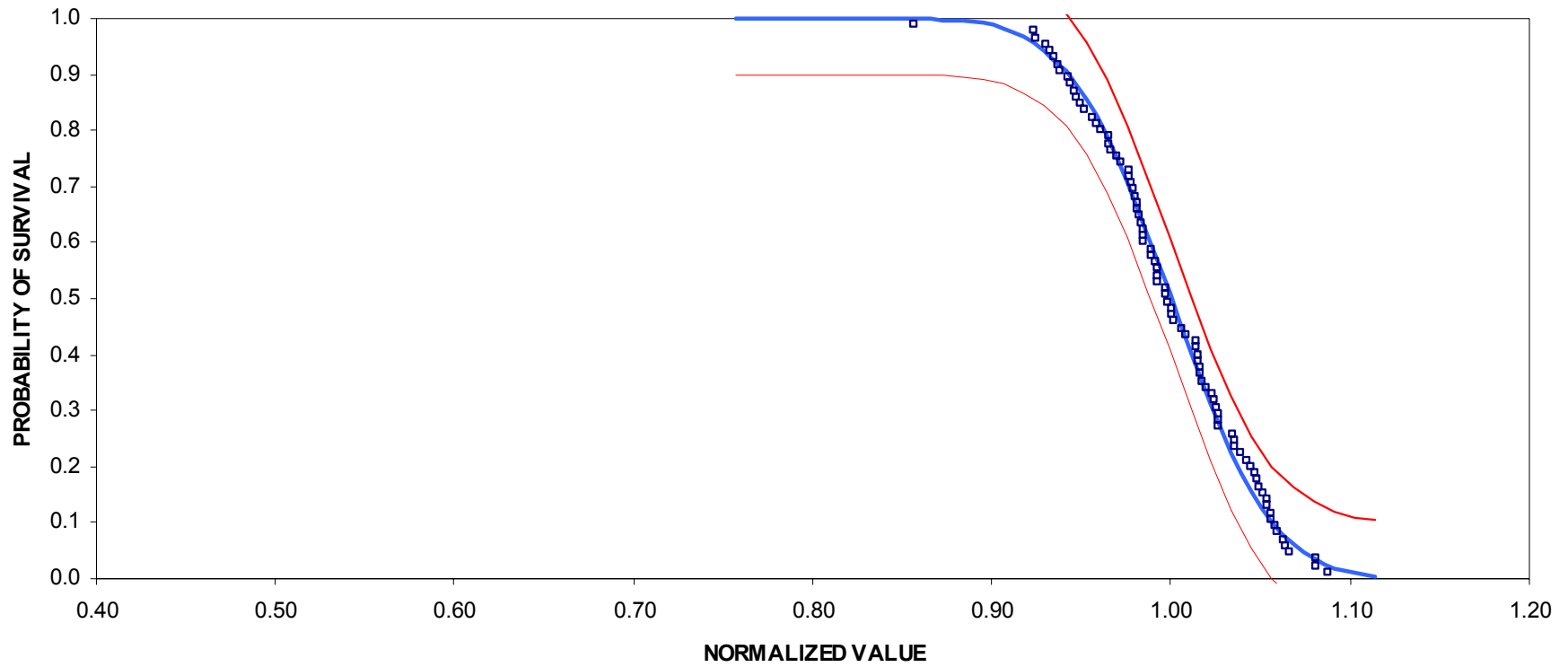


DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric

Cessna

90° Tension - BDUXXXX Normalized

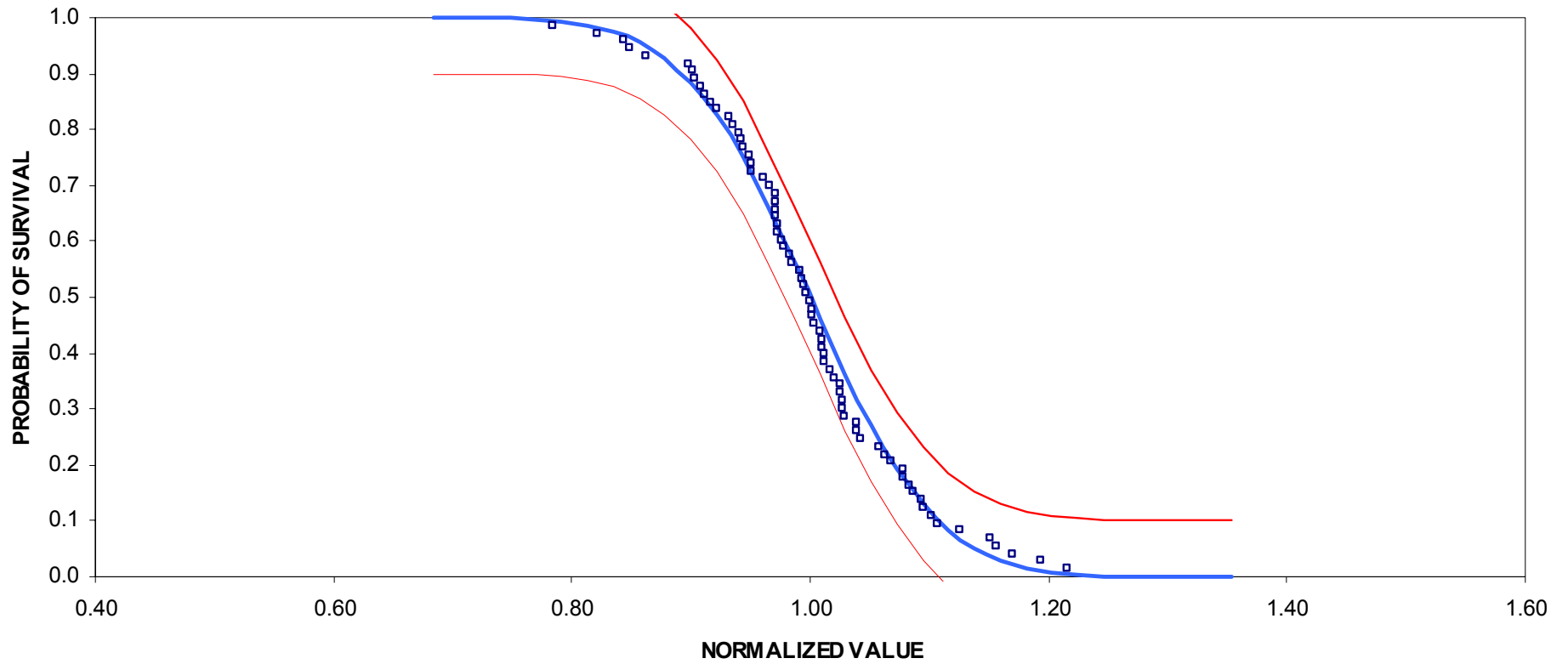


DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric

Cessna

0° Compression - BDKXXXXX Measured

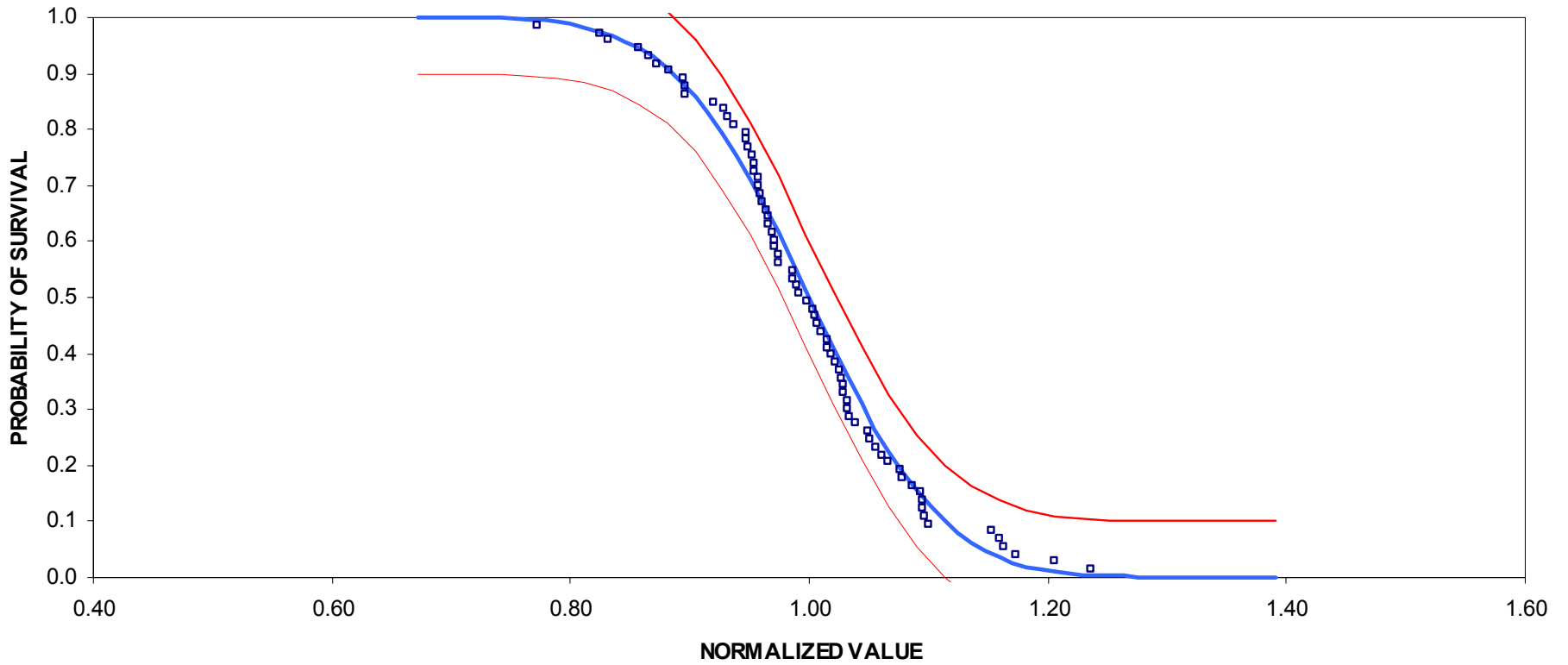


DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric

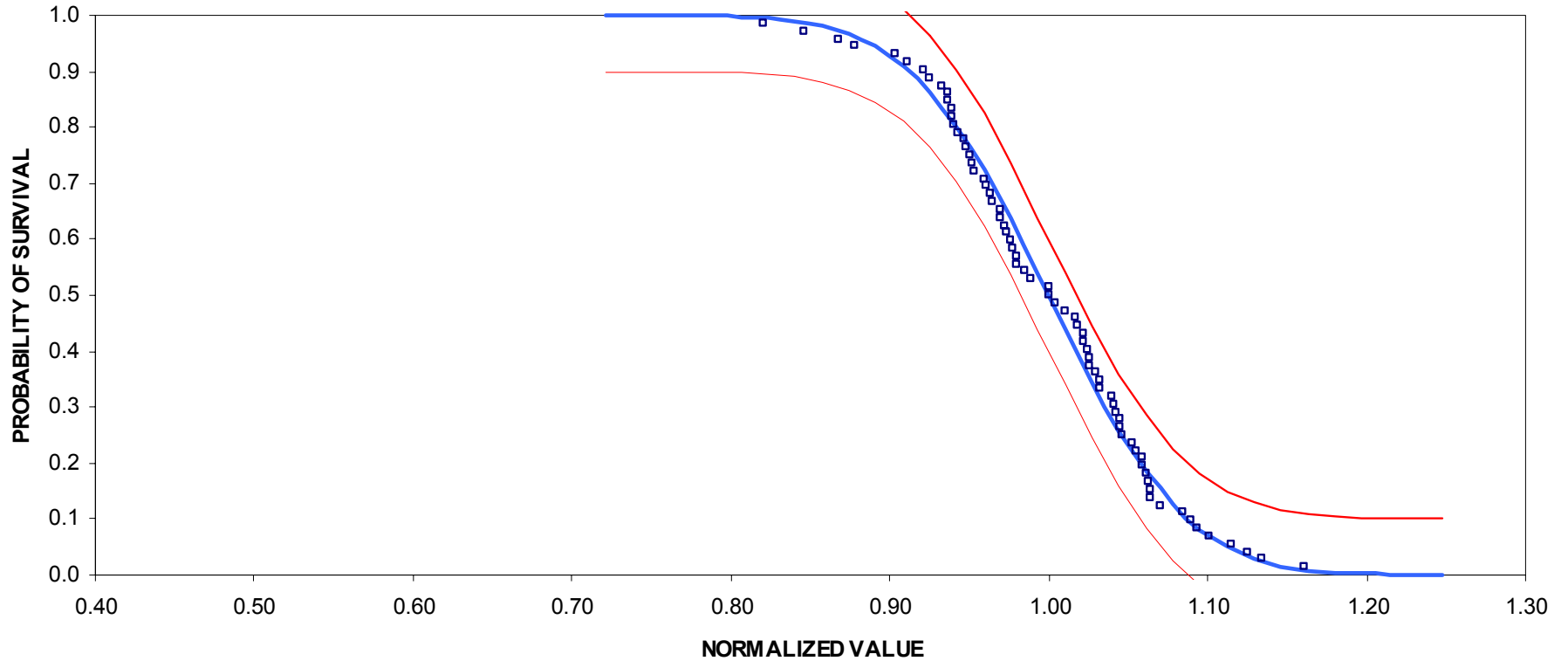
Cessna

0° Compression - BDKXXXXX Normalized



DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric
Cessna
90° Compression - BDWXXXX Measured

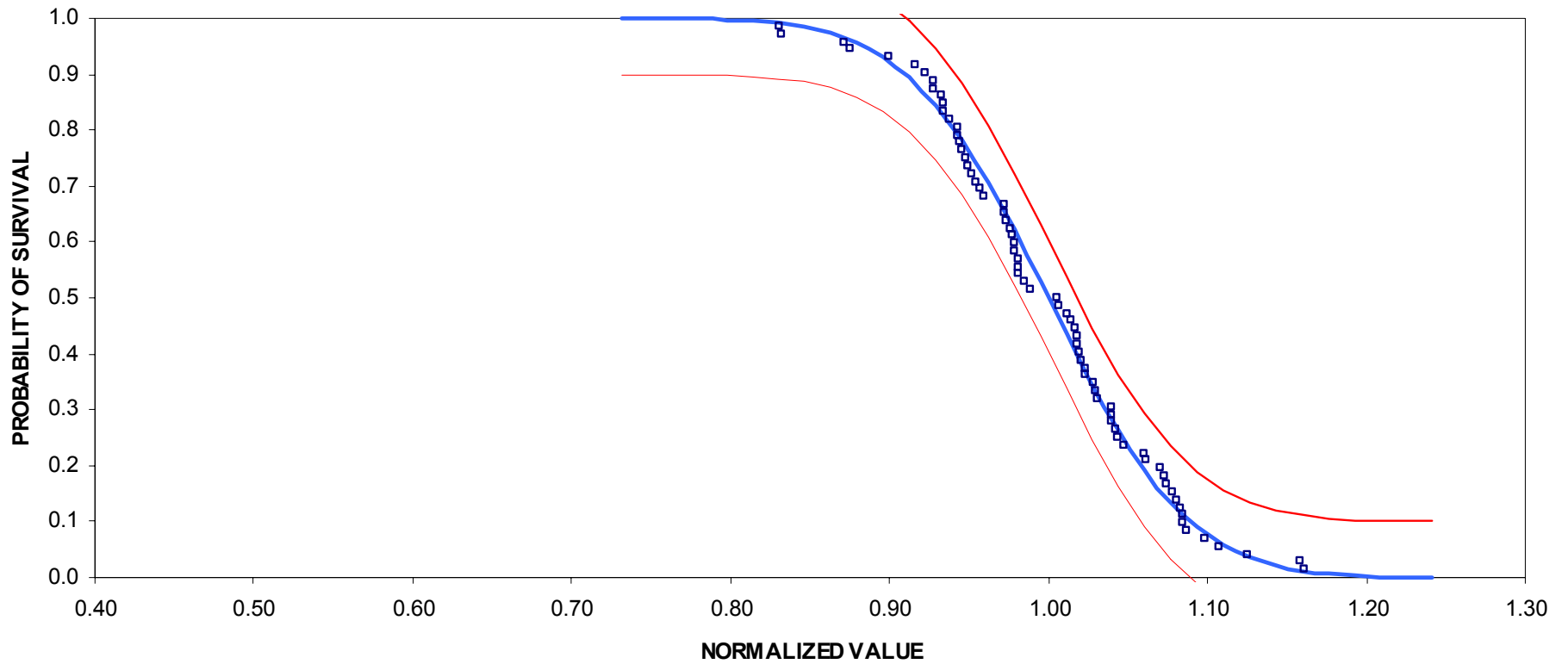


DISTRIBUTION OF POOLED DATA

Fiberite 7740/T650 3K-135-8H Graphite Fabric

Cessna

90° Compression - BDWXXXXX Normalized

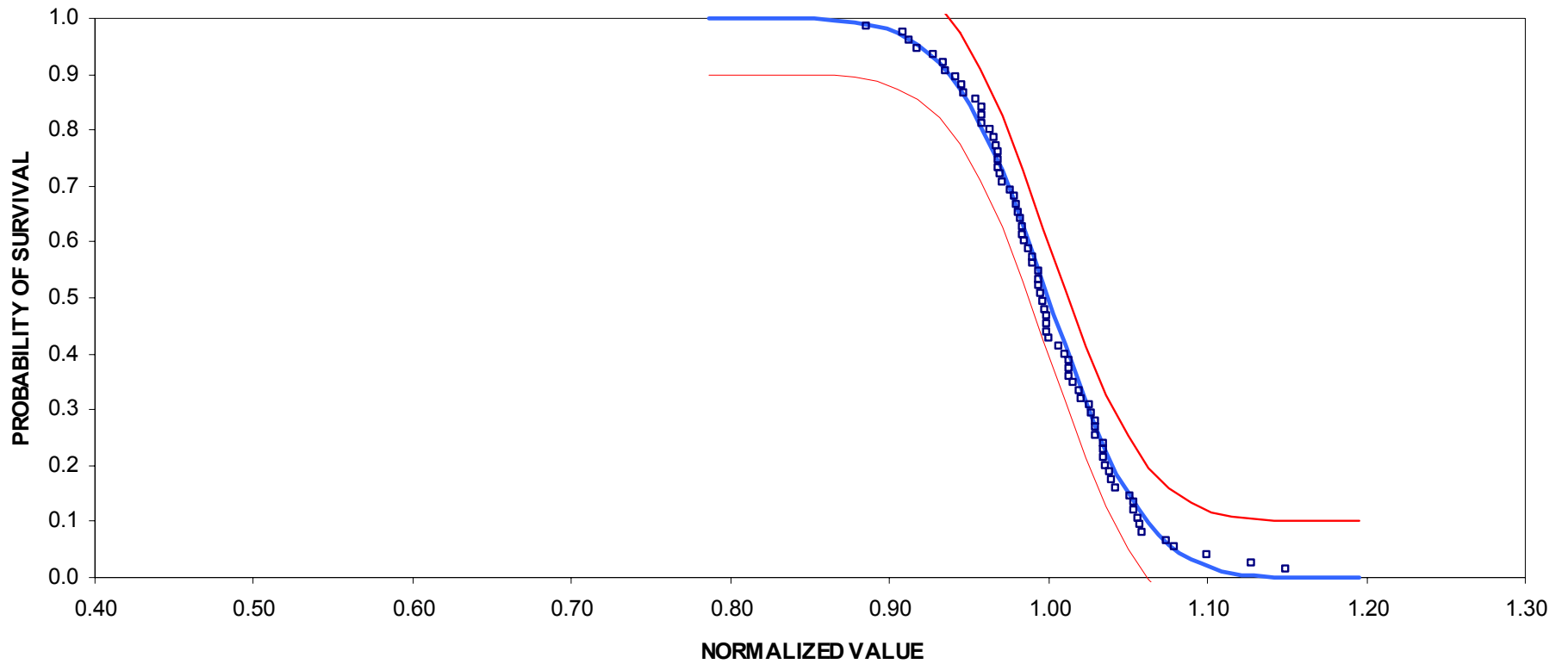


DISTRIBUTION OF POOLED DATA

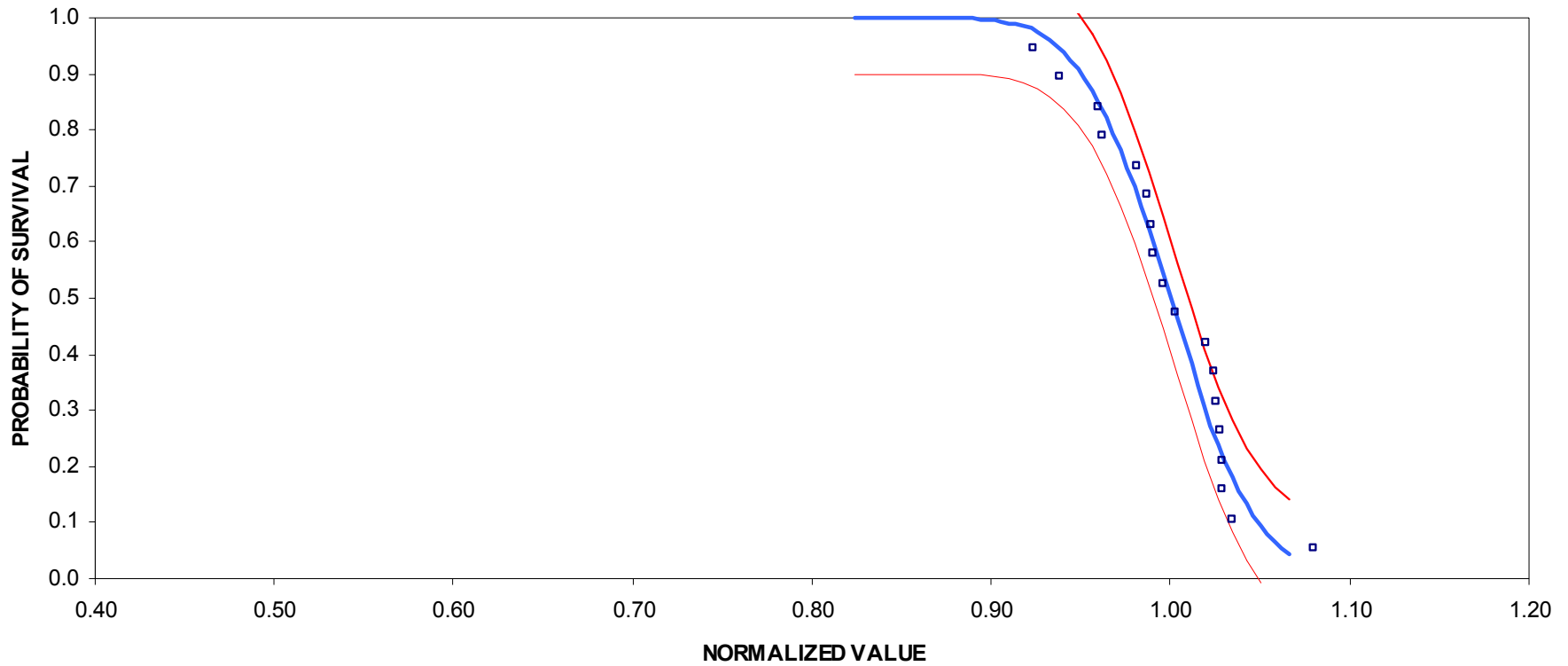
Fiberite 7740/T650 3K-135-8H Graphite Fabric

Cessna

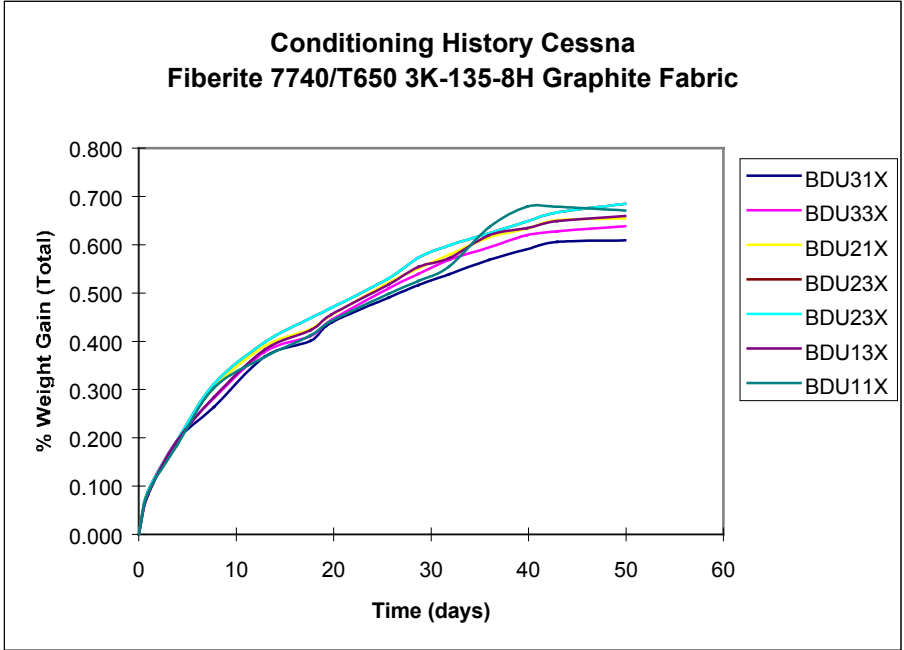
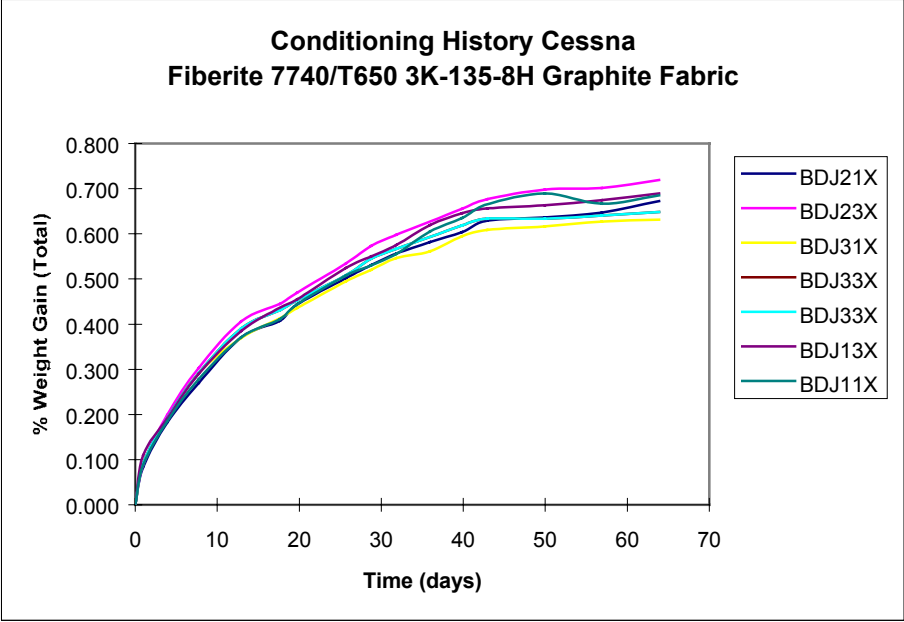
In-Plane Shear - BDNXXXXX Measured

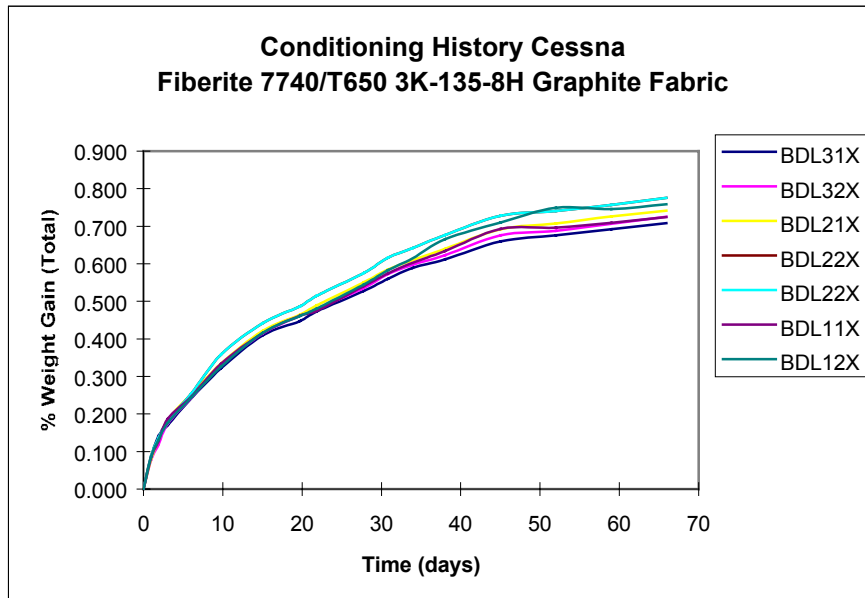
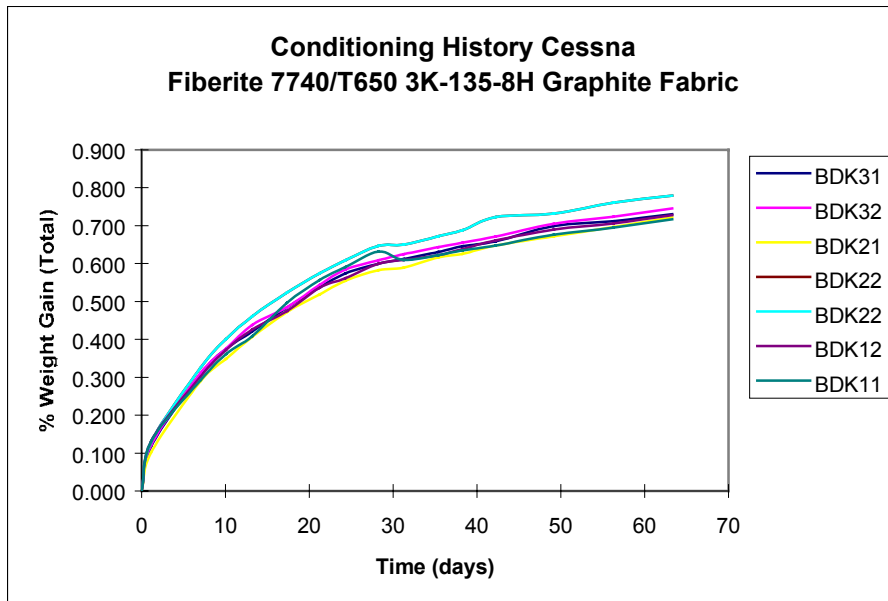


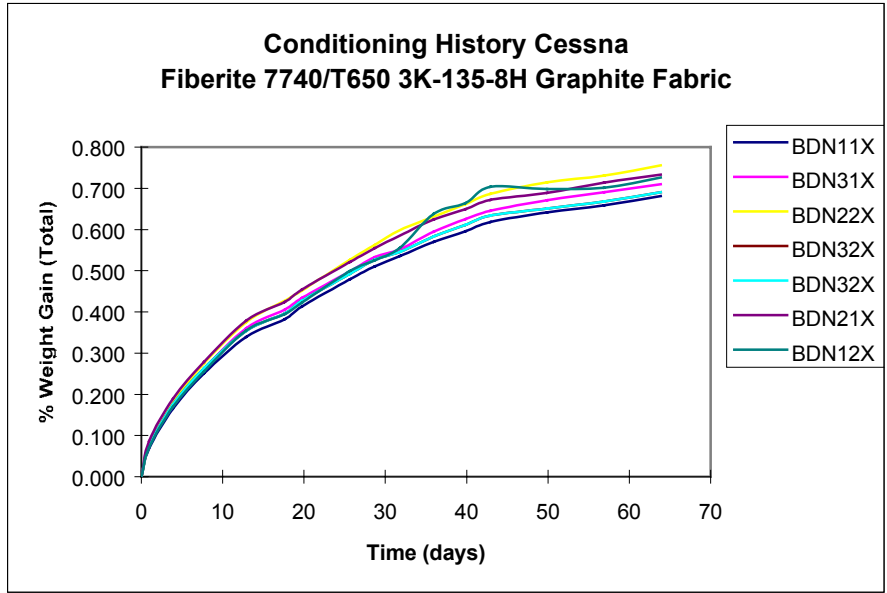
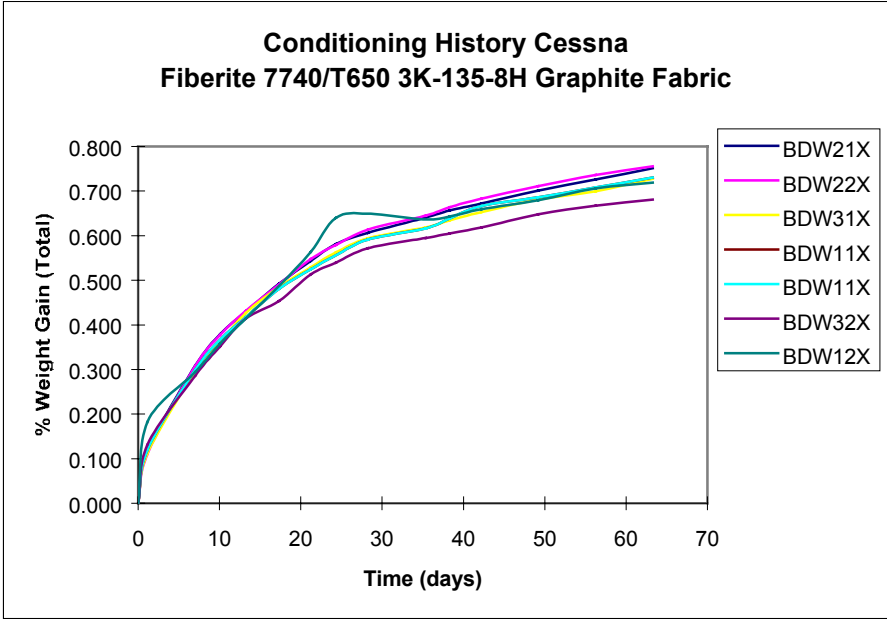
DISTRIBUTION OF POOLED DATA
Fiberite 7740/T650 3K-135-8H Graphite Fabric
Cessna
Apparent Interlaminar Shear - BDQXXXXX Measured

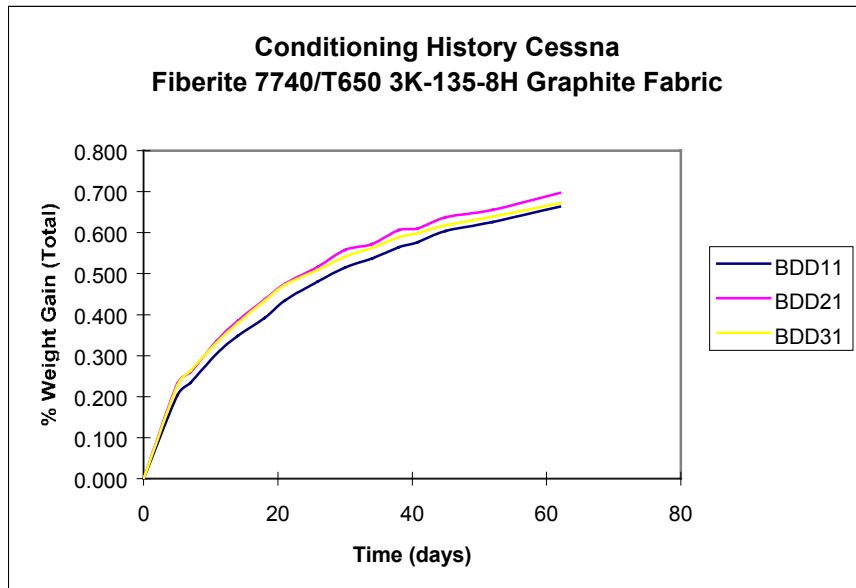
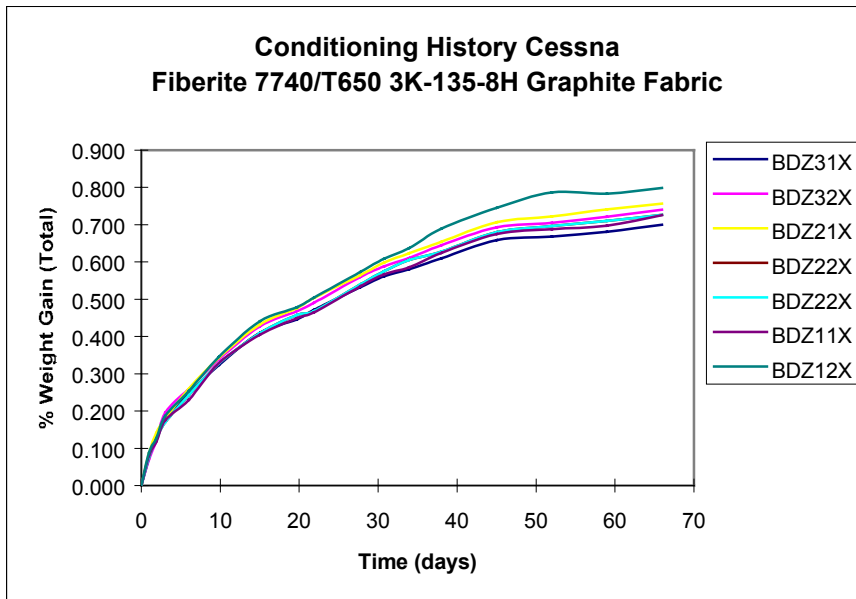


3.4 Moisture Conditioning History Charts









3.5 Physical Test Results

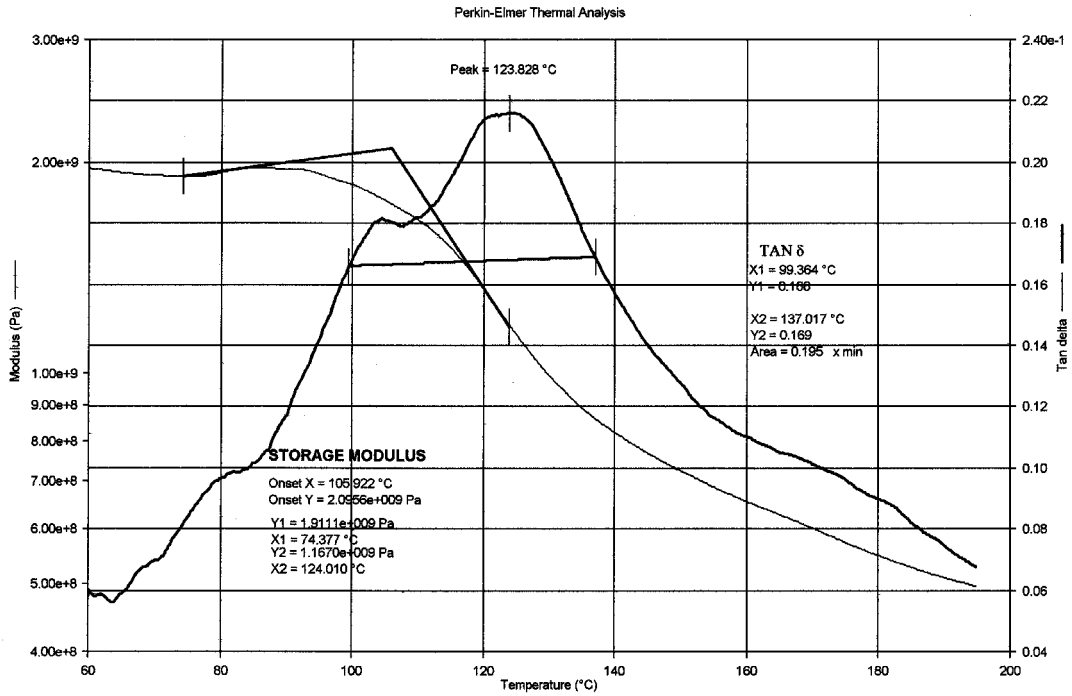
Physical Test Summary
Fiberite 7740/T650 3K-135-8H Graphite Fabric

	Composite Density [g/cc]	Resin Content [wt%]	Fiber Volume [vol%]	Void Content [vol%]
0° Tension (BDJXXXXX)				
No. of Specimens	12	12	12	12
Mean	1.528	34.139	56.712	2.203
Standard Deviation	0.007	1.755	1.553	0.720
90° Tension (BDUXXXXX)				
No. of Specimens	12	12	12	12
Mean	1.520	35.010	55.665	2.431
Standard Deviation	0.010	2.075	1.926	0.797
0° Compression (BDKXXXXX)				
No. of Specimens	7	7	7	7
Mean	1.516	35.345	55.227	2.581
Standard Deviation	0.011	2.656	2.372	1.079
90° Compression (BDWXXXXX)				
No. of Specimens	6	6	6	6
Mean	1.523	36.716	54.285	1.693
Standard Deviation	0.003	2.944	2.498	1.068
In-Plane Shear (BDNXXXXX)				
No. of Specimens	6	6	6	6
Mean	1.519	33.319	57.041	3.129
Standard Deviation	0.006	2.777	2.466	0.891
Interlaminar Shear (BDQXXXXX)				
No. of Specimens	3	3	3	3
Mean	1.520	37.047	53.916	1.736
Standard Deviation	0.006	0.825	0.612	0.585
Overall Summary				
Overall No. of Specimens	46	46	46	46
Overall Mean	1.522	34.969	55.757	2.344
Overall Std. Deviation	0.009	2.421	2.158	0.920

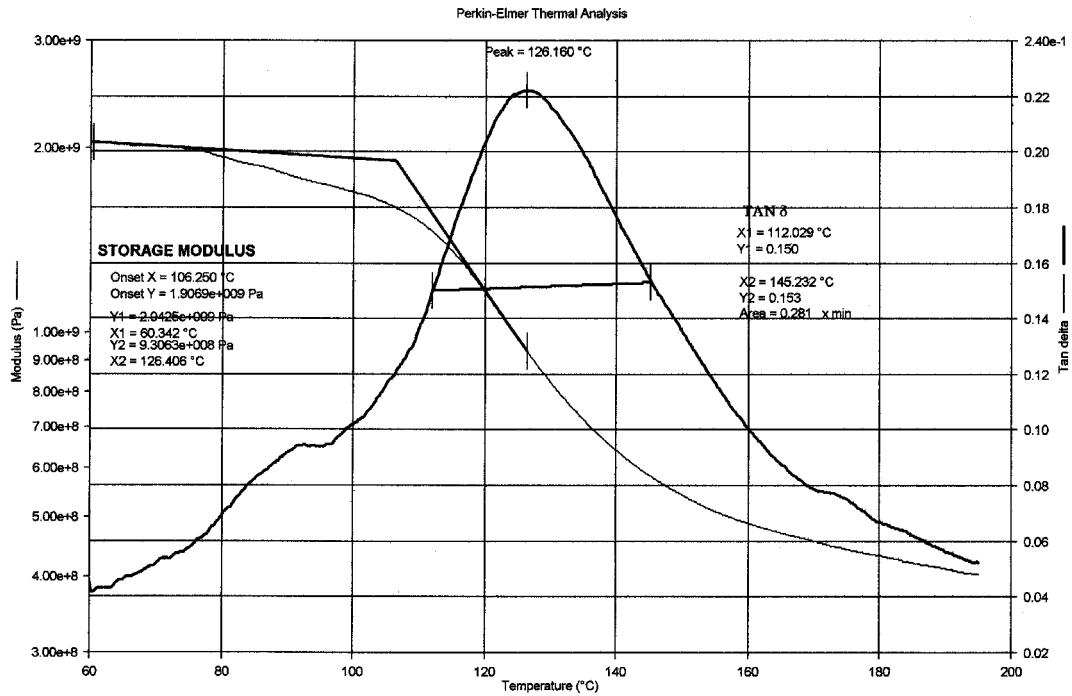
COMPANY : **Cessna**
 MATERIAL SYSTEM : **Fiberite 7740/T650 3K-135-8H Graphite Fabric**
 PROJECT : **980409C1**

DMA Results -- Onset Storage Modulus					
DRY			WET		
As Fabricated			Moisture Equilibrium at 85% RH		
Sample #	Tg [°C]	Tg [°F]	Sample #	Tg [°C]	Tg [°F]
BDD1X1FA	105.92	222.66	BDD1X1BC	82.63	180.73
BDD1X1GA	106.25	223.25	BDD1X1CC	83.63	182.53
BDD1X1HA	110.85	231.53	BDD1X1DC	87.36	189.26
BDD2X1GA	104.59	220.26	BDD2X1BC	81.91	179.44
BDD2X1HA	109.01	228.22	BDD2X1CC	84.72	184.50
BDD2X1IA	113.81	236.85	BDD2X1FC	84.57	184.23
BDD3X1FA	116.14	241.05	BDD3X1BC	83.97	183.14
BDD3X1GA	110.30	230.53	BDD3X1CC	82.97	181.34
BDD3X1HA	112.38	234.28	BDD3X1DC	84.32	183.77
Average [°F]		229.85	Average [°F]		183.22
Standard Dev. [°F]		6.96	Standard Dev. [°F]		2.82
Coeff. Of Var. [%]		3.03	Coeff. Of Var. [%]		1.54

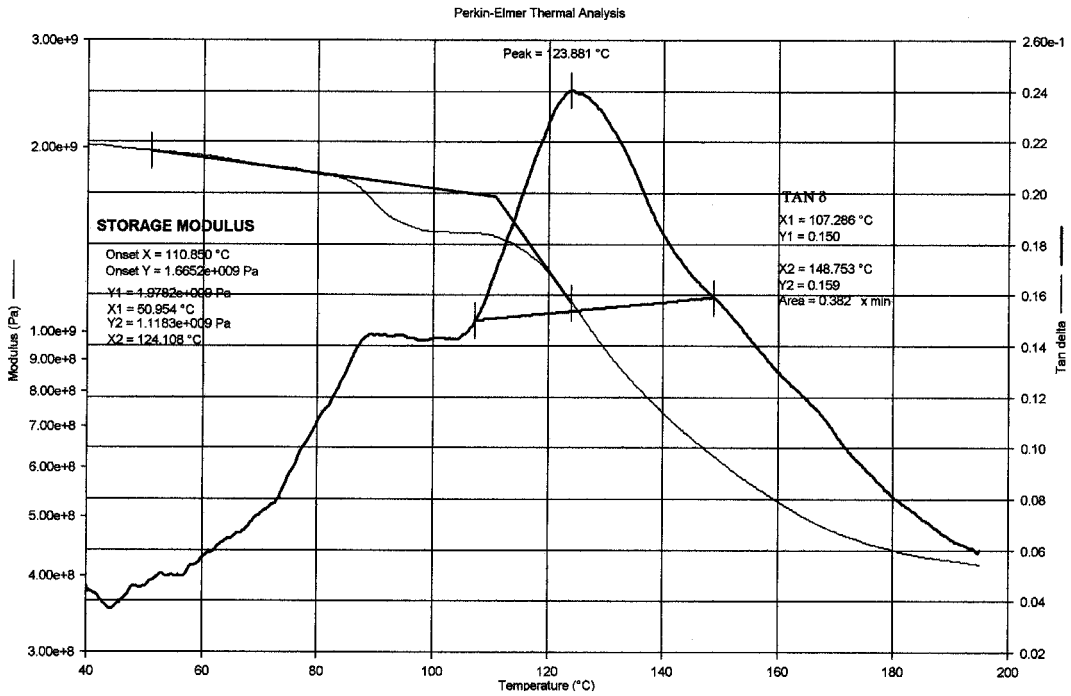
DMA Results - Peak Tan Delta					
DRY			WET		
As Fabricated			Moisture Equilibrium at 85% RH		
Sample #	Tg [°C]	Tg [°F]	Sample #	Tg [°C]	Tg [°F]
BDD1X1FA	123.83	254.89	BDD1X1BC	101.57	214.83
BDD1X1GA	126.16	259.09	BDD1X1CC	102.55	216.60
BDD1X1HA	123.88	254.99	BDD1X1DC	101.91	215.44
BDD2X1GA	122.94	253.29	BDD2X1BC	101.81	215.25
BDD2X1HA	124.26	255.68	BDD2X1CC	106.74	224.14
BDD2X1IA	125.37	257.67	BDD2X1FC	104.41	219.94
BDD3X1FA	126.39	259.49	BDD3X1BC	102.07	215.72
BDD3X1GA	124.64	256.36	BDD3X1CC	101.27	214.28
BDD3X1HA	124.93	256.87	BDD3X1DC	102.93	217.28
Average [°F]		256.48	Average [°F]		217.05
Standard Dev. [°F]		2.03	Standard Dev. [°F]		3.14
Coeff. Of Var. [%]		0.79	Coeff. Of Var. [%]		1.45



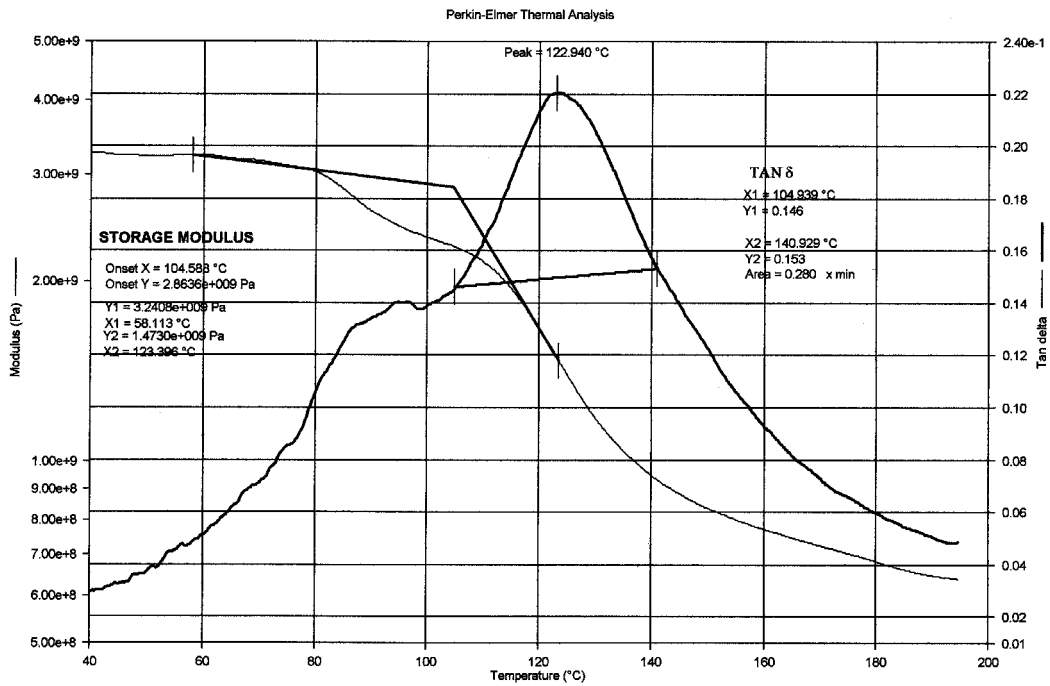
BDD1X1FA



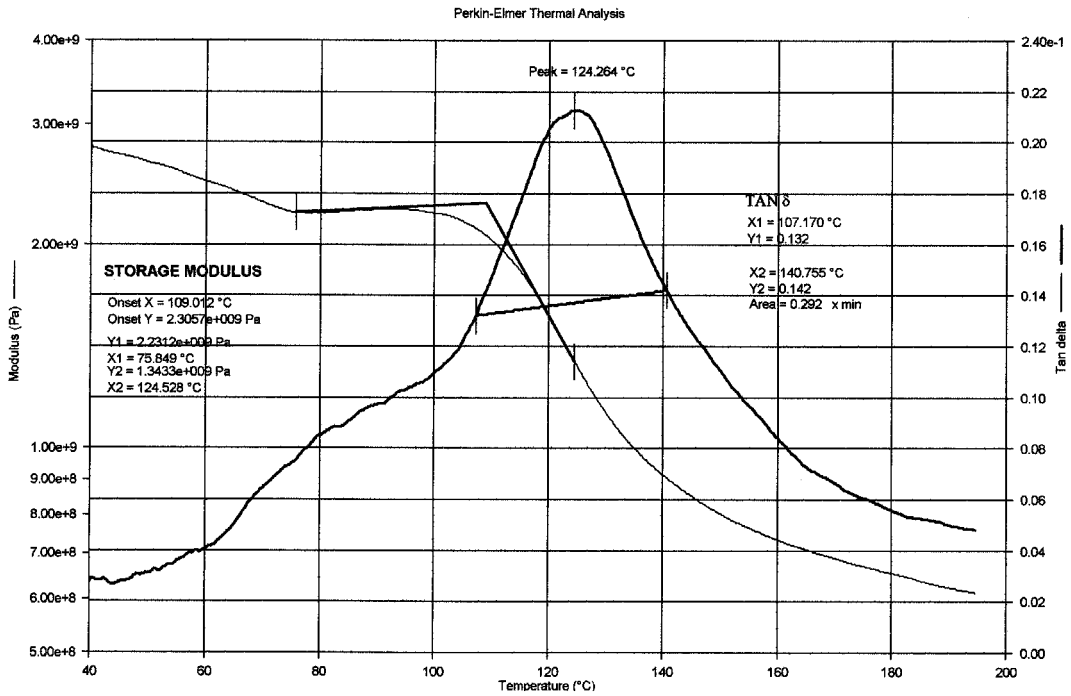
BDD1X1GA



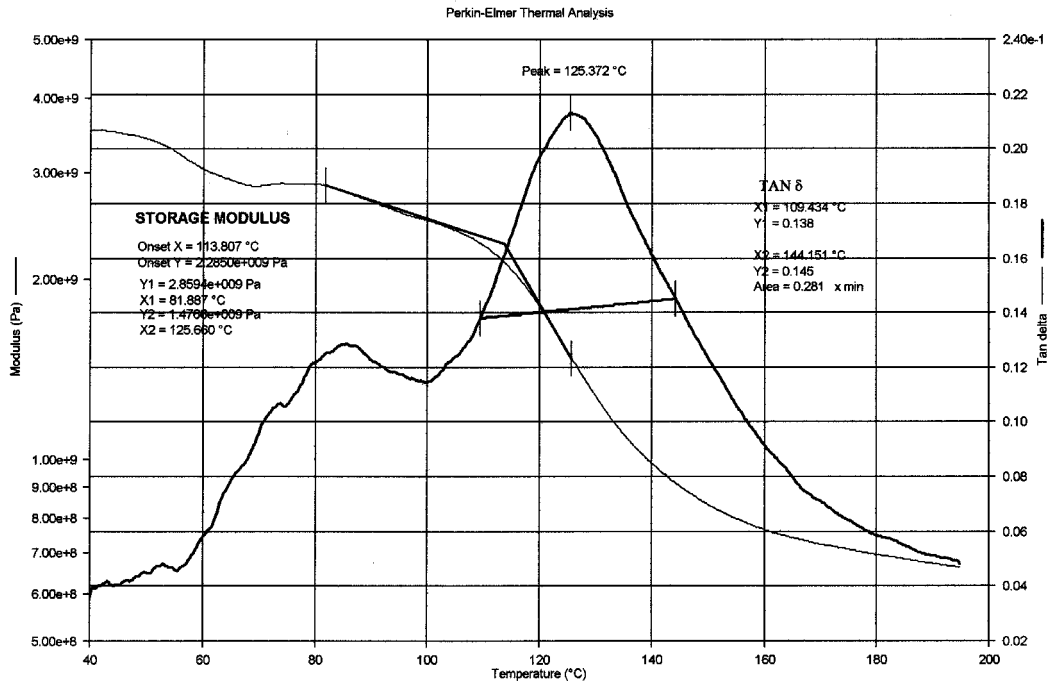
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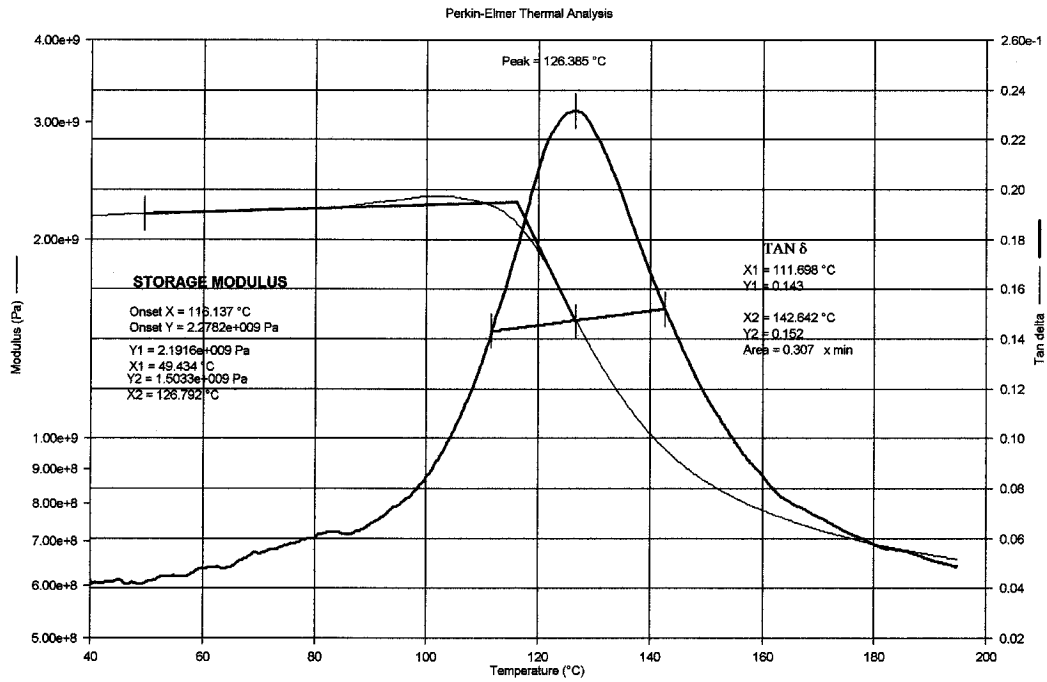
BDD2X1GA



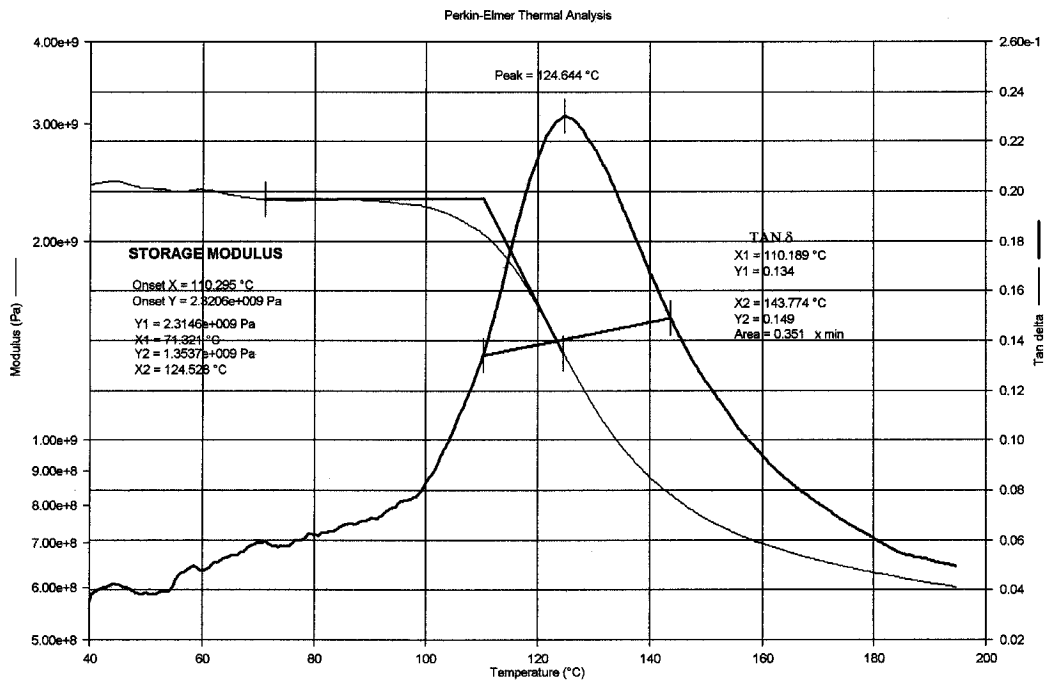
BDD2X1HA



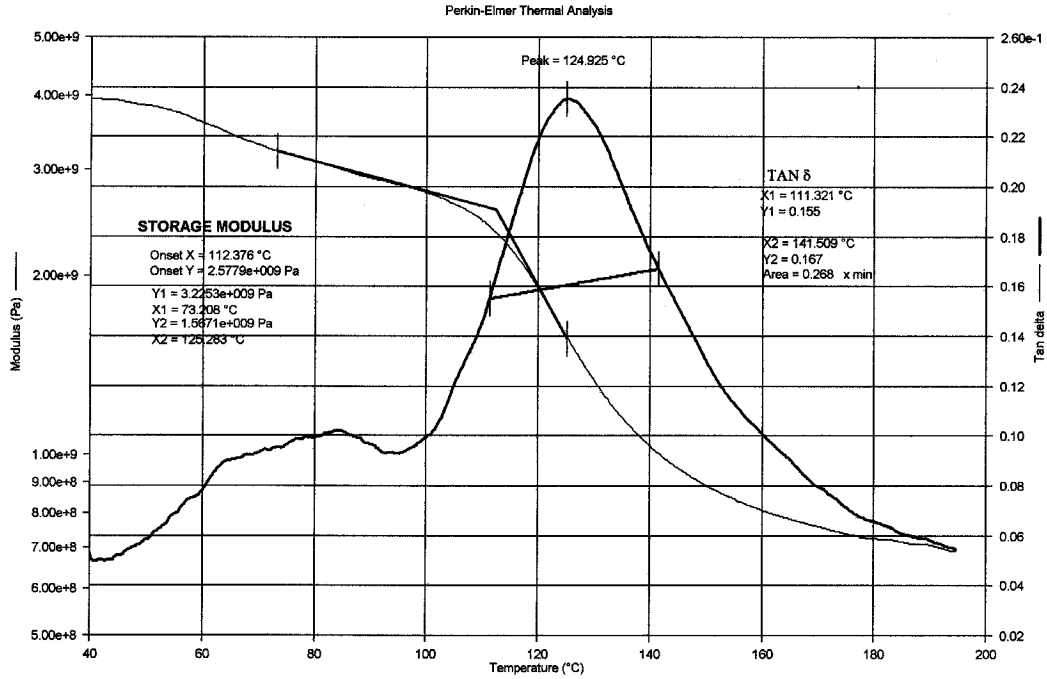
BDD2X1IA



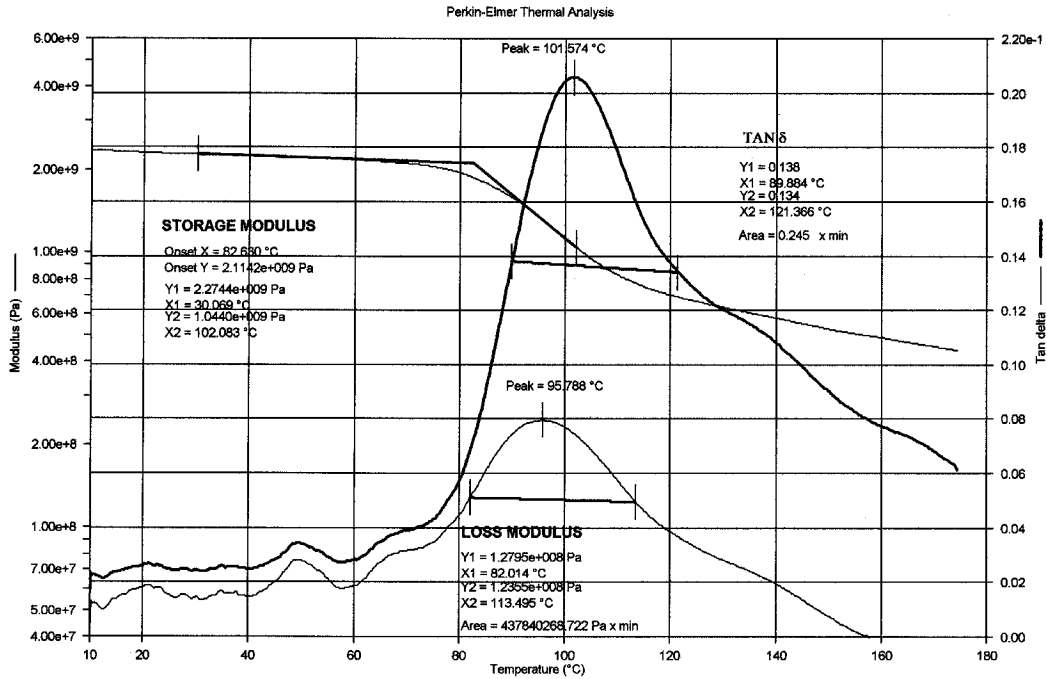
BDD3X1FA



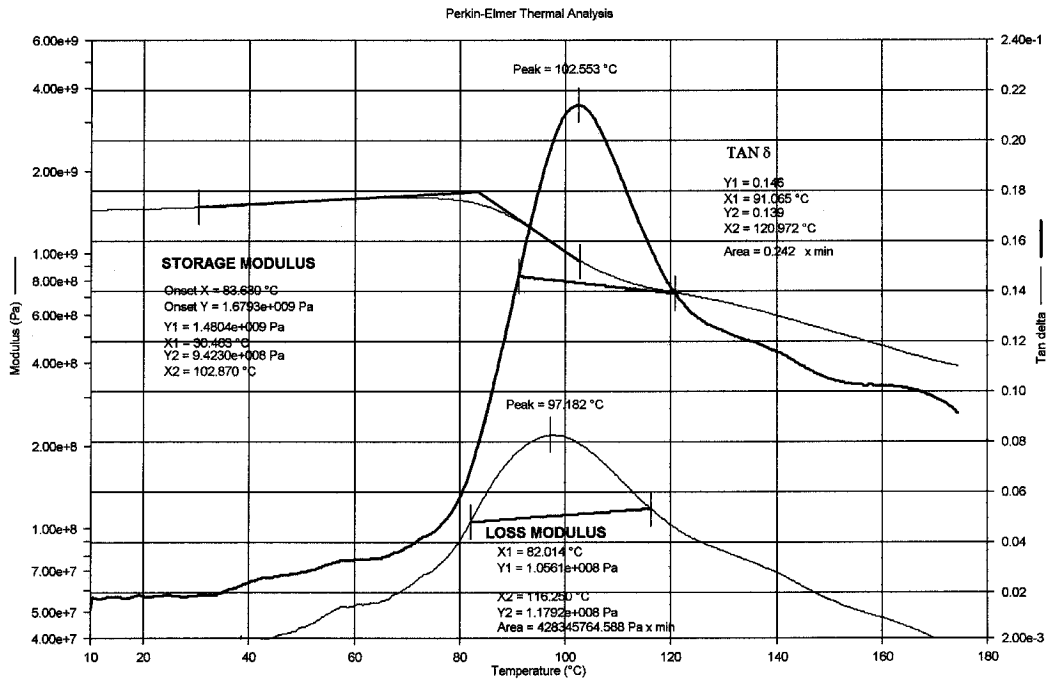
BDD3X1GA



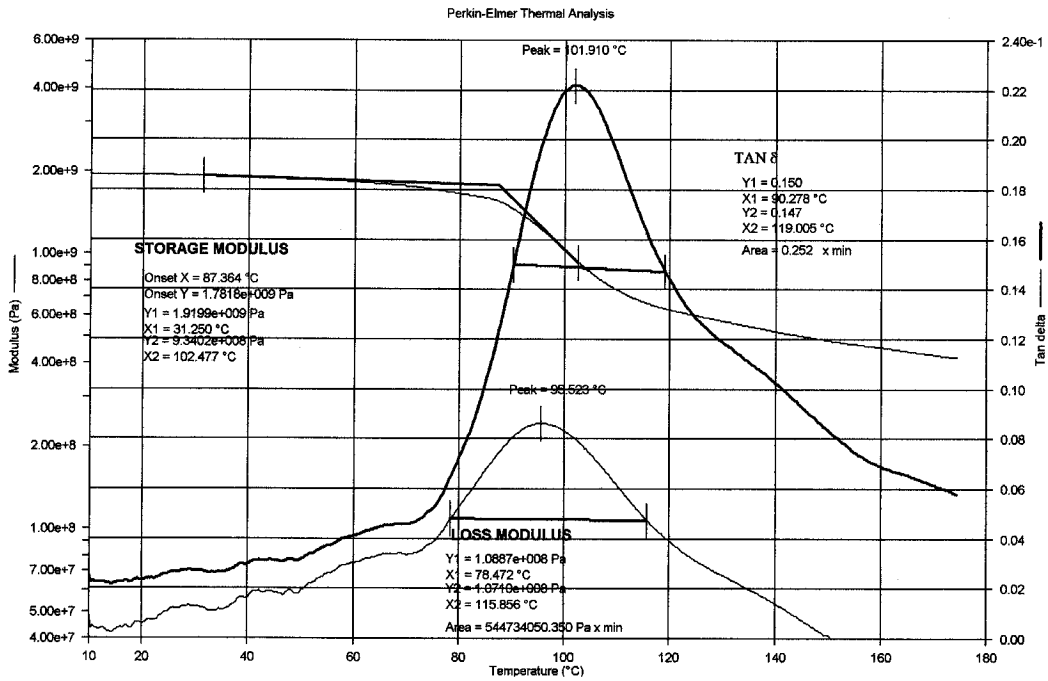
BDD3X1HA



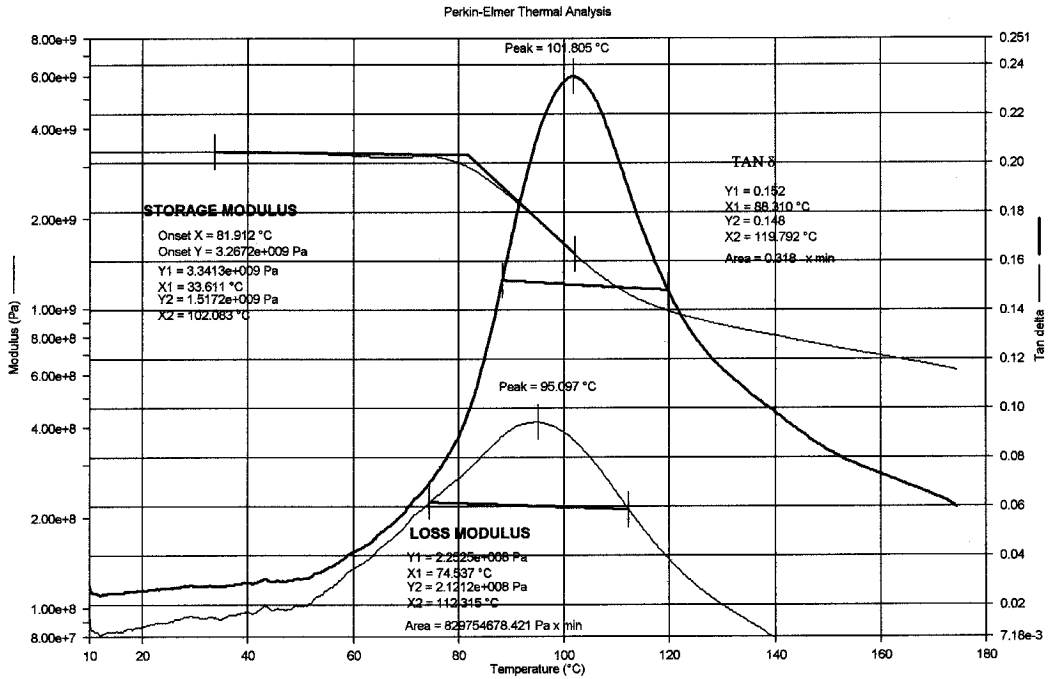
BDD1X1BC



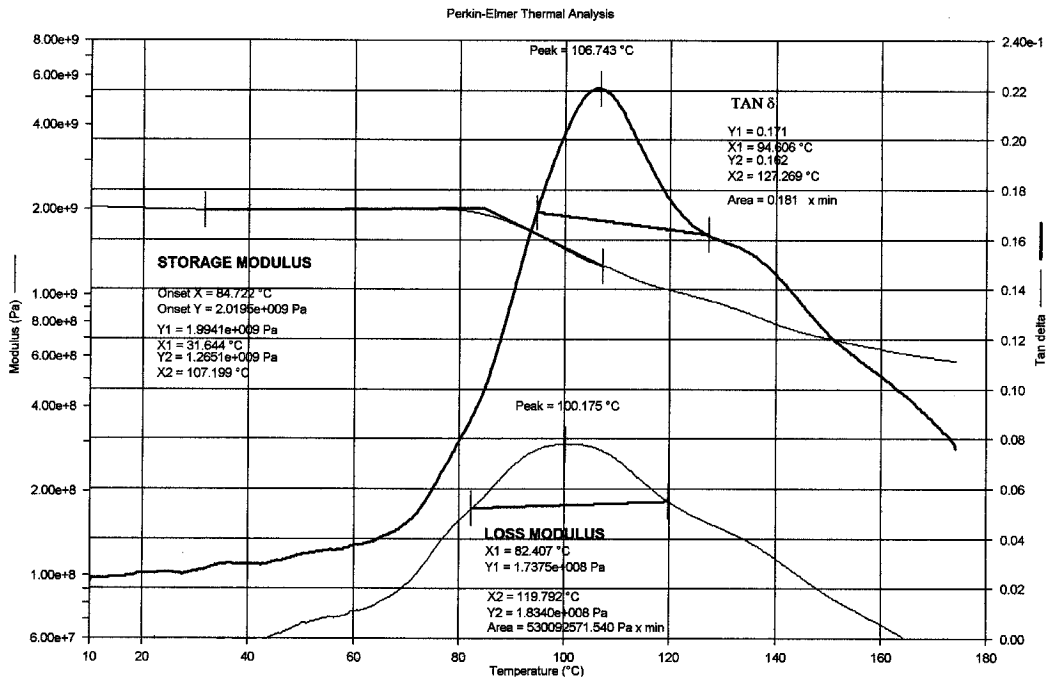
BDD1X1CC



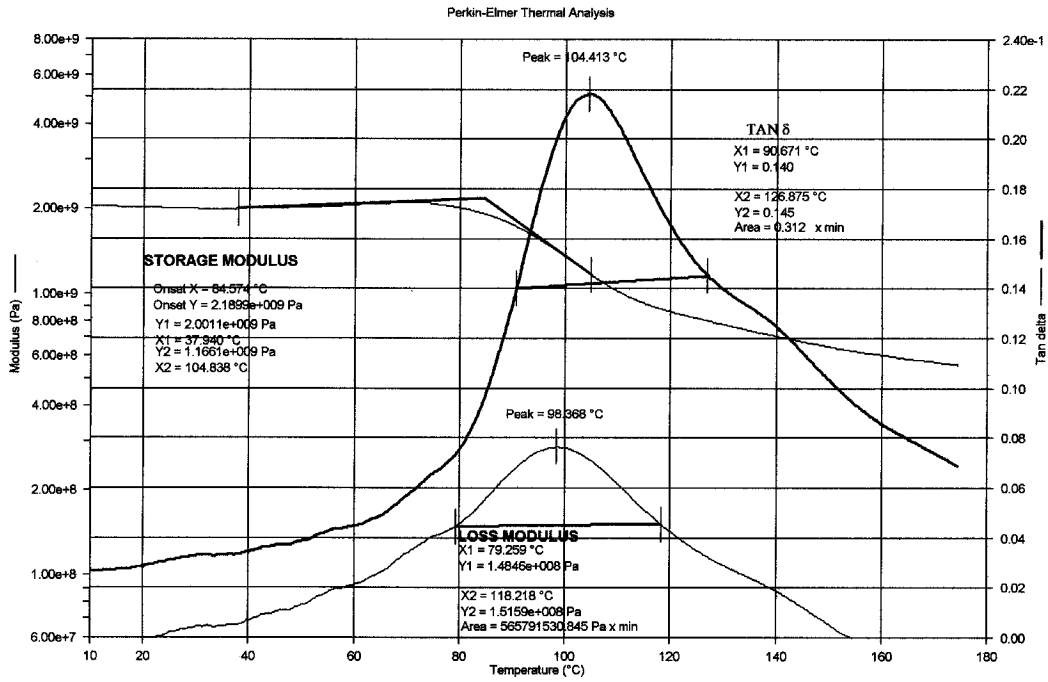
BDD1X1DC



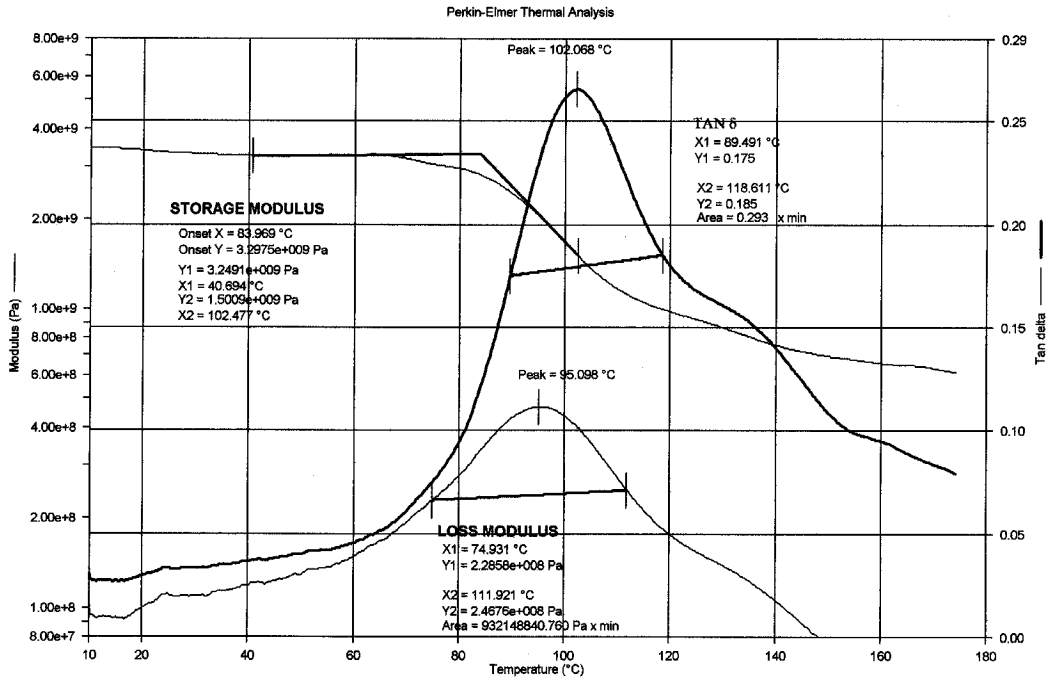
BDD2X1BC



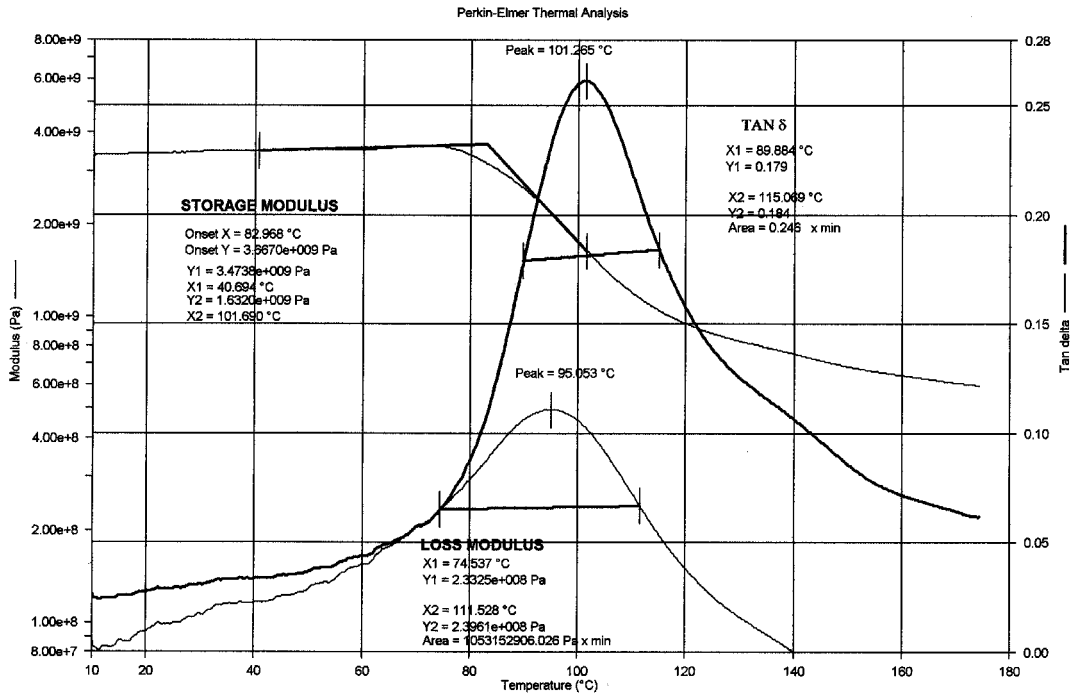
BDD2X1CC



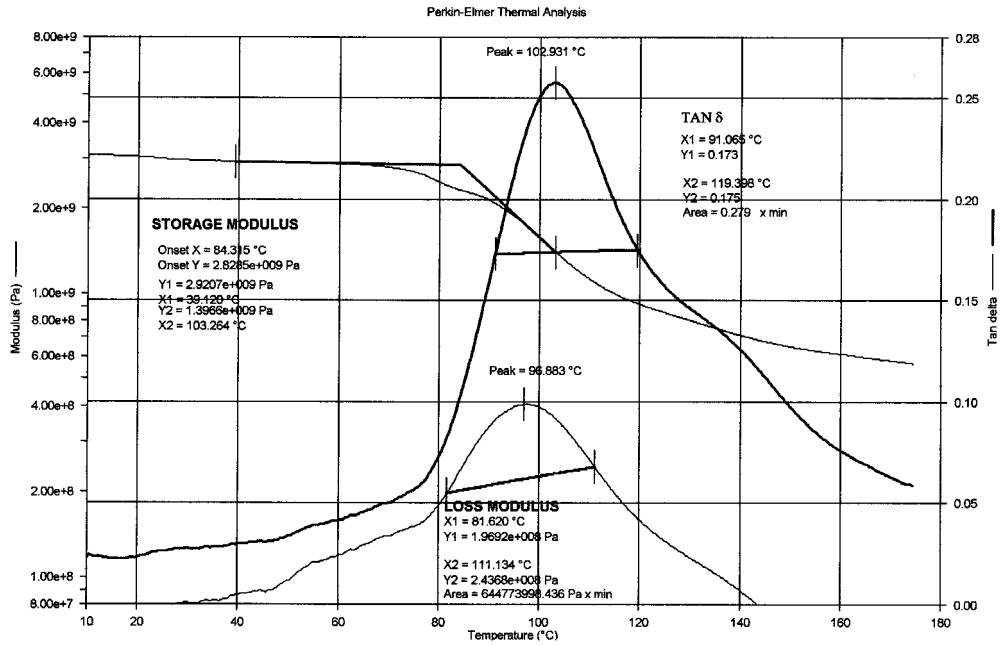
BDD2X1FC



BDD3X1BC



BDD3X1CC



BDD3X1DC

4.0 TESTING AND REPORTING COMMENTS

All tests were conformed under Designated Option Authority (DOA) by Cessna Aircraft Co. Inc.

APPENDIX A. PHYSICAL TEST DATA SUPPLIED BY MATERIAL VENDOR

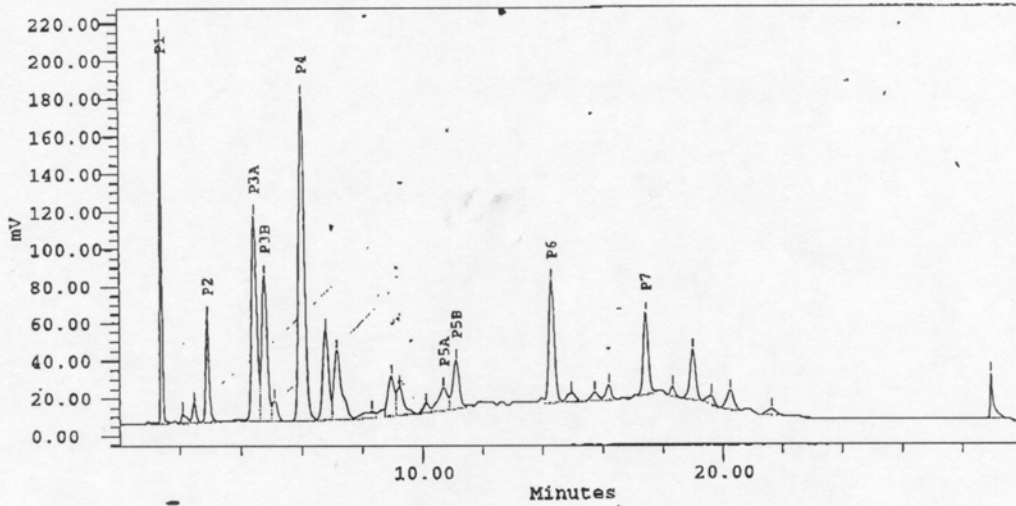
JUN. 3. 1998 4:39PM

FIBERITE INC. TEXAS 903 457 0590

NO. 1111 P. 14/43

FIBERITE INC.
 ANALYTICAL LABORATORY
 GREENVILLE, TEXAS

Project Name: SYSTEM1 Sample Type: Unknown
 Sample Name: 310601/1 Volume: 10.00
 Vial: 10 Run Time: 30.0 min
 Injection: 3 Date Processed: 11/05/97 06:13:20 AM
 Channel: SIM Ch1 Dilution: 1.00000
 Date Acquired: 11/05/97 05:42:14 AM Column_ID 206294
 Scale Factor: 1.00
 Acq Meth Set: H1METHODSET
 Processing Method: H1METHOD



Peak Results

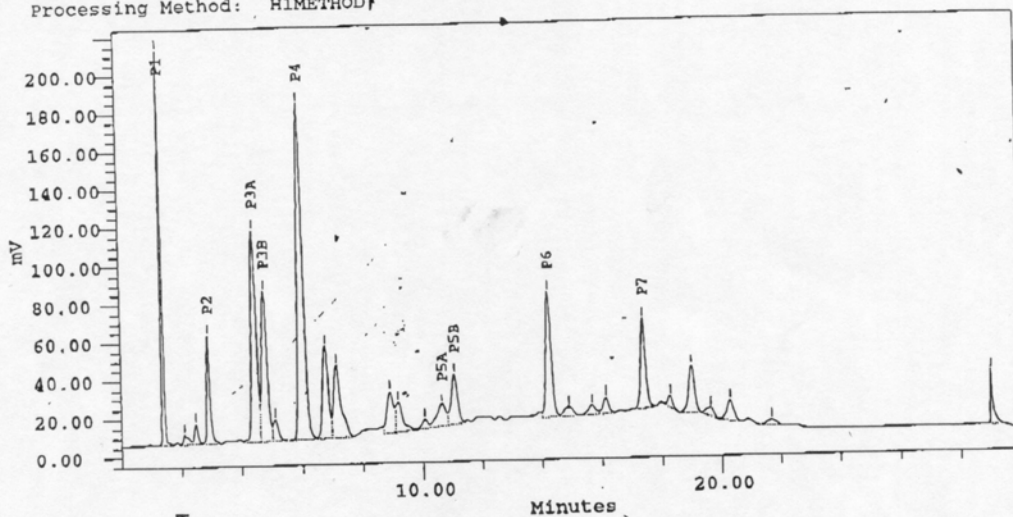
#	Name	Ret Time (min)	Area (uV*sec)	Height (uV)	% Area	arearatio
1	P1	1.400	836844	210797	7.43	0.366
2	P2	2.917	443736	56204	3.94	0.194
3	P3A	4.450	1276438	109837	11.33	0.559
4	P3 GROUP	4.783	2225956	188054	19.75	0.974
5	P3B	4.783	949517	78217	8.43	0.416
6	P4	6.017	2284683	173218	20.27	1.000
7	P5A	10.700	254406	11675	2.26	0.111
8	P5B	11.133	384660	25566	3.41	0.168
9	P5 GROUP	11.133	639066	37241	5.67	0.280
10	P6	14.317	828922	65975	7.36	0.363
11	P7	17.433	509225	43929	4.52	0.223



JUN. 3. 1998 4:39PM FIBERITE INC. TEXAS 303 437 0330

FIBERITE INC.
 ANALYTICAL LABORATORY
 GREENVILLE, TEXAS

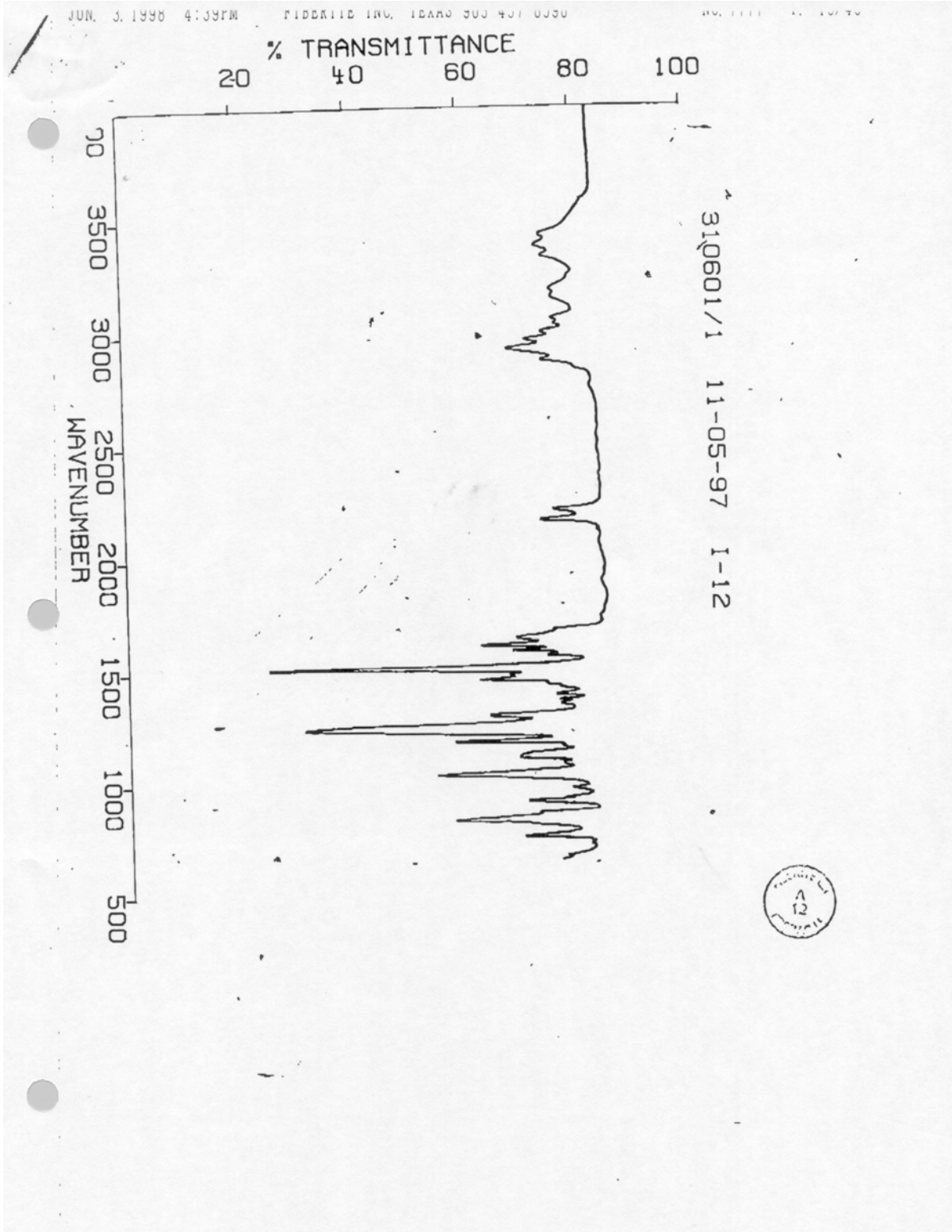
Project Name:	SYSTEM1	Sample Type:	Unknown
Sample Name:	310601/1	Volume:	10.00
Vial:	10	Run Time:	30.0 min
Injection:	2	Date Processed:	11/05/97 06:00:22 AM
Channel:	SIM Ch1	Dilution:	1.00000
Date Acquired:	11/05/97 05:11:00 AM	Column_ID	206294
Scale Factor:	1.00		
Acq Meth Set:	H1METHODSET		
Processing Method:	H1METHOD#		



Peak Results

#	Name	Ret Time (min)	Area (uV*sec)	Height (uV)	% Area	arearatio
1	P1	1.400	835800	207211	7.42	0.365
2	P2	2.917	454721	56649	4.04	0.199
3	P3A	4.467	1280698	110563	11.38	0.560
4	P3 GROUP	4.800	2254664	189407	20.03	0.986
5	P3B	4.800	973966	78844	8.65	0.426
6	P4	6.017	2287596	175971	20.32	1.000
7	P5A	10.650	249840	11705	2.22	0.109
8	P5 GROUP	11.083	635860	37366	5.65	0.278
9	P5B	11.083	386020	25661	3.43	0.169
10	P6	14.267	824669	65889	7.33	0.360
11	P7	17.400	551005	47560	4.89	0.241





JUN. 3. 1998 4:43PM

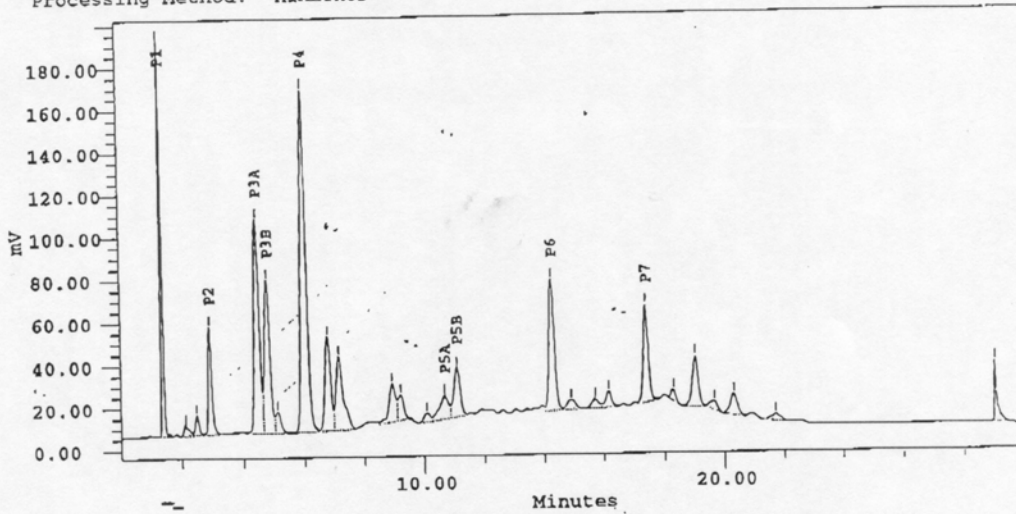
FIBERITE INC. TEXAS 903 401 0090

NO. 1111 1. 01/93

FIBERITE INC.
 ANALYTICAL LABORATORY
 GREENVILLE, TEXAS

Project Name: SYSTEM1
 Sample Name: 310602/1
 Vial: 11
 Injection: 2
 Channel: SIM Ch1
 Date Acquired: 11/05/97 06:45:02 AM
 Scale Factor: 1.00
 Acq Meth Set: H1METHODSET
 Processing Method: H1METHOD

Sample Type: Unknown
 Volume: 10.00
 Run Time: 30.0 min
 Date Processed: 11/05/97 07:16:02 AM
 Dilution: 1.00000
 Column_ID: 206294



Peak Results

#	Name	Ret Time (min)	Area (uV*sec)	Height (uV)	% Area	arearatio
1	P1	1.383	765930	185952	7.48	0.363
2	P2	2.917	404850	50735	3.95	0.192
3	P3A	4.483	1161716	100360	11.35	0.550
4	P3B	4.817	888381	71726	8.68	0.421
5	P3 GROUP	4.817	2050097	172086	20.02	0.971
6	P4	6.033	2110547	160687	20.61	1.000
7	P5A	10.683	230921	11096	2.26	0.109
8	P5 GROUP	11.100	579954	34627	5.66	0.275
9	P5B	11.100	349033	23531	3.41	0.165
10	P6	14.283	769075	61615	7.51	0.364
11	P7	17.417	517877	45455	5.06	0.245

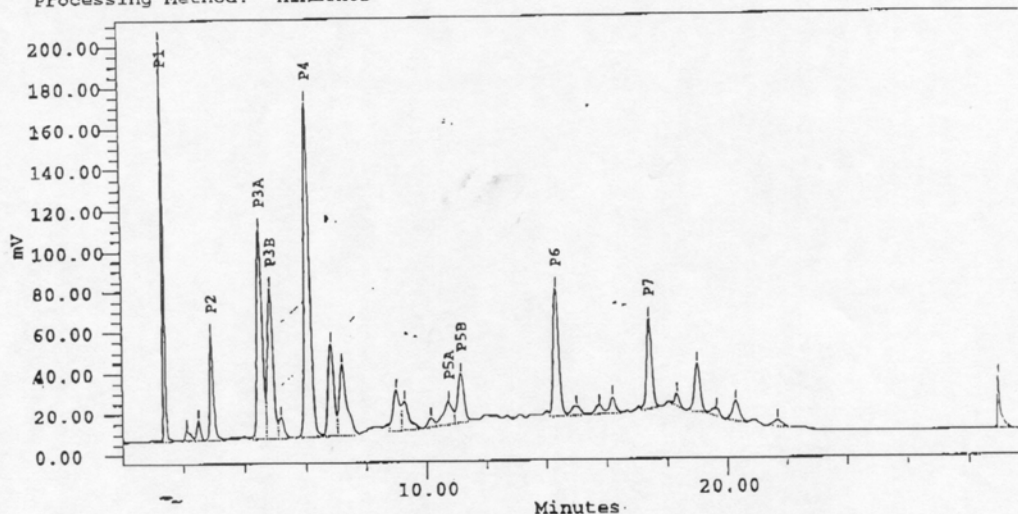
JUN. 3. 1998 4:43PM

FIBERITE INC. TEXAS 903 401 8098

NO. 1111 T. 32/43

FIBERITE INC.
 ANALYTICAL LABORATORY
 GREENVILLE, TEXAS

Project Name:	SYSTEM1	Sample Type:	Unknown
Sample Name:	310602/1	Volume:	10.00
Vial:	11	Run Time:	30.0 min
Injection:	1	Date Processed:	11/05/97 06:44:45 AM
Channel:	SIM Ch1	Dilution:	1.00000
Date Acquired:	11/05/97 06:13:48 AM	Column_ID#	206294
Scale Factor:	1.00		
Acq Meth Set:	HIMETHODSET		
Processing Method:	HIMETHOD		



Peak Results

#	Name	Ret Time (min)	Area (uV*sec)	Height (uV)	% Area	arearatio
1	P1	1.400	775506	195820	7.33	0.361
2	P2	2.933	426295	51619	4.03	0.198
3	P3A	4.533	1198167	103018	11.32	0.558
4	P3 GROUP	4.867	2112130	176788	19.96	0.983
5	P3B	4.867	913963	73770	8.64	0.426
6	P4	6.100	2147886	164083	20.29	1.000
7	P5A	10.750	237918	11219	2.25	0.111
8	P5 GROUP	11.167	592581	35092	5.60	0.276
9	P5B	11.167	354663	23873	3.35	0.165
10	P6	14.350	788695	62707	7.45	0.367
11	P7	17.433	519877	44081	4.91	0.242

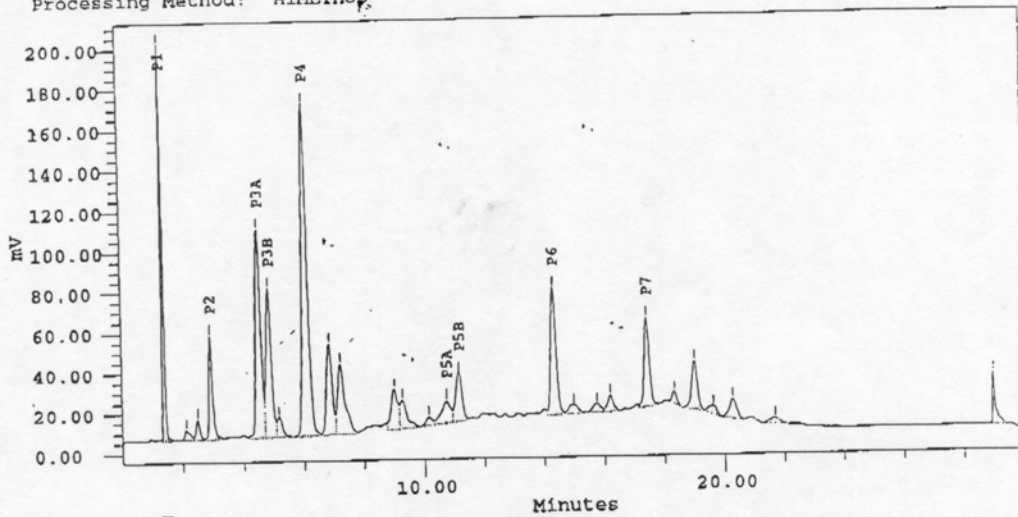
JUN. 3. 1998 4:42PM

FIBERITE INC. TEXAS 903 457 8598

NO. 1111 P. 29/49

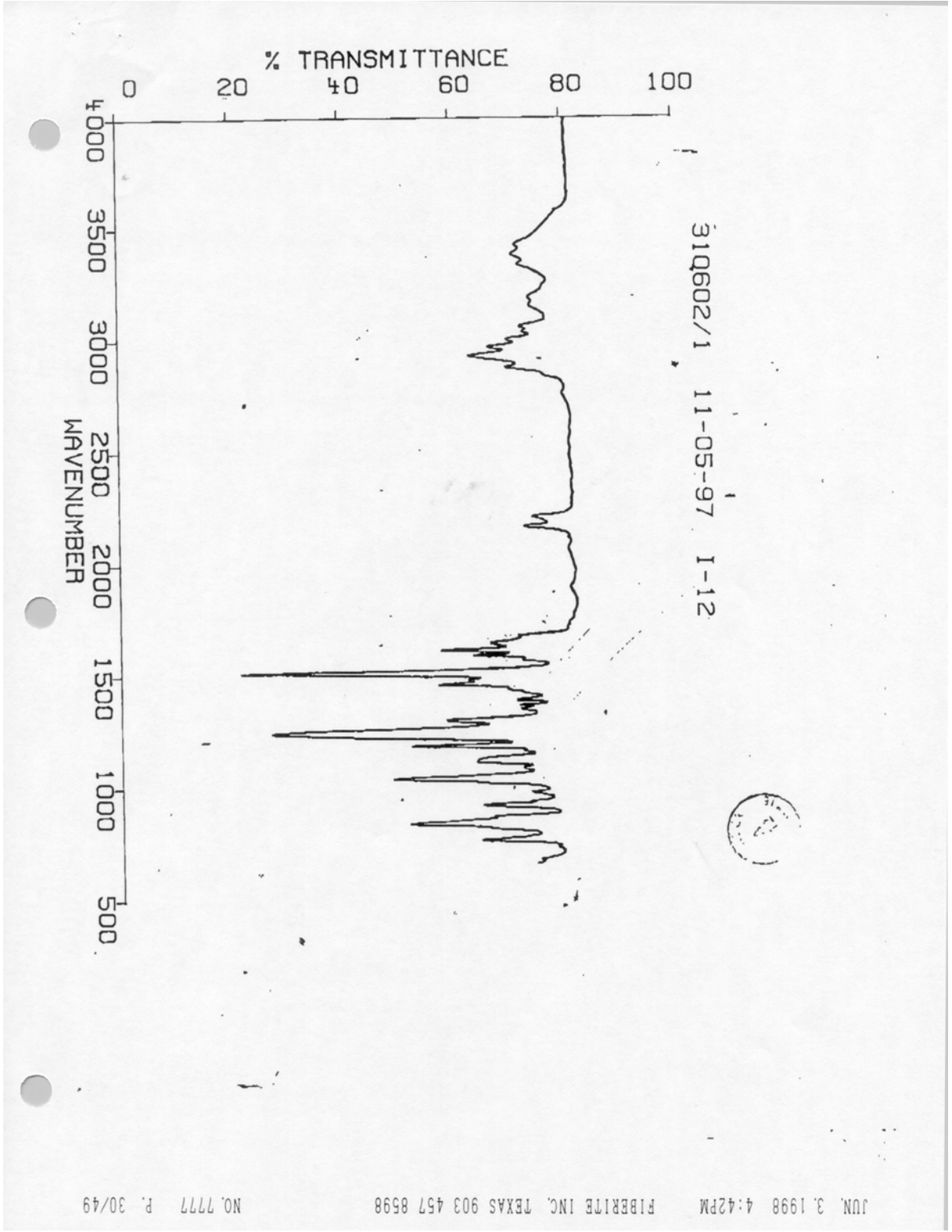
FIBERITE INC.
 ANALYTICAL LABORATORY
 GREENVILLE, TEXAS

Project Name:	SYSTEM1	Sample Type:	Unknown
Sample Name:	310602/1	Volume:	10.00
Vial:	11	Run Time:	30.0 min
Injection:	1	Date Processed:	11/05/97 06:44:45 AM
Channel:	SIM Ch1	Dilution:	1.00000
Date Acquired:	11/05/97 06:13:48 AM	Column_ID	206294
Scale Factor:	1.00		
Acq Meth Set:	H1METHODSET		
Processing Method:	H1METHOD		



Peak Results

#	Name	Ret Time (min)	Area (uV*sec)	Height (uV)	% Area	arearatio
1	P1	1.400	775506	195820	7.33	0.361
2	P2	2.933	426295	51619	4.03	0.198
3	P3A	4.533	1198167	103018	11.32	0.558
4	P3 GROUP	4.867	2112130	176788	19.96	0.983
5	P3B	4.867	913963	73770	8.64	0.426
6	P4	6.100	2147886	164083	20.29	1.000
7	P5A	10.750	237918	11219	2.25	0.111
8	P5 GROUP	11.167	592581	35092	5.60	0.276
9	P5B	11.167	354663	23873	3.35	0.165
10	P6	14.350	788695	62707	7.45	0.367
11	P7	17.433	519877	44081	4.91	0.242



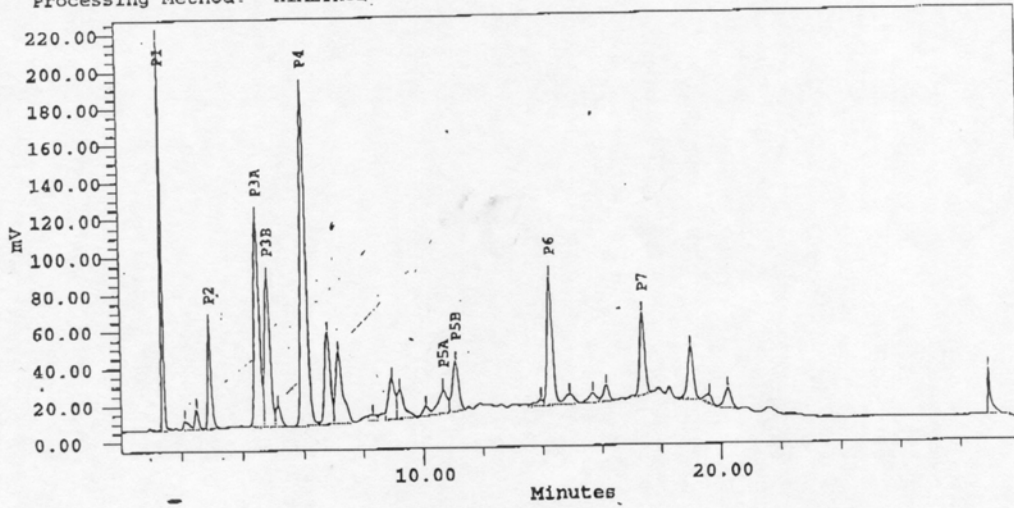
JUN. 3. 1998 4:30PM

FIBERITE INC. IDAAS 303 401 0030

NO. 1111 1. 1740

FIBERITE INC.
ANALYTICAL LABORATORY
 GREENVILLE, TEXAS

Project Name:	SYSTEM1	Sample Type:	Unknown
Sample Name:	310603/1	Volume:	10.00
Vial:	12	Run Time:	30.0 min
Injection:	1	Date Processed:	11/05/97 07:47:23 AM
Channel:	SIM Ch1	Dilution:	1.00000
Date Acquired:	11/05/97 07:16:28 AM	Column_ID	206294
Scale Factor:	1.00		
Acq Meth Set:	HLMETHODSET		
Processing Method:	HLMETHOD		



Peak Results

#	Name	Ret Time (min)	Area (uV*sec)	Height (uV)	% Area	arearatio
1	P1	1.400	814832	210024	7.12	0.344
2	P2	2.933	444711	55784	3.89	0.188
3	P3A	4.500	1300208	111947	11.36	0.550
4	P3B	4.833	973434	80119	8.51	0.411
5	P3 GROUP	4.833	2273641	192065	19.87	0.961
6	P4	6.050	2365962	181013	20.68	1.000
7	P5A	10.683	270126	12545	2.36	0.114
8	P5B	11.117	400921	26586	3.50	0.169
9	P5 GROUP	11.117	671047	39131	5.86	0.284
10	P6	14.283	860700	68599	7.52	0.364
11	P7	17.400	516051	44119	4.51	0.218



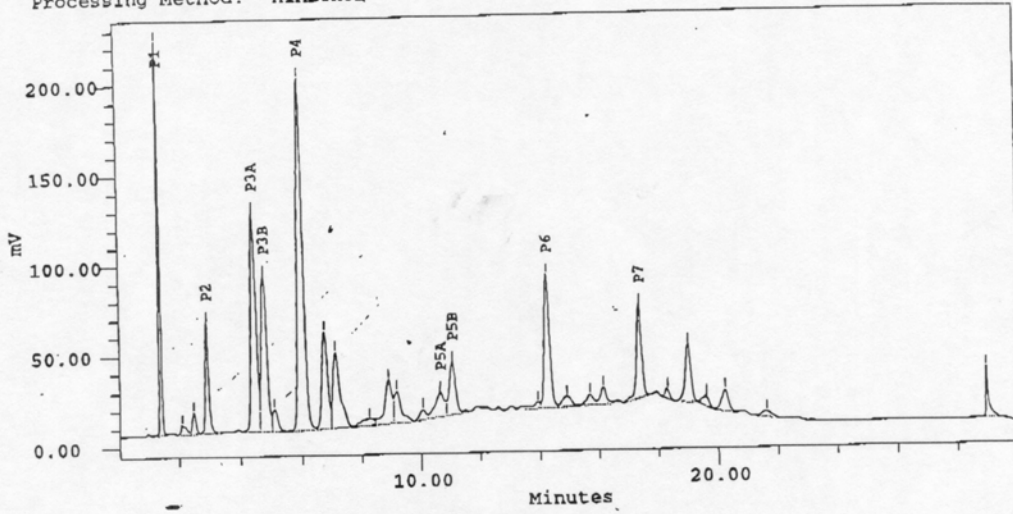
JUN 3 1998 4:38PM

FIBERITE INC. TEXAS 303 437 0030

NO. 1111 11 079

FIBERITE INC.
 ANALYTICAL LABORATORY
 GREENVILLE, TEXAS

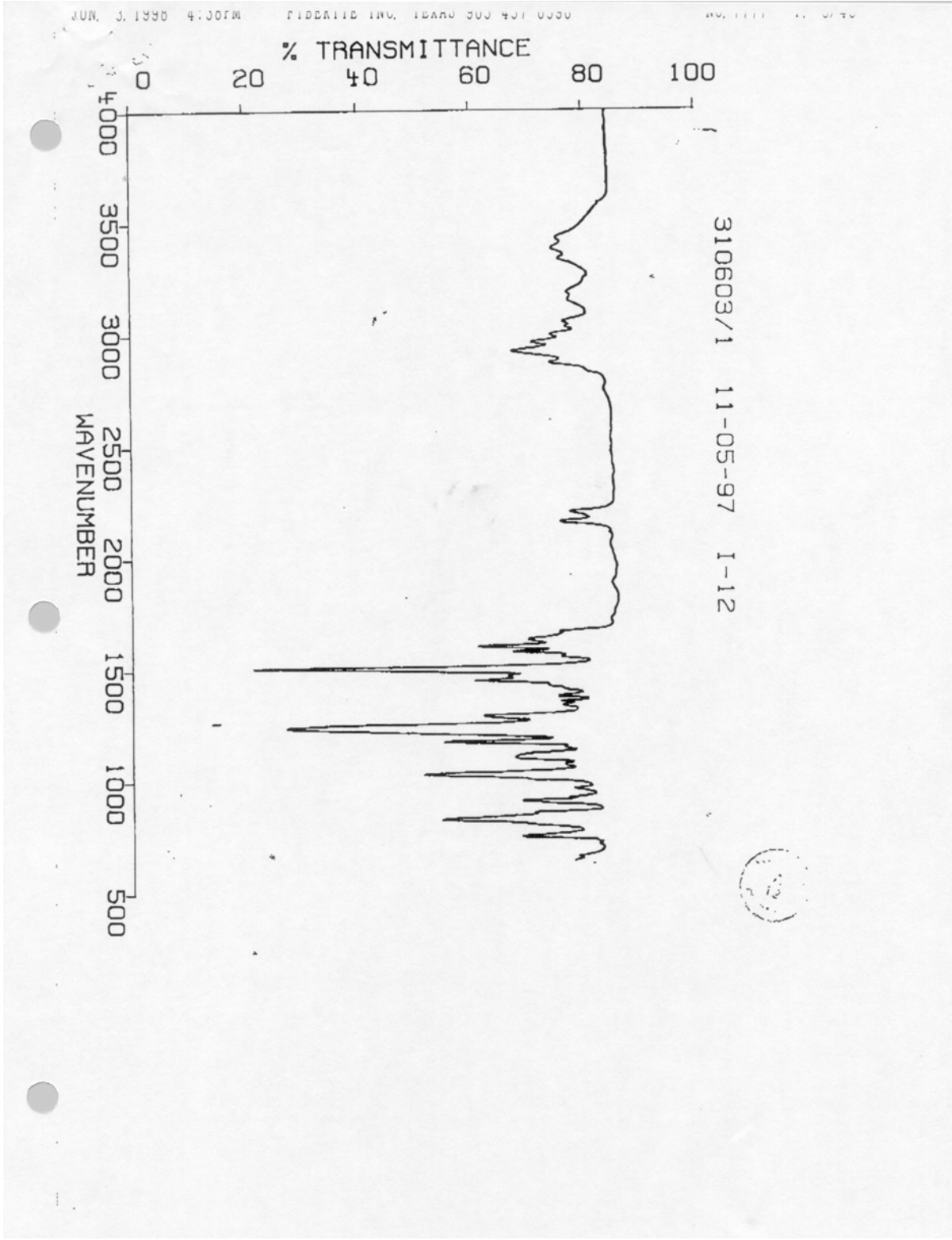
Project Name:	SYSTEM1	Sample Type:	Unknown
Sample Name:	310603/1	Volume:	10.00
Vial:	12	Run Time:	30.0 min
Injection:	2	Date Processed:	11/05/97 08:18:39 AM
Channel:	SIM Ch1	Dilution:	1.00000
Date Acquired:	11/05/97 07:47:40 AM	Column_ID	206294
Scale Factor:	1.00		
Acq Meth Set:	HIMETHODSET		
Processing Method:	HIMETHOD		



Peak Results

#	Name	Ret Time (min)	Area (uV*sec)	Height (uV)	% Area	arearatio
1	P1	1.400	869528	217335	6.87	0.340
2	P2	2.917	482520	60749	3.81	0.188
3	P3A	4.450	1406193	120810	11.11	0.549
4	P3B	4.783	1062134	85876	8.40	0.415
5	P3 GROUP	4.783	2468327	206686	19.51	0.964
6	P4	6.017	2560492	194166	20.24	1.000
7	P5A	10.667	290632	12899	2.30	0.114
8	P5B	11.083	432453	28244	3.42	0.169
9	P5 GROUP	11.083	723084	41143	5.72	0.282
10	P6	14.267	922416	73633	7.29	0.360
11	P7	17.383	616971	51118	4.88	0.241





**APPENDIX B. DATES OF PANEL MANUFACTURE AND COPY OF FAA FORM
8130-3**

1. UNITED STATES		2. FAA FORM 8130-3 AIRWORTHINESS APPROVAL TAG U.S. Department of Transportation Federal Aviation Administration		3. System Tracking Reference AGATE-2	
4. Organization CESSNA AIRCRAFT CO.					
6. Item	7. Description	8. Part Number	9. Eligibility *	10. Quantity	11. Serial/ Batch Number
3.	CARBON EPOXY TEST PANELS	SEE ITEM #13	TEST	53	N/A
13. Remarks Conformity only: Ship to Wichita State University. This item contains the following part numbers (1 ea.): BDJ11 BDJ31 BDJ13 BDJ33 BDJ15 BDK22 BDN12 BDJ12 BDJ32 BDJ14 BDJ34 BDK12 BDL21 BDN32 BDU11 BDU31 BDU13 BDU33 BDL11 BDW22 BDU12 BDU32 BDU14 BDU34 BDU15 BDZ21 BDJ21 BDN11 BDK21 BDN12 BDN31 BDK32 BDJ22 BDK11 BDK21 BDN21 BDK31 BDW31 BDU21 BDW11 BDK21 BDN21 BDK31 BDW32 BDU22 BDK11 BDK21 BDN21 BDK31 BDZ31					
14. Limited life parts must be accompanied by maintenance history including total time/total cycles/time since new. Reviewed FAA Form 8130-9, Dated _____ New <input checked="" type="checkbox"/> Newly Overhauled <input type="checkbox"/> Certifies that the new or newly overhauled part(s) identified above, except as otherwise specified in block 13 was (were) manufactured in accordance with FAA approved design data and airworthiness. NOTE: In case of parts to be exported, the special requirements of the importing country have been met.					
15. Signature <i>Maurice M. Linnebur</i>		16. FAA Authorization No. DMMRCL 501529		19. Return to Service in Accordance with FAR 43.9 Certifies that the work specified in block 13 (or attached) above was carried out in accordance with FAA airworthiness regulations and in respect to the work performed the part(s) is (are) approved for return to service.	
17. Name (Typed or Printed): MAURICE M. LINNEBUR		18. Date: 8-4-98		20. Authorized Signature: 21. Certificate Number:	
				22. Name (Typed or Printed): 23. Date:	

* (Optional) Installer must cross check eligibility with applicable technical data.