Advanced Composites Group
ACG MTM45-1 6781 S-2 glass 35% RC
Qualification Material Property Data Report

FAA Special Project Number: SP3505WI-Q

NCAMP Test Report Number: CAM-RP-2009-001 Rev C

Report Date: May 1, 2013

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Ed Hooper (Submitted to Wichita FAA ACO Office)

Revision:

Rev	By	Date	Pages Revised or Added
N/C	Kristin Marlett, Michelle Man	3/26/2009	Document initial Release
A	Kristin Marlett	4/23/2009	Normalization value corrected on Lamina Summary Chart - should be 0.0101 not 0.00101.
A	Kristin Marlett	4/23/2009	Ultimate Strength removed from Pin Bearing test results. Specimens were not taken to failure.
A	Kristin Marlett	5/12/2009	UNC1 modulus and FC and WC modulus and Poisson's ratio values removed pending investigation into high CV obtained.
A	Kristin Marlett	6/22/2009	Tg wet results listed on lamina/laminate chart was incorrect, it included more than the MH cure cycle. Results adjusted from 374.86 to 391.47 °F.
A	Kristin Marlett	9/22/2009	Report template updated; thickness updated on ILT (from specimen thickness to ply thickness). IPS minimum thickness updated and subsequently, the moisture conditioning charts
A	Kristin Marlett	11/4/2009	Physical testing values updated
A	Kristin Marlett	2/16/2010	Report template updated. Moisture conditioning charts changed to reflect thickest and thinnest panel, not specimen
B	Kristin Marlett	3/10/2011	Introduction/Scope Section 1.1 wording edited. ILT vaues modified to reflect the correct delta and thickness at tcurve and dy formula update to ETW template
C	Michelle Man	5/1/2013	- Typographical and Editorial changes - Removed Fluid Sensitivity Screening table, Section 1.5.6 - Added notes and updated/clarified references in Section 1.5.2.3, 1.5.3, 1.5.7 and 6.2 - Modulus Data Updated in Section 2.3.3(WC), 2.3.4 (FC), 2.3.7(UNC1); affected sections also updated (Section 2.1, 2.2, 3, and 4) - 0.2% Offset Strain Chart added to Section 3.5 and 4.5 - Graph in Section 5 updated.

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1. Introduction

1.1 Scope

The test methods and results described in this document are intended to provide basic composite properties essential to most methods of analysis and are consistent with CMH-17G—Composite Materials Handbook for Polymer Matrix Composites.

This report contains material property data of common usefulness to wide range of projects. The lamina and laminate material property data have been generated with FAA oversight through FAA Special Project Number SP3505WI-Q; the test panels, test specimens, and test setups have been conformed by the FAA and the testing has been witnessed by the FAA. However, the data may not fulfill all the needs of any specific company's programs. Specific properties, environments, laminate architecture, and loading situations that individual companies may require additional testing.

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

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

Statistical analysis of the data including the calculations of b-basis values are given in a separate report, Advanced Composites Group MTM45-1/ Style 6781 S2 Glass Qualification Statistical Analysis Report, NCP-RP-2009-001 Rev B or later revisions.

The qualification material was procured to ACG Material Specification ACGM 1001–12 Revision I/R dated March 10, 2005. An equivalent NCAMP Material Specification NMS 451/12 which contains specification limits that are derived from guidelines in DOT/FAA/AR-03/19 has been created. The qualification test panels were cured in accordance with ACG process specification ACGP 1001-02 Revision E “MH” cure cycle. An equivalent NCAMP Process Specification, NPS 81451 with baseline “MH” Cure Cycle, has been created. The panels were fabricated at

Bell Helicopter Textron lnc 600 East Hurst Blvd. Hurst, TX 76053. The ACG Test Plan AI/TR/1392 Revision E was used for this qualification program.

Part fabricators that wish to utilize the material property data, allowables, and specifications may be able to do so by demonstrating the capability to reproduce the original material properties; a process known as equivalency. More information about this equivalency process including the test statistics and its limitations can be found in Section 6 of DOT/FAA/AR-03/19 and Section 8.4.1 of CMH-17G. The applicability of equivalency process must be evaluated on program-by-program basis by the applicant and certifying agency. The applicant and certifying agency must agree that the equivalency test plan along with the equivalency process described in Section 6 of DOT/FAA/AR-03/19 and Section 8.4.1 of CMH17G are adequate for the given program.

Aircraft companies should not use the data published in this report without specifying NCAMP Material Specification NMS 451/12. NMS 451/12 may have additional requirements that are listed in its prepreg process control document (PCD), fiber specification, fiber PCD and other raw material specifications and PCDs which impose essential quality controls on the raw materials and raw material manufacturing equipment and processes. *Aircraft companies and certifying agencies should assume that the material property data published in this report is not applicable when the material is not procured to NMS 451/12.* NMS 451/12 is a free, publicly available, non-proprietary aerospace industry material specification.

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

1.2 Symbols Used

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

Superscripts

c	compression
cu	compression ultimate
s	shear
su	shear ultimate
t	tension
tu	tension ultimate
ν	Poisson's Ratio

Subscripts

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

Acronyms and Definitions

ASTM	American Society for Testing and Materials
B – Basis	95% lower confidence limit on the tenth population percentile
CV	Coefficient of variation
CTD	cold temperature dry
CPT	cured ply thickness
ETD	elevated temperature dry
ETW	elevated temperature wet, lower wet temperature
ETW2	elevated temperature wet, higher wet temperature
Gr/Ep	graphite/epoxy
norm	normalized
RTD	room temperature dry
SACMA	Suppliers of Advanced Composite Materials Association
SRM	SACMA Recommended Method
Tply	thickness divided by the number of plies provides the thickness average per specimen
wet	specimen with an “equilibrium” moisture content
T, RH	temperature, relative humidity

1.3 NIAR NCAMP – ACG Specimen Naming Format

The NIAR specimen names can be correlated to ACG specimen names using the scheme in Figure 1-1.

NIAR — ACG SPECIMEN NAMING FORMAT

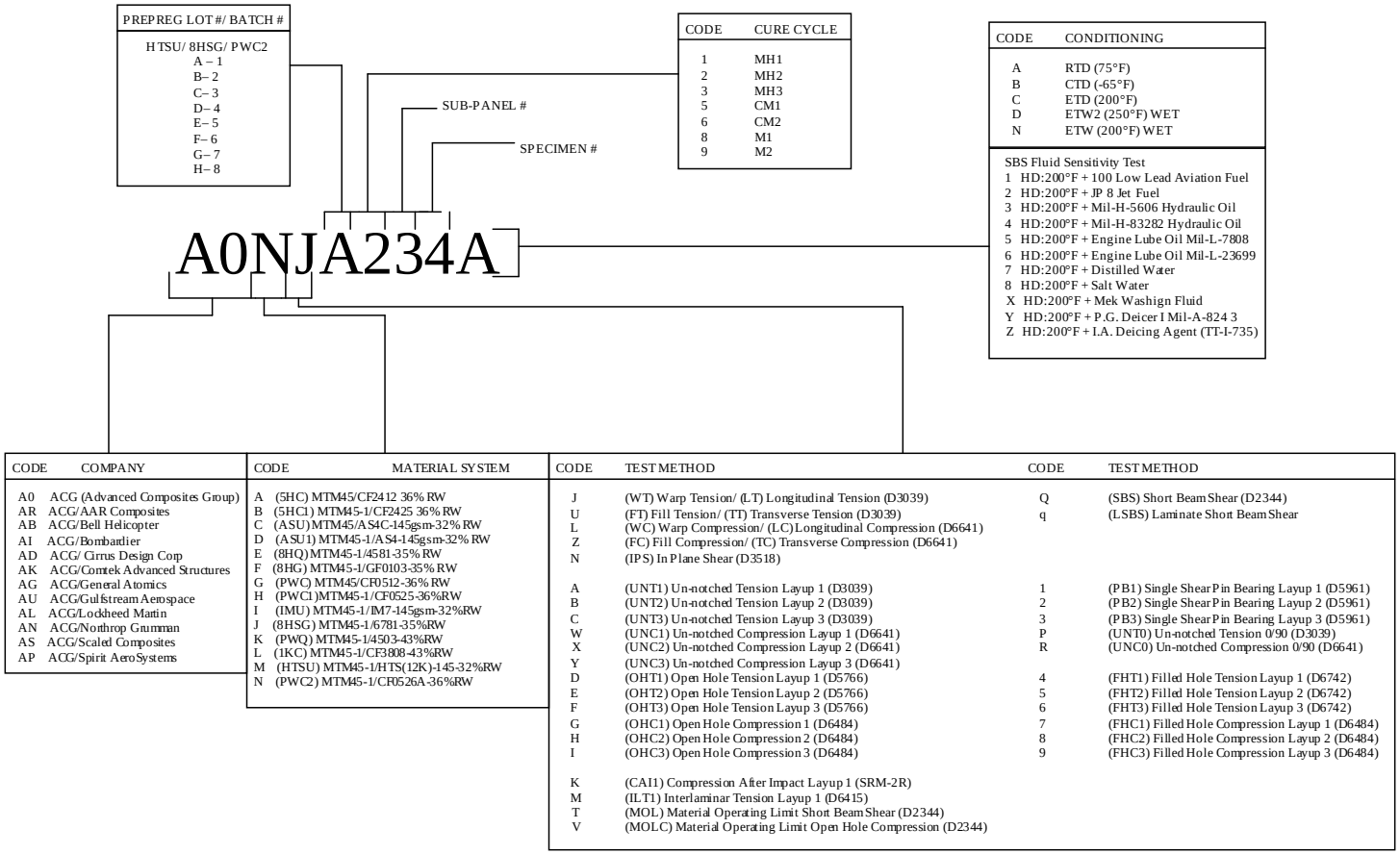


Figure 1-1: NIAR – ACG Specimen Naming Format Correlation

1.4 ASTM Standards

ASTM D 3039/D 3039M – 00^{e2} *Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials*

ASTM D 6641/D 6641M – 01^{e1} *Standard Test Method for Determining the Compressive Properties of Polymer Matrix Composite Laminates Using a Combined Loading Compression (CLC) Test Fixture*

ASTM D 3518/D 3518M – 94 (2001) *Standard Test Method for In-Plane Shear Response of Polymer Matrix Composite Materials by Tensile Test of a 645° Laminate*

ASTM D 2344/D 2344M – 00^{e1} *Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates*

ASTM D 5766/D 5766M – 02a *Standard Test Method for Open Hole Tensile Strength of Polymer Matrix Composite Laminates*

ASTM D 6742/D 6742M – 02 *Standard Practice for Filled-Hole Tension and Compression Testing of Polymer Matrix Composite Laminates*

ASTM D 6484/D 6484M – 04 *Standard Test Method for Open-Hole Compressive Strength of Polymer Matrix Composite Laminates*

ASTM D 5961/D 5961M – 05 *Standard Test Method for Bearing Response of Polymer Matrix Composite Laminates*

SACMA Standards

- SACMA SRM 2R-94 *SACMA Recommended Test Method for Compression After Impact Properties of Oriented Fiber-Resin Composites*

1.5 Methodology

1.5.1 Process Definition

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

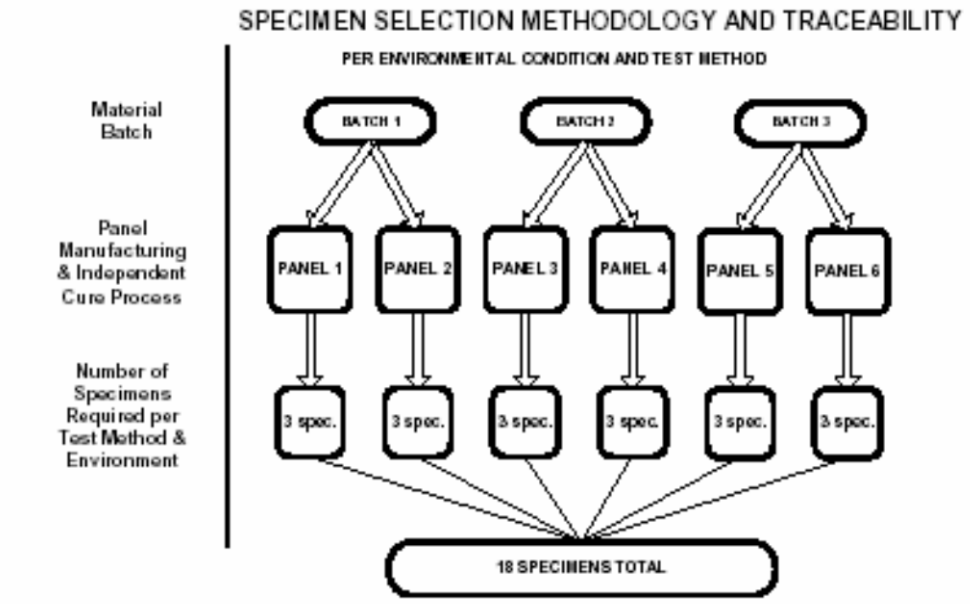


Figure 1-2: Cure Cycle Definition for Mechanical Test Panels

All panels were cured in accordance with ACG process specification ACGP 1001 Revision B.

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

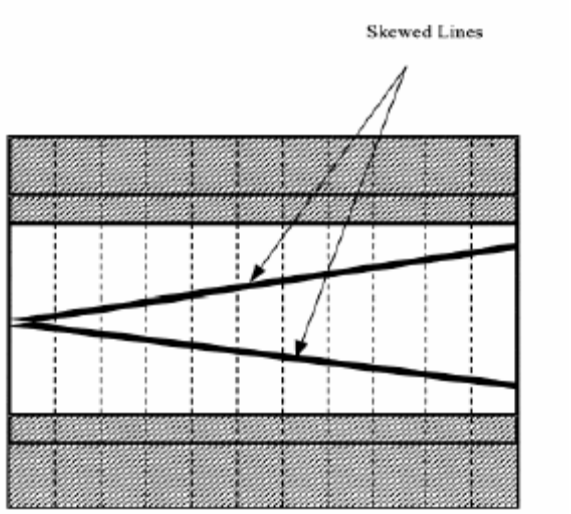


Figure 1-3: Specimen Traceability Line

1.5.2 Specimen & Testing Details

1.5.2.1 Tabbing

No tabs were used for this material system.

1.5.2.2 Strain gages

Strain gages were employed for modulus on selected test methods.

ASTM D3039 tensile: CEA-XX-250UW-120 or 350 (refer to Appendix 1 for specific requirements)
ASTM D3518 in-plane shear: CEA-XX-250UW-120 or 350 (one each 0° and 90° to specimen axis) optionally CEA-XX-125UT-120 or 350 biaxial gage
All ASTM D6641 compression: CEA-XX-125UT-120 or 350
Optional ASTM D6641 compression of unidirectional materials and fabric materials of tow/yarn 3K or smaller: CEA-XX-062UT-120 or 350
Where XX = 03 or 06 the self temperature compensation factor for the purposes and procedures of this test plan considered equivalent.

Where modulus is required for other tests, an extensometer was be used.

1.5.2.3 Specimen Dimensions & Test Configuration

For the open-hole tests, the hole diameter were 0.25 in ±0.003 in. For filled-hole and bearing tests, the hole diameter were 0.25 in -0.000 +0.003 in. The fastener type was NAS674X, where 'X' is the grip length for each different specimen thickness. The grip lengths chosen are listed below.

Fastener Type	Grip Length	Test Method
NAS674 –V2	.125 grip	Filled Hole Tension
NAS674 –V3	.188 grip	Filled Hole Compression
NAS674 –V13	.812 grip	Pin Bearing

Table 1-1: Fastener and Corresponding Grip Length

The washer type was NAS1149C0432R (nominal ID 0.265, nominal OD 0.500and nominal thickness 0.032 inches) and the nut type will be NAS1291C4M. Washers were used under both the head and nut as directed by ACG.

For filled hole tensile and pin bearing tests the fastener torque were 10 to 15 in-lbs above the run on torque required to bring the fastener/specimen/fixture flush. For example, if it requires 15 in-lbs to flush the specimen/fastener/fixture with no gap, additional 10-15 in-lbs was applied for a total of 25-30 in-lbs. For filled hole compression tests the fasteners were installed as above then torque released approximately one-quarter (1/4) turn to maintain fastener “flushness” and approximate zero (0) torque allowing the fastener to turn/twist with no lateral movement or “slack”. In all cases, for each laminate thickness and given test, the torque applied was equal. Fasteners were installed before conditioning.

For the pin bearing tests, the single shear method was used with one of the pairs of specimens replaced by a steel fixture. The configuration is shown in Figure 1-4 below. Thickness of specimen fixture used was 0.685”

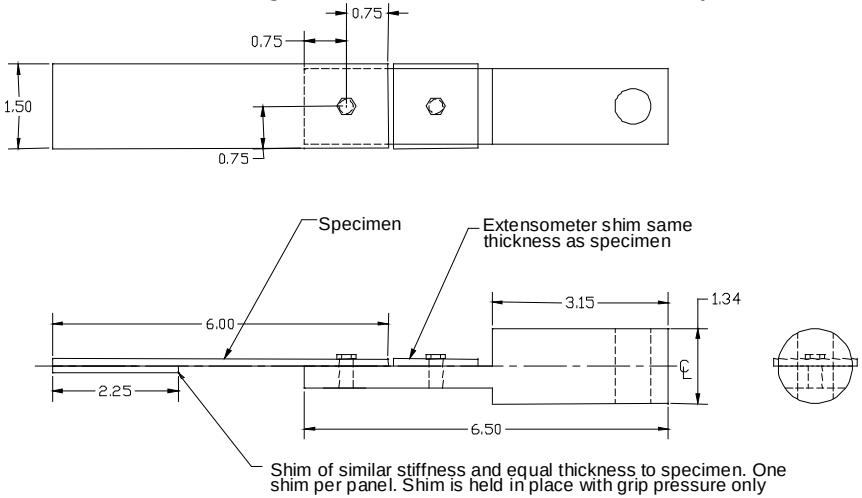


Figure 1-4: ASTM D5961 (Pin Bearing) Specimen and Loading Arrangement

The configuration of the ASTM D6415-99 specimen is as shown in Figure 1-5. 0 degree of the stacking sequence is along L (shown in the figure below).

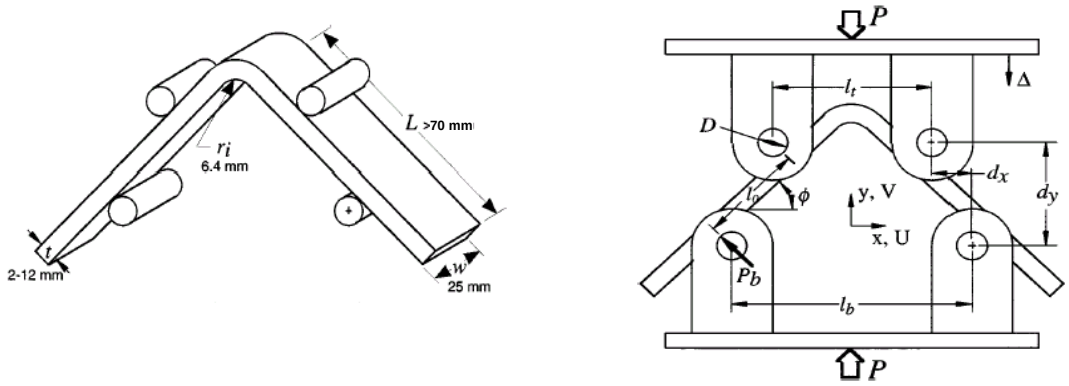


Figure 1-5: ASTM D6415 (Interlaminar Tension) Specimen and Loading Arrangement

For compression after impact, specimens following impact received nondestructive inspection by c-scan or equivalent method to determine extent and area of damage.

1.5.3 Test Matrix

Table 1-2 summarizes the lamina level tests carried out on fabric materials. The lay-ups chosen were designed to produce the appropriate thickness required for the various types of tests to be performed. Table 1.6-B summarizes the laminate level tests carried out on fabric materials. Lamina and Laminate stacking sequence can be obtained from page 10 of Appendix 1 of AI/TR/1392 E Appendix (or later revisions).

Layup (warp direction)	Test Type and Direction	Property	Number of Batches x Number of Panels x Number of Test Specimens				
			Test Temperature/Moisture Condition				
			CTD	RTD	ETD	ETW	ETW2
[0°]n	Warp Tension	Strength, Modulus	3x2x3	3x2x3		3x2x3	3x2x3
[0°]n	Warp Compression	Strength, Modulus, Poisson's	3x2x3	3x2x3		3x2x3	3x2x3
[90]n	Fill Tension	Strength, Modulus	3x2x3	3x2x3		3x2x3	3x2x3
[90]n	Fill Compression	Strength, Modulus, Poisson's	3x2x3	3x2x3	3x2x3	3x2x3	3x2x3
[45°/-45°]ns	In-Plane Shear	Strength and Modulus	3x2x3	3x2x3		3x2x3	3x2x3
[90°]n	Short Beam Strength	Strength	3x2x3	3x2x3	3x2x3	3x2x3	3x2x3

Table 1-2: Lamina Level Tests - Fabric

Table 1-3 below indicates the laminate level tests performed on the 6781 S2 glass material. This table emphasizes those properties and test condition combinations believed to constitute the worst case. Additional testing at some test conditions may be necessary depending on the results obtained.

Layup	Test Type and Direction	Property	Number of Batches x Number of Panels x Number of Test Specimens			
			Test Temperature/Moisture Condition			
			CTD	RTD	ETW	ETW2
(25%/50%/25% - QI)	Open Hole Tension (1)	Strength	3x2x3	3x2x3	1x2x3	3x2x3
(10%/80%/10%)	Open Hole Tension (1)(6)	Strength	3x2x3	1x2x3		1x2x3
(40%/20%/40%)	Open Hole Tension (1)(6)	Strength	3x2x3	1x2x3		1x2x3
(25%/50%/25% - QI)	Open Hole Compression (1)	Strength		3x2x3	1x2x3	3x2x3
(10%/80%/10%)	Open Hole Compression (1)(6)	Strength		1x2x3		3x2x3
(40%/20%/40%)	Open Hole Compression (1)(6)	Strength		1x2x3		3x2x3
(25%/50%/25% - QI)	Un-notched Tension	Strength and modulus	3x2x3	3x2x3		1x2x3
(10%/80%/10%)	Un-notched Tension (5)(6)	Strength and modulus	1x2x3	1x2x3		1x2x3
(40%/20%/40%)	Un-notched Tension (5)(6)	Strength and modulus	1x2x3	1x2x3		1x2x3
(25%/50%/25% - QI)	Un-notched Compression (and short beam strength)	Strength and modulus		3x2x3 (3x2x3)	1x2x3 (1x2x3)	3x2x3 (3x2x3)
(10%/80%/10%)	Un-notched Compression (5)(6)	Strength and modulus		1x2x3		1x2x3
(40%/20%/40%)	Un-notched Compression (5)(6)	Strength and modulus		1x2x3		1x2x3

(25%/50%/25% - QI)	Filled Hole Tension (2)	Strength	3x2x3	1x2x3		
(10%/80%/10%)	Filled Hole Tension (2) (5)	Strength	1x2x3	1x2x3		1x2x3
(40%/20%/40%)	Filled Hole Tension (2) (5)	Strength	1x2x3	1x2x3		
(25%/50%/25% - QI)	Filled Hole Compression (2) (6)	Strength		1x2x3		3x2x3
(10%/80%/10%)	Filled Hole Compression (2) (5)	Strength		1x2x3		3x2x3
(40%/20%/40%)	Filled Hole Compression (2) (5)	Strength		1x2x3		3x2x3
(25%/50%/25% - QI)	Single Shear Bearing (3)	Strength		3x2x3		3x2x3
(10%/80%/10%)	Single Shear Bearing (3)(5)	Strength		1x2x3		3x2x3
(40%/20%/40%)	Single Shear Bearing (3)(5)	Strength		1x2x3		3x2x3
(25%/50%/25% - QI)	Interlaminar Tension (4)(6)	Strength		1x1x6		1x1x6
(25%/50%/25% - QI)	SACMA Compression After Impact – 1500 in-lb/in impact (6)	Strength		1x1x6		

(1). Open-hole configuration: 0.25” hole diameter, 1.5 inch width.
(2). Filled-hole test configuration: 0.25” diameter, protruding head fastener, 1.5” width.
(3). Single shear bearing test configuration: 0.25: hole diameter, 1.5” width, one protruding head fastener e/D=3
(4). Interlaminar tension test as described above.
(5) Omitted for 4581quartz, 4503 quartz, 6781 S2 Glass and, 7781 E glass
(6) Omitted for 4503 quartz – other 4503 properties RT dry only except for interlaminar tension. 4581 one batch on

Table 1-3: Laminate Level Tests – Fabric

1.5.4 Physical Testing

The following tests were conducted for each test laminate with the exception of DMA Tg which was conducted on one separate traveler laminate per batch from each oven cure conducted where that batch is present. This data is included at the top of each individual test summary sheet, located in section 1.7.1.

Property	Condition/Method(1)	# Replicates
Cured Ply Thickness	SACMA SRM10 - Data from mechanical test laminates	Report
Laminate Density	ASTM D792	3
Fiber Volume, % by Volume	ASTM D3171-99(2)	3
Resin Content, % by Volume	ASTM D3171-99(2)	3
Void Content, % by Volume	ASTM D3171-99(2)	3
Glass Transition Temperature, Tg, By DMA	Dry and Wet – SACMA SRM 18R-94	1 dry(3) 1 wet(3)

(1) Where the applicable standard allows variations in specimen form or test method, the specific parameters used are specified in the test work instructions and reported in the applicable test report.
(2) Method II, except for laminates of materials where actual fiber weight is not known accurately prior to impregnation. As is the case for unidirectional materials. For these materials to verify Method II is accurate, a minimum of 12 samples per batch (two from each roll must be included) were tested by Method I, Procedure B for carbon reinforcements and Procedure G for glass or quartz reinforcements.
(3) Minimum 24 dry and 24 wet for each material system, 3 dry & 3 wet per traveler coupon for equivalency testing.

Table 1-4: Cured Laminate Physical Testing

1.5.5 Environmental Conditioning

The following tables define the range of tests and conditions were used to produce design allowable property and other screening data. Test environments are defined as:
CTD = -65±5°F, ambient moisture content dry
RTD = room temperature ambient dry
RTA = room temperature ambient – no drying required
ETD = 200±5°F dry
ETW= 200±5°F, wet (equilibrium moisture content)
ETW2=250±5°F, wet (equilibrium moisture content)

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

For dry testing, specimens were dried at 160°F±5°F for 120 to 130 hours. When drying was completed, specimens were either stored until testing in a sealed oven maintained at 85°F ± 5°F or alternately stored with desiccant in a sealed container. For wet testing, specimens were conditioned to equilibrium in a 160°F±5°F and 85% ± 5% RH environment in accordance with ASTM D 5229/D5229M Procedure C. Equilibrium was determined in accordance with DOT/FAA/AR-03/19 section 3.2. When conditioning was completed the specimens and traveler were stored in the conditioning chamber for up to 60 days or were wrapped in moist cloth or paper towel in a sealed container up no more than 14 days. If storage time exceeded 14 days, the traveler was reweighed to assure moisture equilibrium. In the event that moisture equilibrium was not maintained, the specimens were placed back into the chamber until equilibrium was reached. For non-ambient testing, DOT/FAA/AR-03/19 section 3.3 was followed.

1.5.6 Fluid Sensitivity Screening

Fluid Sensitivity Screening was not done on this material.

1.5.7 Normalization Procedures

The nominal cure ply thicknesses (CPT) for each material type are given in appendix 3 of AI/TR/1392 E Appendix. Lamina level tension and compression strength and modulus properties were normalized to the cured ply thickness indicated. Per ACG's request, the laminate level properties were also normalized. Wherever properties are normalized, both measured and normalized data were reported.

The nominal fiber areal weight was at 300 g/m^2 and the average of the four batches of material was 300.01 g/m^2 therefore normalization by cured ply thickness (CPT) was used, i.e.

Normalized strength=Measured Strength x Measured CPT/Nominal CPT

The nominal CPT is 0.0101 inches and the average CPT was 0.0103 inches. individual ply thicknesses can be found in each individual summary sheet, but as an example, the range for each panel was between 0.0099 inches and 0.0108 inches CPT. The CPT of the individual specimens were also shown to be close to the nominal CPT.

1.5.8 Conformity

All laminates and specimens for design allowable property were inspected for conformance with the requirements of this document and appendices 1 and 2. For all materials requiring FAA approval, the conformance was verified by an FAA approved designated airworthiness representative (DAR). Test setup and methods were approved and witnessed by the FAA or authorized designated engineering representative (DER) as required. Conformity documentation can be obtained in PDF file entitled Conformity_Final and is included on the CD provided with this report.

1.5.9 Material Pedigree Information

The PMC Data collection template includes the material pedigree information required, such as material and batch information, as well as environmental conditioning and test results. This template is included on the CD provided with this report.

ACG 6781 Glass Test results

The files below are available on the CD provided with this report.

2. Test Results

2.1 Lamina Level Test Summary

Prepreg Material:	Advanced Composites Group - MTM45-1/ 6781 S2 Glass NCAMP Material Specification NMS 451/12				**ACG - MTM45-1/ 6781 S2 Glass Lamina Properties Summary**
Fiber:	JPS Glass (fabric)/AGY (fiber): SCG75 1/0 1.0Z 636 7636	**Resin:**	MTM45-1		
Tg(dry):	391.47 °F	**Tg(wet):**	341.86 °F	**Tg METHOD:**	DMA (SRM 18-94)
PROCESSING:	NCAMP Process Specification NPS 81451 "MH" Cure Cycle				

Date of fiber manufacture	October 2005 - November 2005	**Date of testing**	07/11/2007 - 03/2009
Date of resin manufacture	November 2005 - January 2006	**Date of data submittal**	3/27/2009
Date of prepreg manufacture	November 2005 - January 2006		
Date of composite manufacture	April 2006-September 2006		

LAMINA MECHANICAL PROPERTY SUMMARY
Data reported as: Normalized & Measured
(Normalized by CPT= 0.0101 inch)

	CTD Mean		RTD Mean		ETD Mean		ETW Mean		ETW2 Mean	
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F_1^{tu} (ksi)	92.34	90.05	81.46	79.92	---	---	57.66	56.11	57.51	56.18
E_1^t (Msi)	4.32	4.21	4.22	4.14	---	---	3.90	3.80	3.77	3.68
F_2^{tu} (ksi)	90.06	88.17	80.50	78.92	---	---	57.22	56.07	55.32	54.10
E_2^t (Msi)	4.14	4.06	4.07	3.99	---	---	3.77	3.69	3.62	3.53
F_1^{cu} (ksi)	102.88	100.03	83.43	81.41	---	---	58.29	56.68	50.97	49.77
E_1^c (Msi)	4.35	4.23	4.22	4.12	---	---	4.09	3.98	4.02	3.92
ν_{12}^c	---	0.140	---	0.138	---	---	---	0.116	---	0.101
F_2^{cu} (ksi)	85.81	83.23	69.07	67.08	59.70	57.85	47.86	46.15	41.09	39.82
E_2^c (Msi)	4.24	4.12	4.02	3.90	3.94	3.82	3.96	3.82	4.04	3.91
ν_{21}^c	---	0.133	---	0.129	---	0.115	---	0.108	---	0.098
$F_{12}^{s5\%strain}$ (ksi)	---	12.29	---	9.16	---	---	---	5.64	---	4.57
$F_{12}^{s0.2\%}$ (ksi)	---	7.25	---	5.45	---	---	---	3.38	---	2.66
G_{12}^s (Msi)	---	0.71	---	0.55	---	---	---	0.34	---	0.27
SBS (ksi)	---	12.51	---	9.79	---	7.88	---	6.58	---	5.14

Table 2-1: Lamina Level Test Summary

2.2 Laminate Level Test Summary

Prepreg Material:	Advanced Composites Group - MTM45-1/ 6781 S2 Glass NCAMP Material Specification NMS 451/12			**ACG - MTM45-1/6781 S2 Glass Laminate Properties Summary**	
Fiber	JPS Glass (fabric)/AGY (fiber): SCG75 1/0 1.0Z 636 7	**Resin**	MTM45-1		
Tg(dry):	391.47 °F	**Tg(wet):**	341.86 °F	**Tg METHOD**	DMA (SRM 18-94)
PROCESSING:	NCAMP Process Specification NPS 81451 "MH" Cure Cycle				

Date of fiber manufacture	October 2005 - November 2005	**Date of testing**	07/11/2007 - 03/2009
Date of resin manufacture	November 2005 - January 2006	**Date of data submittal**	3/27/2009
Date of prepreg manufacture	November 2005 - January 2006		
Date of composite manufacture	April 2006-September 2006		

LAMINATE MECHANICAL PROPERTY SUMMARY
Data reported as: Normalized & Measured
(Normalized by CPT= 0.0101 inch)

	Layup:	**25/50/25**		**10/80/10**		**40/20/40**	
	Test Condition	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
OHT	**CTD**	38.93	37.81	37.97	36.87	44.69	43.49
Strength (ksi)	**RTD**	32.06	31.08	30.84	30.40	38.33	37.72
	ETW	24.43	24.26	---	---	---	---
	ETW2	24.34	23.64	20.08	19.60	26.00	25.78
OHC	**RTD**	37.02	36.37	31.56	31.44	41.08	40.73
Strength (ksi)	**ETW**	26.30	26.26	---	---	---	---
	ETW2	23.48	23.05	20.14	19.73	26.05	25.62
UNT	**CTD**	72.42	70.32	---	---	---	---
Strength (ksi)	**RTD**	63.70	61.79	---	---	---	---
	ETW2	46.69	46.22	---	---	---	---
Modulus (msi)	**CTD**	3.42	3.32	---	---	---	---
	RTD	3.13	3.03	---	---	---	---
	ETW2	2.78	2.75	---	---	---	---
UNC	**RTD**	70.76	69.88	---	---	---	---
Strength (ksi)	**ETW**	46.79	46.39	---	---	---	---
	ETW2	39.73	39.07	---	---	---	---
Modulus (msi)	**RTD**	3.30	3.26	---	---	---	---
	ETW	3.09	3.07	---	---	---	---
	ETW2	3.28	3.23	---	---	---	---
νUNC	**RTD**	---	0.298	---	---	---	---
	ETW	---	0.353	---	---	---	---
	ETW2	---	0.362		---	---	---
FHT	**CTD**	41.07	40.30	---	---	---	---
Strength (ksi)	**RTD**	34.47	34.13	---	---	---	---
	ETW2	---	---	---	---	---	---
FHC	**RTD**	56.05	55.58	---	---	---	---
Strength (ksi)	**ETW2**	35.21	34.43	---	---	---	---
LSBS	**RTD**	---	9.46	---	---	---	---
Strength (ksi)	**ETW**	---	6.38	---	---	---	---
	ETW2	---	5.11	---	---	---	---
PB							
2% offset Strength	**RTD**	82.73	80.85	---	---	---	---
Strength (ksi)	**ETW2**	63.82	62.56	---	---	---	---
ILT	**RTD**	---	6.13	---	---	---	---
Strength (ksi)	**ETW2**	---	2.60	---	---	---	---
CAI	**RTD**	31.87	31.53	---	---	---	---
Strength (ksi)							

Table 2-2: Laminate Level Test Summary

2.3 Individual Test Summaries

The individual test summaries are below.

2.3.1 Warp Tension Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass		**Tension, 1-axis** **Gr/ Ep** **MTM45-1/ Style 6781 S2 Glass** **$[0]_{6S}$**
Resin content:	52.58 vol%	**Comp. density:** 1.79 [g/cc]	
Fiber volume:	47.42 vol%		
Ply thickness:	0.0102 - 0.0107		
Ply count:	12		
Test method:	ASTM D3039-00	**Modulus calculation:** linear fit from 1000 to 3000 micro in/in	
Normalized by:	0.0101 in. CPT		

		CTD (B)		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		-65		75		200		250	
Moisture Conditioning		dry		dry		equilibrium		equilibrium	
Equilibrium at T, RH						160 F,85%		160 F,85%	
Source code		ABJJXXXXB		ABJJXXXXA		ABJJXXXXN		ABJJXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	92.34	90.05	81.46	79.92	57.66	56.11	57.51	56.18
	Minimum	85.98	83.32	75.98	74.10	55.67	53.75	53.91	52.22
F_1^{tu}	**Maximum**	98.00	94.34	84.33	82.99	59.87	58.83	60.78	59.22
(ksi)	**C.V.(%)**	3.38	3.48	3.13	3.16	2.36	2.45	3.75	4.21
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	
	Mean	4.32	4.21	4.22	4.14	3.90	3.80	3.77	3.68
	Minimum	4.24	4.10	4.19	3.99	3.81	3.65	3.72	3.60
	Maximum	4.41	4.34	4.26	4.23	3.97	3.92	3.82	3.77
E_1^t	**C.V.(%)**	0.99	1.46	0.57	1.35	0.97	1.83	0.74	1.60
(Msi)									
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	

2.3.2 Fill Tension Properties

Material: Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass

Resin content: 53.72 vol%
Fiber volume: 46.28 vol%
Ply thickness: 0.0100-0.0105
Ply count: 12

Comp. density: 1.79 [g/cc]

Tension, 2-axis
Gr/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
$[90]_{6S}$

Test method: ASTM D3039-00

Modulus calculation: linear fit from 1000 to 3000 micro in/in

Normalized by: 0.0101 in. CPT

		CTD (B)		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		-65		75		200		250	
Moisture Conditioning		dry		dry		equilibrium		equilibrium	
Equilibrium at T, RH						160 F,85%		160 F,85%	
Source code		ABJUXXXXB		ABJUXXXXA		ABJUXXXXN		ABJUXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	90.06	88.17	80.50	78.92	57.22	56.07	55.32	54.10
	Minimum	84.24	82.98	72.21	70.92	52.09	50.79	52.03	50.80
F_2^{tu}	**Maximum**	95.81	92.95	84.60	83.63	59.77	59.08	59.62	57.27
(ksi)	**C.V.(%)**	3.67	2.87	4.73	5.00	4.00	4.43	3.15	3.18
	No. Specimens	19		19		19		22	
	No. Prepreg Lots	3		3		3		3	
	Mean	4.14	4.06	4.07	3.99	3.77	3.69	3.62	3.53
	Minimum	4.07	3.93	4.00	3.86	3.67	3.53	3.47	3.37
	Maximum	4.27	4.18	4.19	4.11	3.92	3.85	3.78	3.72
E_2^t	**C.V.(%)**	1.27	2.05	1.32	2.01	1.88	2.26	2.23	2.78
(Msi)									
	No. Specimens	19		19		19		24	
	No. Prepreg Lots	3		3		3		3	

2.3.3 Warp Compression Properties

Material: Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass

Resin content: 54.18%vol **Comp. density:** 1.78 [g/cc]
Fiber volume: 45.82%vol
Ply thickness: 0.0100-0.0108
Ply count: 12

Test method: ASTM D6641-01 **Modulus calculation:** linear fit from 1000 to 3000 micro in/in

Normalized by: 0.0101 in. CPT

Compression, 1-axis
Gr/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
$[0]_{6S}$

		CTD (B)		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		-65		75		200		250	
Moisture Conditioning		dry		dry		equilibrium		equilibrium	
Equilibrium at T, RH						160 F,85%		160 F,85%	
Source code		ABJLXXXXB		ABJLXXXXA		ABJLXXXXN		ABJLXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
F_1^{cu} (ksi)	**Mean**	102.88	100.03	83.43	81.41	58.29	56.68	50.97	49.77
	Minimum	86.23	83.17	74.87	72.17	50.74	48.98	42.68	41.05
	Maximum	110.58	110.03	92.17	90.02	64.99	62.31	58.34	58.01
	C.V.(%)	6.72	7.28	5.77	6.16	6.06	6.13	9.21	10.26
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	
E_1^c (Msi)	**Mean**	4.35	4.23	4.22	4.12	4.09	3.98	4.02	3.92
	Minimum	4.05	3.90	4.07	3.93	3.95	3.78	3.86	3.71
	Maximum	4.56	4.54	4.35	4.35	4.20	4.18	4.71	4.73
	C.V.(%)	3.61	4.91	2.23	3.08	1.87	3.36	4.46	5.71
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	
ν_{12}	**Mean**	0.140		0.138		0.116		0.101	
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	

2.3.4 Fill Compression Properties

Material: Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass

Resin content: 54.51 vol% **Comp. density:** 1.79 [g/cc]
Fiber volume: 45.49 vol%
Ply thickness: 0.0100-0.0108
Ply count: 12

Test method: ASTM D6641-01e1 **Modulus calculation:** linear fit from 1000 to 3000 micro in/in

Normalized by: 0.0101 in. CPT

Compression, 2-axis
Gr/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
$[90]_{6S}$

		CTD (B)		RTD (A)		ETD (C)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		-65		75		200		200		250	
Moisture Conditioning		dry		dry		dry		equilibrium		equilibrium	
Equilibrium at T, RH								160 F,85%		160 F,85%	
Source code		ABJZXXXXB		ABJZXXXXA		ABJZXXXXC		ABJZXXXXN		ABJZXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	85.81	83.23	69.07	67.08	59.70	57.85	47.86	46.15	41.09	39.82
	Minimum	79.76	76.86	62.09	59.93	49.18	46.82	44.34	41.91	37.15	35.90
F_2^{cu}	**Maximum**	96.42	95.90	74.64	73.69	64.79	63.36	51.36	50.76	45.92	45.45
(ksi)	**C.V.(%)**	5.95	7.04	5.73	6.16	8.12	8.70	4.00	5.24	5.30	5.49
	No. Specimens	19		18		20		16		16	
	No. Prepreg Lots	3		3		3		3		3	
	Mean	4.24	4.12	4.02	3.90	3.94	3.82	3.96	3.82	4.04	3.91
	Minimum	3.77	3.61	3.82	3.68	3.81	3.65	3.89	3.69	3.71	3.53
	Maximum	4.44	4.40	4.14	4.07	4.05	3.95	4.07	3.99	4.45	4.34
E_2^c	**C.V.(%)**	4.34	4.91	2.12	3.07	1.63	2.90	1.31	2.80	5.09	6.21
(Msi)											
	No. Specimens	19		18		20		16		16	
	No. Prepreg Lots	3		3		3		3		3	
	Mean	0.133		0.129		0.115		0.108		0.098	
ν_{21}	**No. Specimens**	19		18		20		16		16	
	No. Prepreg Lots	3		3		3		3		3	

*Batch A cure Cycle 2 Specimens: Orientation of plies are in 0 degree direction so results omitted

2.3.5 In-Plane Shear Properties

Material: Advanced Composites Group - MTM45-1/Style 6781 S2 Glass

Resin content: 53.85 vol%
Comp. density: 1.79 [g/cc]
Fiber volume: 46.15 vol%
Ply thickness: 0.0100 - 0.0107
Ply count: 8

Test method: ASTM D3518-94
Modulus calculation: linear fit from 1000 to 6000 micro in/in

Normalized by: 0.0101 in. CPT

In-Plane Shear
Gr/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
[±45]2S

		CTD (B)		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		-65		75		200		250	
Moisture Conditioning		dry		dry		equilibrium		equilibrium	
Equilibrium at T, RH						160 F,85%		160 F,85%	
Source code		ABJNXXXXB		ABJNXXXXA		ABJNXXXXN		ABJNXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
$F_{12}^{s5\%strain}$ (ksi)	**Mean**		12.29		9.16		5.64		4.57
	Minimum		11.96		8.96		5.40		4.27
	Maximum		12.60		9.38		5.94		5.07
	C.V.(%)		1.58		1.44		2.18		3.97
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	
$F_{12}^{s0.2\%}$ (ksi)	**Mean**		7.25		5.45		3.38		2.66
	Minimum		7.05		5.36		3.29		2.42
	Maximum		7.39		5.58		3.45		2.85
	C.V.(%)		1.27		0.97		1.49		3.36
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	
G_{12}^{s} (Msi)	**Mean**		0.71		0.55		0.34		0.27
	Minimum		0.69		0.54		0.33		0.24
	Maximum		0.76		0.56		0.35		0.29
	C.V.(%)		2.26		1.07		1.50		3.68
	No. Specimens	19		19		19		19	
	No. Prepreg Lots	3		3		3		3	

2.3.6 Unnotched Tension 1 Properties

Material: Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass

Resin content: 54.02 vol% **Comp. density:** 1.78 [g/cc]
Fiber volume: 45.98 vol%
Ply thickness: 0.0101 - 0.0107
Ply count: 12

Test method: ASTM D3039-07 **Modulus calculation:** linear fit from 1000 to 3000 micro in/in

Normalized by: 0.0101 in. CPT

Unnotched Tension 1
G/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
[45,0,-45,0,45,0]S

		CTD (B)		RTD (A)		ETW2 (D)	
Test Temperature [°F]		-65		75		250	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		ABJAXXXXB		ABJAXXXXA		ABJXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	72.42	70.32	63.70	61.79	46.69	46.22
	Minimum	67.11	65.08	59.42	57.21	44.98	44.14
UNT1	**Maximum**	75.90	75.17	65.37	65.09	47.76	47.64
Strength (ksi)	**C.V.(%)**	3.11	3.52	2.82	3.99	1.70	2.11
	No. Specimens	20		21		8	
	No. Prepreg Lots	3		3		1	
	Mean	3.42	3.32	3.13	3.03	2.78	2.75
	Minimum	3.33	3.20	3.07	2.93	2.67	2.62
UNT1	**Maximum**	3.54	3.51	3.24	3.17	2.85	2.84
Modulus (Msi)	**C.V.(%)**	1.64	2.42	1.38	2.62	2.24	2.81
	No. Specimens	20		21		8	
	No. Prepreg Lots	3		3		1	

2.3.7 Unnotched Compression 1 Properties

Material: Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass

Resin content: 53.79 vol% **Comp. density:** 1.79 [g/cc]
Fiber volume: 46.21 vol%
Ply thickness: 0.0101-0.0105
Ply count: 12

Test method: ASTM D6641-01e1 **Modulus calculation:** linear fit from 1000 to 3000 micro in/in

Normalized by: 0.0101 in. CPT

Unnotched Compression 1
G/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
[45,0,-45,0,45,0]S

		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		75 F		200 F		250 F	
Moisture Conditioning				equilibrium		equilibrium	
Equilibrium at T, RH				160 F,85%		160 F,85%	
Source code		ABJWXXXXA		ABJWXXXXN		ABJWXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	70.76	69.88	46.79	46.39	39.73	39.07
	Minimum	67.02	64.88	43.91	43.55	36.15	34.79
	Maximum	73.21	73.02	48.65	48.37	43.56	43.16
UNC1	**C.V.(%)**	2.12	2.75	3.09	3.14	5.61	6.40
Strength (ksi)							
	No. Specimens	19		7		19	
	No. Prepreg Lots	3		1		3	
	Mean	3.30	3.26	3.09	3.07	3.28	3.23
	Minimum	3.08	3.06	2.97	2.93	2.75	2.70
	Maximum	3.44	3.41	3.23	3.21	3.61	3.58
UNC1	**C.V.(%)**	3.05	3.30	2.64	2.84	6.34	6.18
Modulus (Msi)							
	No. Specimens	19		7		19	
	No. Prepreg Lots	3		1		3	
	Mean	0.298		0.353		0.362	
νUNC1	**No. Specimens**	19		7		19	
	No. Prepreg Lots	3		1		3	

2.3.8 Laminate Short Beam Strength Properties

Material: Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass

Resin content: See FHT1 **Comp. density:** See FHT1
Fiber volume: See FHT1
Ply thickness: 0.0099 - 0.0104
Ply count: 12

Test method: ASTM D2344-00e1

Normalized by: N/A

Laminate Short Beam Strength
Gr/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
[45,0,-45,0,45,0]S

		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		75		200		250	
Moisture Conditioning		dry		equilibrium		equilibrium	
Equilibrium at T, RH							
Source code		ABJqXXXXA		ABJqXXXXN		ABJqXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		9.46		6.38		5.11
	Minimum		8.37		6.31		4.58
LSBS	**Maximum**		9.91		6.55		5.33
(ksi)	**C.V.(%)**		4.96		1.26		4.02
	No. Specimens	19		7		19	
	No. Prepreg Lots	3		1		3	

2.3.9 Lamina Short Beam Strength Properties

Material: Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass

Resin content: See WC **Comp. density:** See WC
Fiber volume: See WC
Ply thickness: .0100-.0107
Ply count: 12

Test method: ASTM D2344-00e1

Normalized by: NA

Lamina Short Beam Strength
Gr/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
$[90]_{6S}$

		CTD (B)		RTD (A)		ETD (C)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		-65		75		200		200		250	
Moisture Conditioning		dry		dry		dry		equilibrium		equilibrium	
Equilibrium at T, RH								160 F,85%		160 F,85%	
Source code		ABJQXXXXB		ABJQXXXXA		ABJQXXXXC		ABJQXXXXN		ABJQXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		12.51		9.79		7.88		6.58		5.14
	Minimum		11.30		8.93		7.26		6.13		4.68
SBS	**Maximum**		13.50		10.81		8.62		7.39		5.50
(ksi)	**C.V.(%)**		6.34		6.49		5.56		6.28		5.06
	No. Specimens	20		19		19		19		19	
	No. Prepreg Lots	3		3		3		3		3	

2.3.10 Open Hole Tension 1 Properties

Material:	Advanced Composites Group - MTM45-1/Style 6781 S2 Glass
Resin content:	53.52 vol%
Comp. density:	1.79 [g/cc]
Fiber volume:	46.48 vol%
Ply thickness:	0.0101 - 0.0107
Ply count:	12
Test method:	ASTM D5766-02a
Normalized by:	0.0101 in. CPT

Open Hole Tension 1
Gr/ Ep
ACG - MTM45-1/ Style 6781 S2 Glass
[45,0,-45,0,45,0]S

		CTD (B)		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		-65		75		200		250	
Moisture Conditioning		dry		dry		equilibrium		equilibrium	
Equilibrium at T, RH						160 F,85%		160 F,85%	
Source code		ABJDXXXXB		ABJDXXXXA		ABJDXXXXN		ABJDXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	38.93	37.81	32.06	31.08	24.43	24.26	24.34	23.64
	Minimum	37.79	36.49	30.85	29.69	24.05	23.81	23.54	22.55
OHT1	**Maximum**	39.94	39.82	32.62	32.03	25.03	24.83	25.20	24.66
Strength (ksi)	**C.V.(%)**	1.67	2.25	1.45	1.68	1.35	1.31	1.94	2.25
	No. Specimens	19		19		7		19	
	No. Prepreg Lots	3		3		1		3	

2.3.11 Open Hole Tension 2 Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass		**Open Hole Tension 2** **G/ Ep** **ACG - MTM45-1/ Style 6781** **S2 Glass** **[45,-45,0,-45,45]3**
Resin content:	53.82 vol%	**Comp. density:** 1.79 [g/cc]	
Fiber volume:	46.22 vol%		
Ply thickness:	0.0102 - 0.0105		
Ply count:	15		
Test method:	ASTM D5766-02a		
Normalized by:	0.0101 in. CPT		

		CTD (B)		RTD (A)		ETW2 (D)	
Test Temperature [°F]		-65		75		250	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		ABJEXXXXB		ABJEXXXXB		ABJEXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	37.97	36.87	30.84	30.40	20.08	19.60
	Minimum	37.14	35.66	30.15	29.95	19.92	19.28
OHT2	**Maximum**	38.93	38.01	31.24	30.80	20.28	19.91
Strength (ksi)	**C.V.(%)**	1.53	1.88	1.18	0.85	0.68	1.05
	No. Specimens	19		7		8	
	No. Prepreg Lots	3		1		1	

No scraps/specimens avaiable from panel OHT2-B-MH1 for physical testing

2.3.12 Open Hole Tension 3 Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass		**Open Hole Tension 3** **G/ Ep** **ACG - MTM45-1/ Style 6781** **S2 Glass** **$[0_3,45,0_3,-45,0_3,45,0_3]$**
Resin content:	54.22 vol%	**Comp. density:** 1.79 [g/cc]	
Fiber volume:	45.78 vol%		
Ply thickness:	0.0100 - 0.0107		
Ply count:	15		
Test method:	ASTM D5766-02a		
Normalized by:	0.0101 in. CPT		

		CTD (B)		RTD (A)		ETW2 (D)	
Test Temperature [°F]		-65		75		250	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		ABJFXXXXB		ABJFXXXXA		ABJFXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	44.69	43.49	38.33	37.72	26.00	25.78
	Minimum	40.99	39.58	37.04	36.23	25.22	24.74
OHT3	**Maximum**	46.65	46.20	39.46	38.80	26.87	26.76
Strength (ksi)	**C.V.(%)**	3.36	3.98	2.37	2.57	1.92	2.69
	No. Specimens	20		8		7	
	No. Prepreg Lots	3		1		1	

2.3.13 Filled Hole Tension 1 Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass					**Filled Hole Tension 1** G/ Ep ACG - MTM45-1/ Style 6781 S2 Glass [45,0,-45,0,45,0]S	
Resin content:	53.71 vol%	**Comp. density:** 1.79 [g/cc]					
Fiber volume:	46.29 vol%						
Ply thickness:	0.0101-0.0104						
Ply count:	12						
Test method:	ASTM D6742-02						
Normalized by:	0.0101 in. CPT						
		CTD (B)		**RTD (A)**			
Test Temperature [°F]		-65		75			
Moisture Conditioning		dry		dry			
Equilibrium at T, RH							
Source code		ABJ4XXXXB		ABJ4XXXXA			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	41.07	40.30	34.47	34.13		
	Minimum	39.61	38.65	33.42	33.03		
	Maximum	42.30	41.64	35.10	34.90		
FHT1	**C.V.(%)**	1.95	2.09	1.97	2.09		
Strength (ksi)							
	No. Specimens	19		7			
	No. Prepreg Lots	3		1			

No additional scrap/specimens from FHT1-A-MH1 for physical testing

2.3.14 Open Hole Compression 1 Properties

Material:	Advanced Composites Group -MTM45-1/ Style 6781 S2 Glass		**Open Hole Compression 1** **Gr/ Ep** **ACG - MTM45-1/ Style 6781 S2 Glass** **[45,0,-45,0,45,0]S**
Resin content:	50.00 vol%	**Comp. density:** 1.803 [g/cc]	
Fiber volume:	50.00 vol%		
Ply thickness:	0.0100 - 0.0106		
Ply count:	12		
Test method:	ASTM D6484-04		
Normalized by:	0.0101 in. CPT		

		RTD (A)		ETW (N)		ETW2 (D)	
Test Temperature [°F]		75		200		250	
Moisture Conditioning		dry		equilibrium		equilibrium	
Equilibrium at T, RH				160 F,85%		160 F,85%	
Source code		ABJGXXXXA		ABJGXXXXN		ABJGXXXXD	
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	37.02	36.37	26.30	26.26	23.48	23.05
	Minimum	36.06	35.16	25.75	25.49	22.61	21.99
OHC1	**Maximum**	38.26	37.43	26.86	26.81	24.28	24.38
Strength (ksi)	**C.V.(%)**	1.58	1.71	1.55	1.73	2.09	2.64
	No. Specimens	20		7		19	
	No. Prepreg Lots	3		1		3	

2.3.15 Open Hole Compression 2 Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass		**Open Hole Compression 2** **G/ Ep** **ACG - MTM45-1/ Style 6781 S2 Glass** **$[45,-45,0,-45,45]_3$**
Resin content:	50.97 vol%	**Comp. density:** 1.79 [g/cc]	
Fiber volume:	49.03 vol%		
Ply thickness:	0.0100 - 0.0105		
Ply count:	15		
Test method:	ASTM D6484-04		
Normalized by:	0.0101 in. CPT		

		RTD (A)		ETW2 (D)			
Test Temperature [°F]		75		250			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		ABJHXXXXA		ABJHXXXXD			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	31.56	31.44	20.14	19.73		
	Minimum	30.77	30.89	17.47	16.82		
OHC2	**Maximum**	32.14	31.85	22.18	21.83		
Strength (ksi)	**C.V.(%)**	1.71	0.99	5.64	6.42		
	No. Specimens	7		19			
	No. Prepreg Lots	1		3			

2.3.16 Open Hole Compression 3 Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass					**Open Hole Compression 3**	
Resin content:	53.53 vol%	**Comp. density:** 1.79 [g/cc]				**G/ Ep**	
Fiber volume:	46.47 vol%					**ACG - MTM45-1/ Style 6781 S2 Glass**	
Ply thickness:	0.0101 - 0.0105					**[0_3,45,0_3,-45,0_3,45,0_3]**	
Ply count:	15						
Test method:	ASTM D6484-04						
Normalized by:	0.0101 in. CPT						
		RTD (A)		**ETW2 (D)**			
Test Temperature [°F]		75		250			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		ABJIXXXXA		ABJIXXXXD			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	41.08	40.73	26.05	25.62		
	Minimum	40.53	39.97	23.33	23.06		
OHC3	**Maximum**	41.89	41.63	27.80	27.35		
Strength (ksi)	**C.V.(%)**	1.278	1.55	4.55	4.82		
	No. Specimens	7		19			
	No. Prepreg Lots	1		3			

2.3.17 Filled Hole Compression 1 Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass		**Filled Hole Compression 1** **G/ Ep** **ACG - MTM45-1/ Style 6781 S2 Glass** **[45,0,-45,0,45,0]S**
Resin content:	53.86 vol%	**Comp. density:** 1.79 [g/cc]	
Fiber volume:	46.14 vol%		
Ply thickness:	0.0101 - 0.0106		
Ply range:	12		
Test method:	ASTM D6742-02		
Normalized by:	0.0101 in. CPT		

		RTD (A)		ETW2 (D)			
Test Temperature [°F]		75		250			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		ABJ7XXXXA		ABJ7XXXXD			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	56.05	55.58	35.21	34.43		
	Minimum	54.59	53.93	31.64	31.27		
FHC1	**Maximum**	58.34	57.86	40.91	39.75		
Strength (ksi)	**C.V.(%)**	2.26	2.50	6.97	7.10		
	No. Specimens	7		20			
	No. Prepreg Lots	1		3			

2.3.18 Pin Bearing 1 Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass					**Pin Bearing 1**	
Resin content:	53.38 vol%	**Comp. density:** 1.80 [g/cc]				**G/ Ep**	
Fiber volume:	46.62 vol%					**ACG - MTM45-1/ Style 6781 S2 Glass**	
Ply thickness:	0.0101 - 0.0106					**[45,0,-45,0,45,0]S**	
Ply count:	12						
Test method:	ASTM D5961-05						
Normalized by:	0.0101 in CPT						
		RTD (A)		**ETW2 (D)**			
Test Temperature [°F]		75		250			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		ABJ1XXXXA		ABJ1XXXXD			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	82.73	80.85	63.82	62.56		
	Minimum	77.00	76.41	53.10	52.80		
	Maximum	91.12	90.01	70.59	68.85		
PB1	**C.V.(%)**	4.01	4.07	7.22	6.83		
2% offset Strength							
(ksi)	**No. Specimens**	22		19			
	No. Prepreg Lots	3		3			

2.3.19 Compression after Impact Properties

Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass				**Compression After Impact**	
					Gr/ Ep	
Resin content:	53.03 vol%	**Comp. density:**	1.80 [g/cc]		**ACG - MTM45-1/ Style 6781 S2 Glass**	
Fiber volume:	46.62 vol%				**[0,45,90,-45]2S**	
Ply thickness:	0.0101-0.0102					
Ply count:	16					
Test method:	SACMA SRM2-94					
Normalized by:	0.0101 in. CPT					
		RTD (A)				
Test Temperature [°F]		75				
Moisture Conditioning		dry				
Equilibrium at T, RH						
Source code		ABJKXXXXA				
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean	31.87	31.53				
	Minimum	30.73	30.34				
CAI	**Maximum**	33.83	33.37				
Strength (ksi)	**C.V.(%)**	3.94	4.00				
	No. Specimens	7					
	No. Prepreg Lots	1					

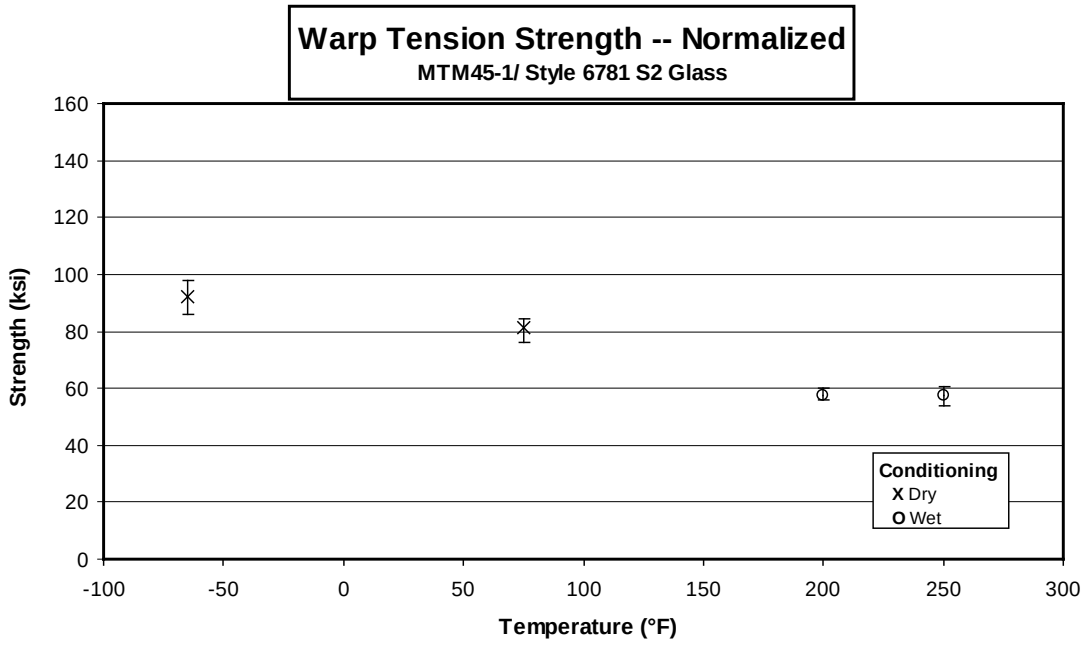
2.3.20 Interlaminar Tension Properties

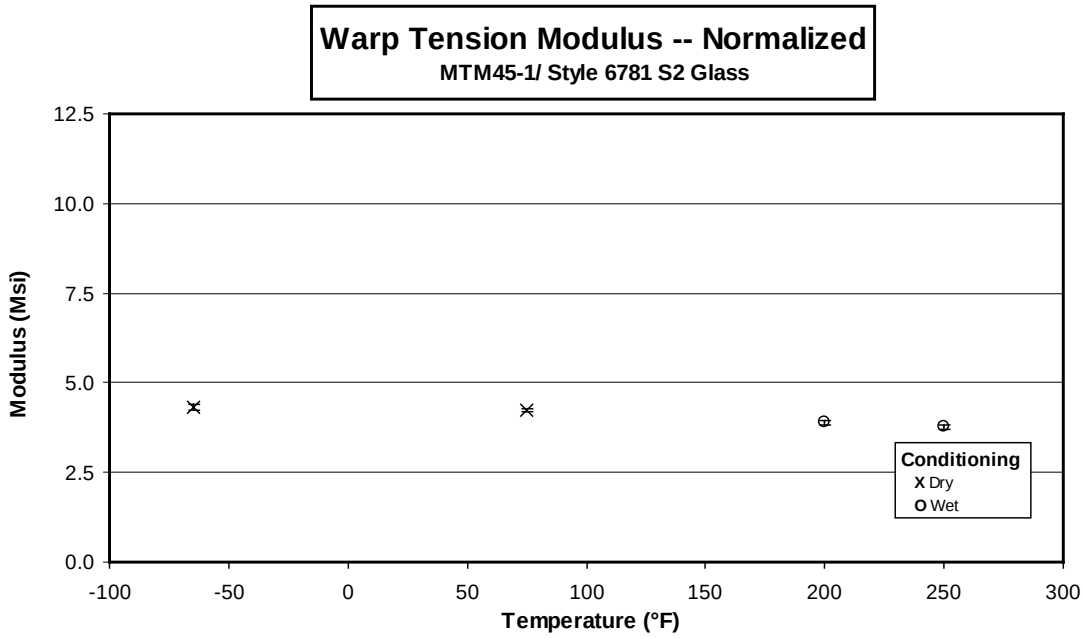
Material:	Advanced Composites Group - MTM45-1/ Style 6781 S2 Glass					**Interlaminar Tension** Gr/ Ep ACG - MTM45-1/ Style 6781 S2 Glass [0,45,90,-45]2S	
Resin content:	53.28 vol%		**Comp. density:** 1.80 [g/cc]				
Fiber volume:	46.72 vol%						
Ply thickness:	0.011 - 0.012						
Ply count:	16						
Test method:	ASTM D6415-99e1						
Normalized by:	N/A						
		RTD (A)		**ETW2 (D)**			
Test Temperature [°F]		75		250			
Moisture Conditioning		dry		equilibrium			
Equilibrium at T, RH				160 F,85%			
Source code		ABJMXXXXA		A0NMXXXXD			
		Normalized	**Measured**	**Normalized**	**Measured**	**Normalized**	**Measured**
	Mean		6.13		2.60		
	Minimum		5.04		1.55		
ILT	**Maximum**		6.84		2.98		
Strength (ksi)	**C.V.(%)**		9.74		18.91		
	No. Specimens	6		7			
	No. Prepreg Lots	1		1			

3. Individual Test Charts

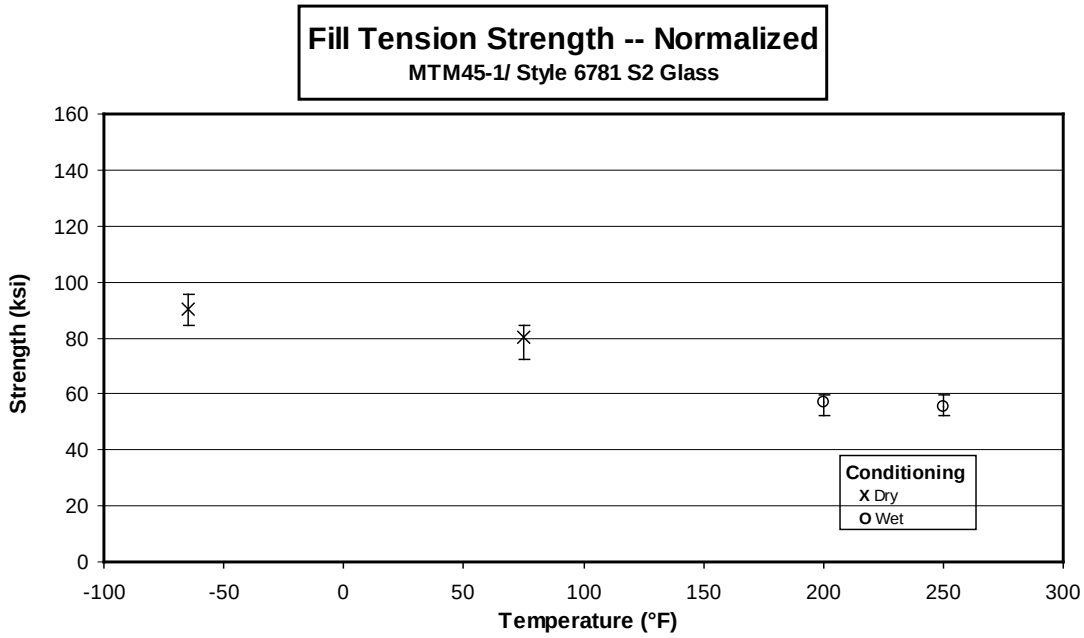
These charts combine all three batches of data and plot the minimum and maximum modulus and strength range based on the test temperature.

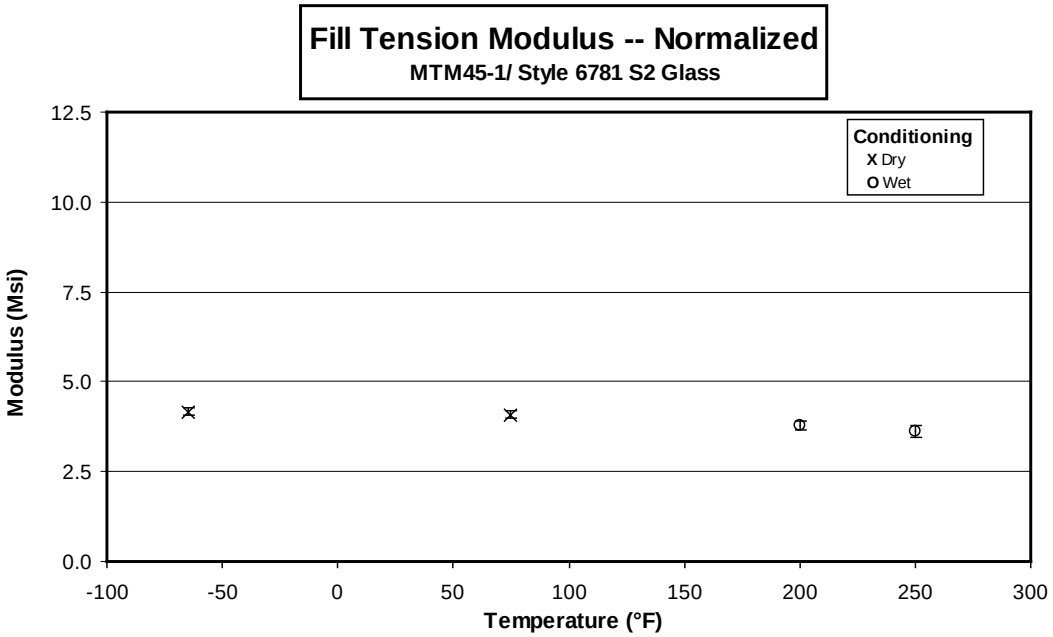
3.1 Warp Tension Properties



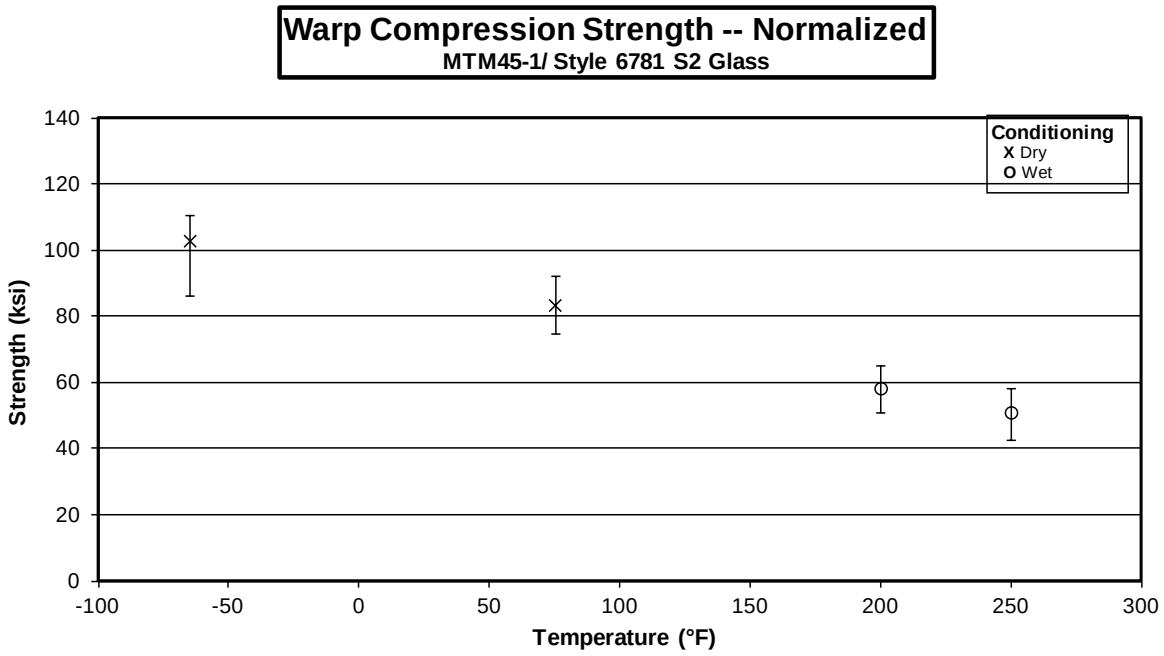


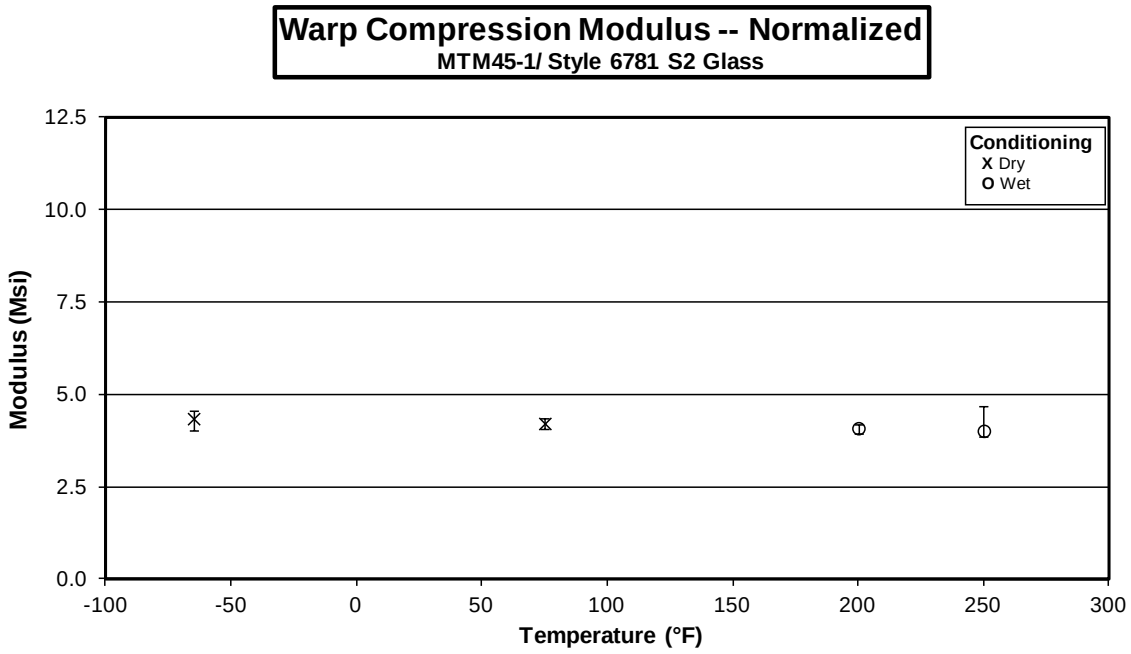
3.2 Fill Tension Properties



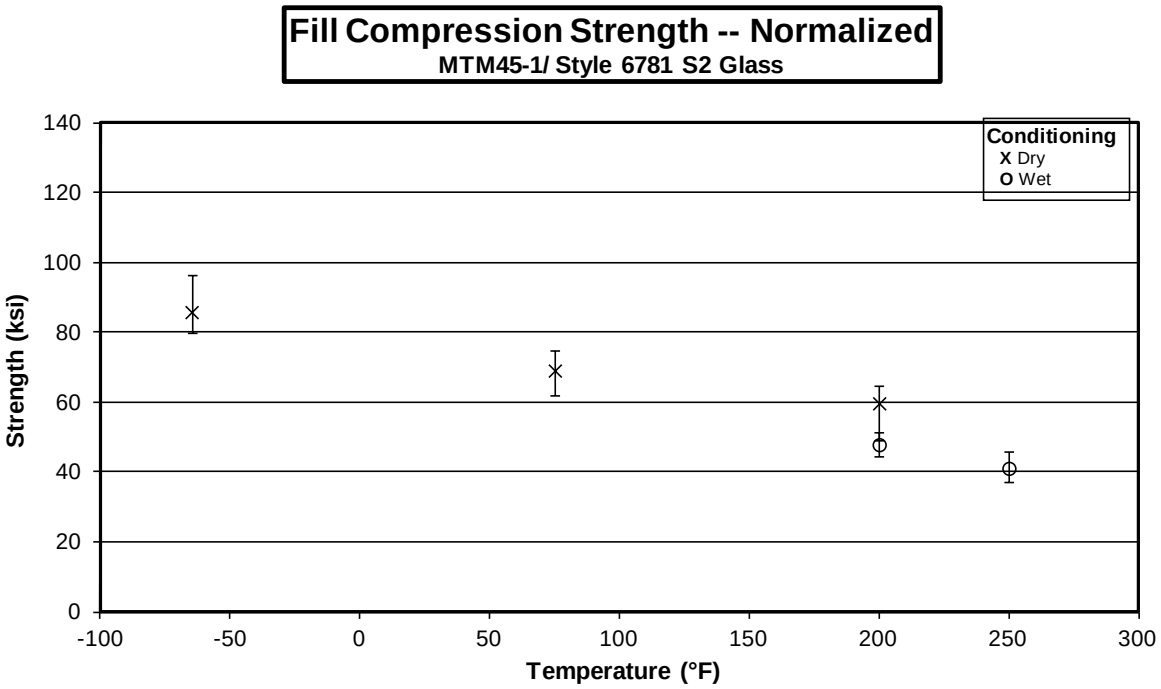


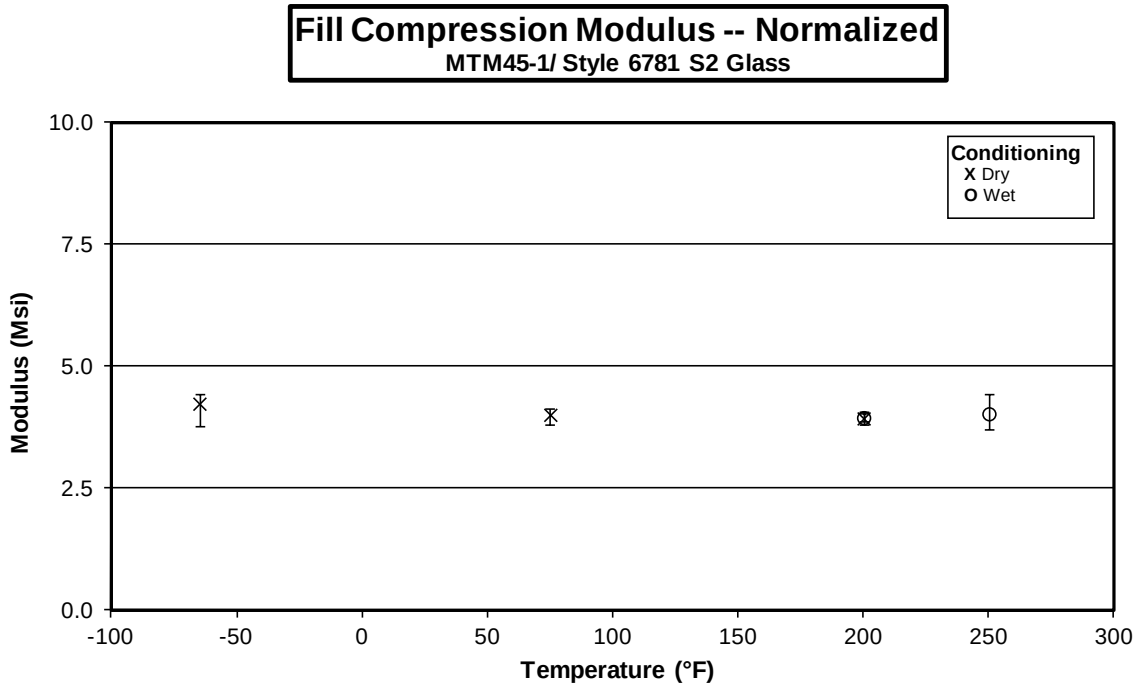
3.3 Warp Compression Properties



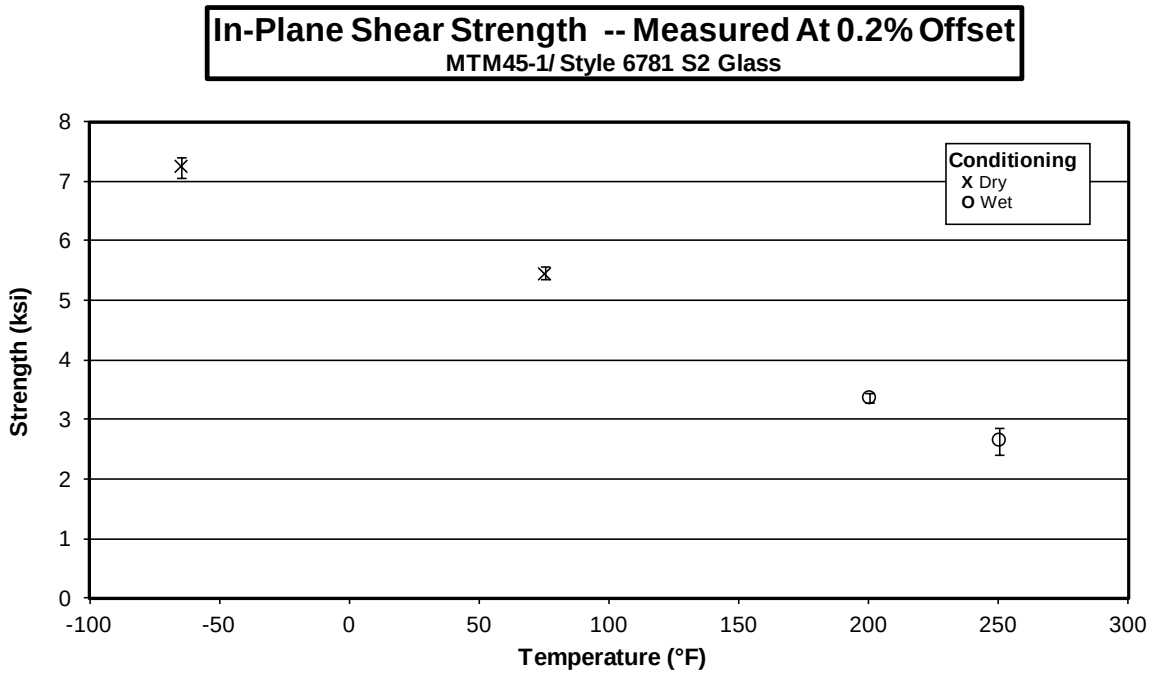


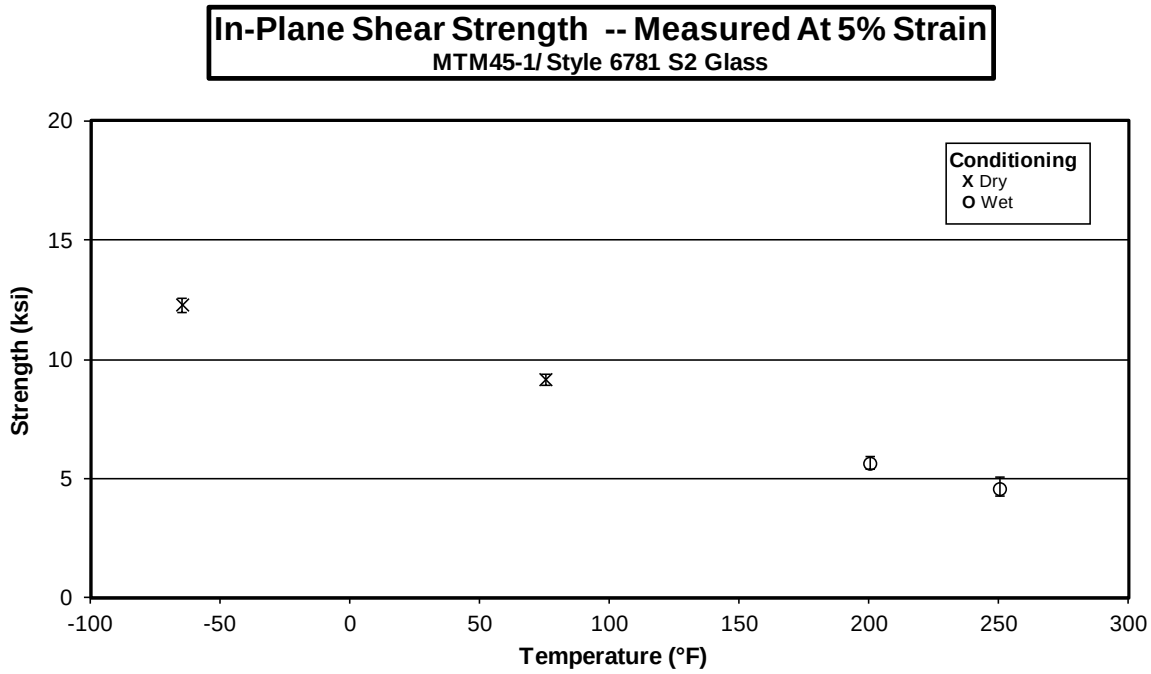
3.4 Fill Compression Properties

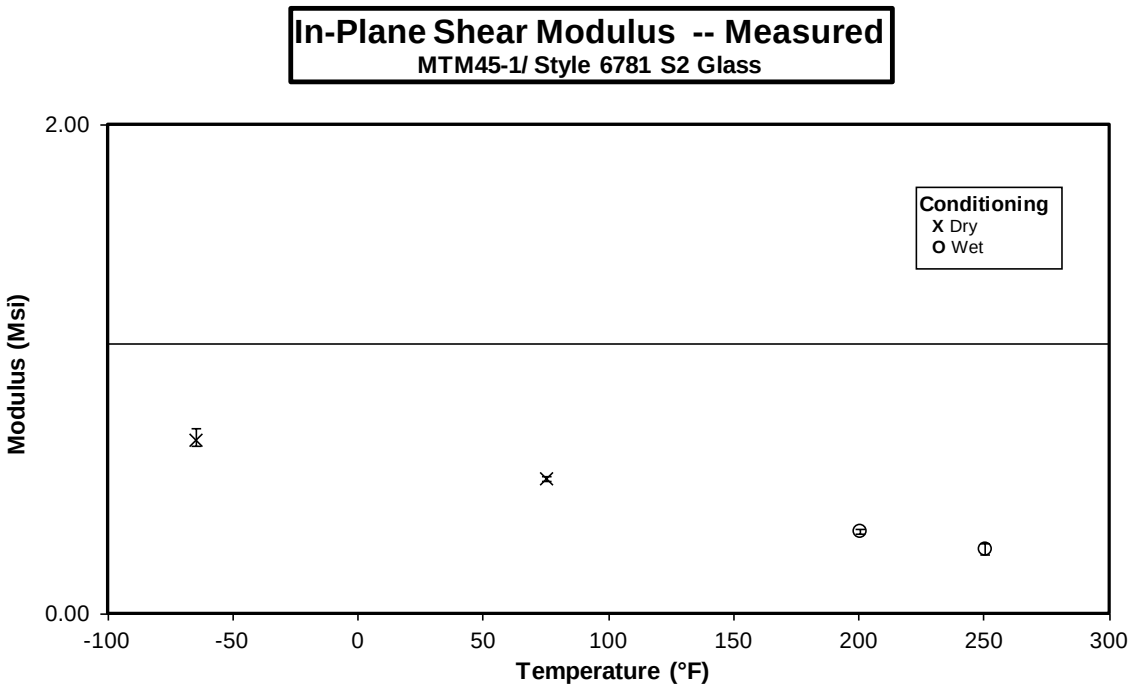




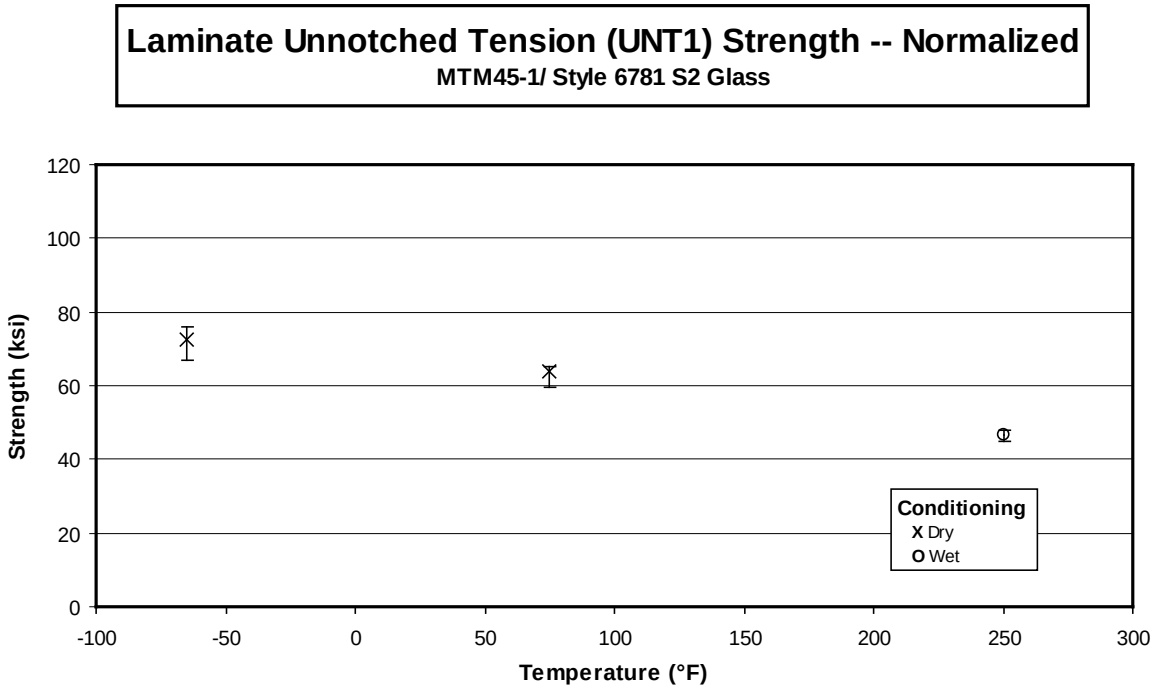
3.5 In-Plane Shear Properties

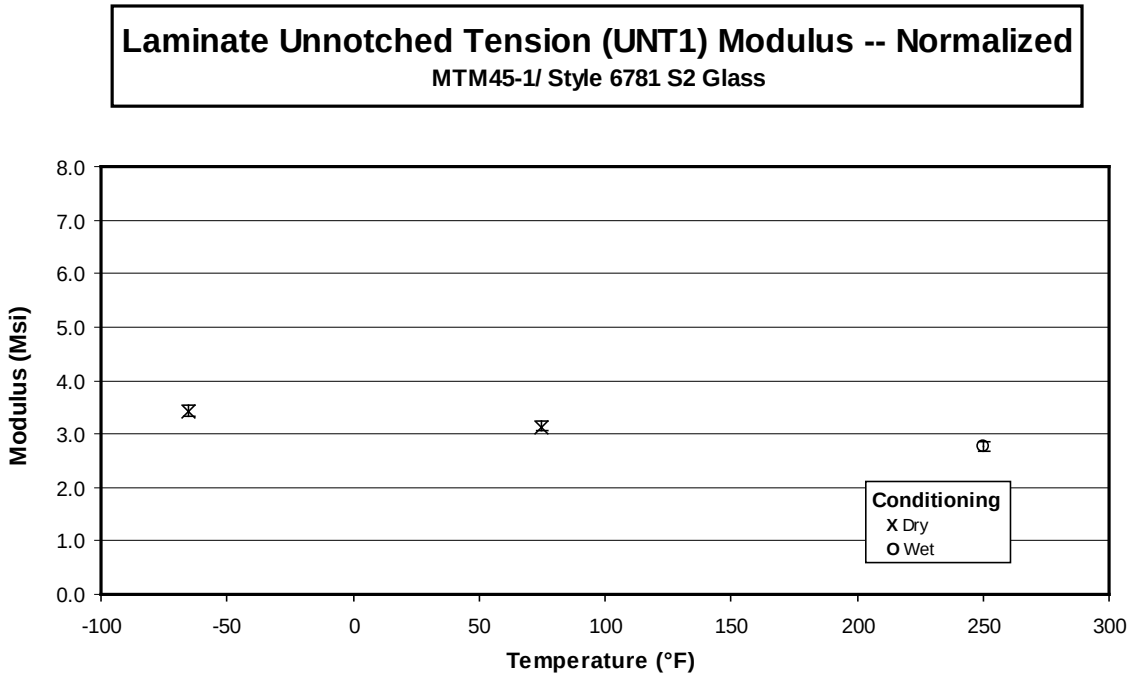




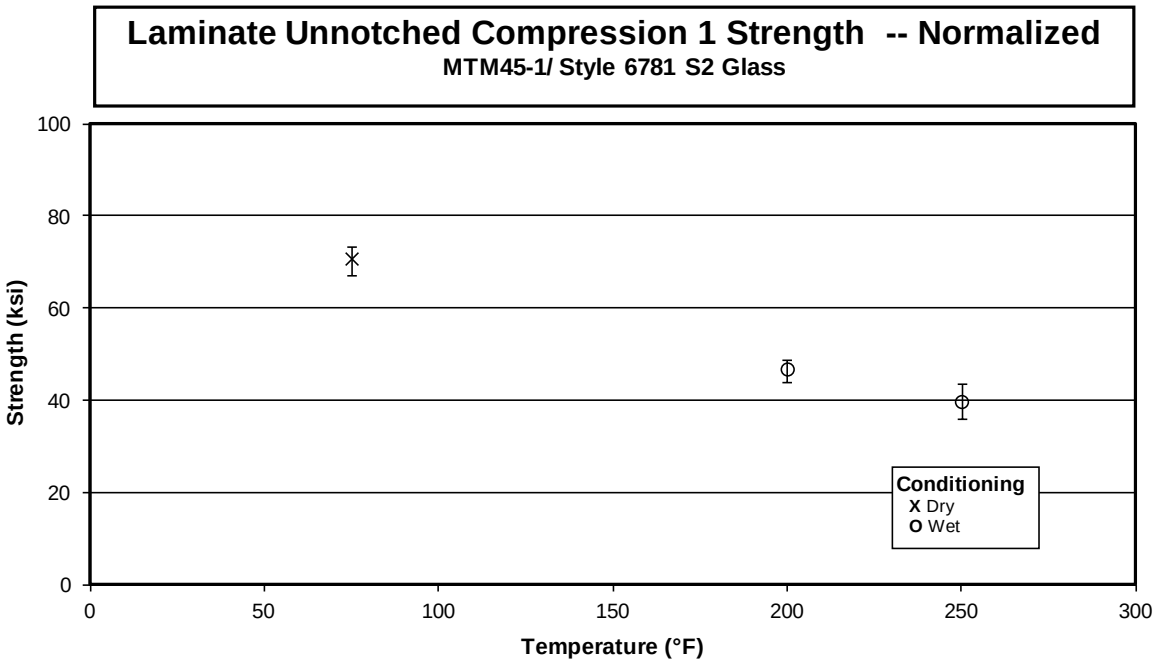

In-Plane Shear Modulus -- Measured
MTM45-1/ Style 6781 S2 Glass
2.00
0.00
Modulus (Msi)
Conditioning
X Dry
O Wet
-100
-50
0
50
100
150
200
250
300
Temperature (°F)

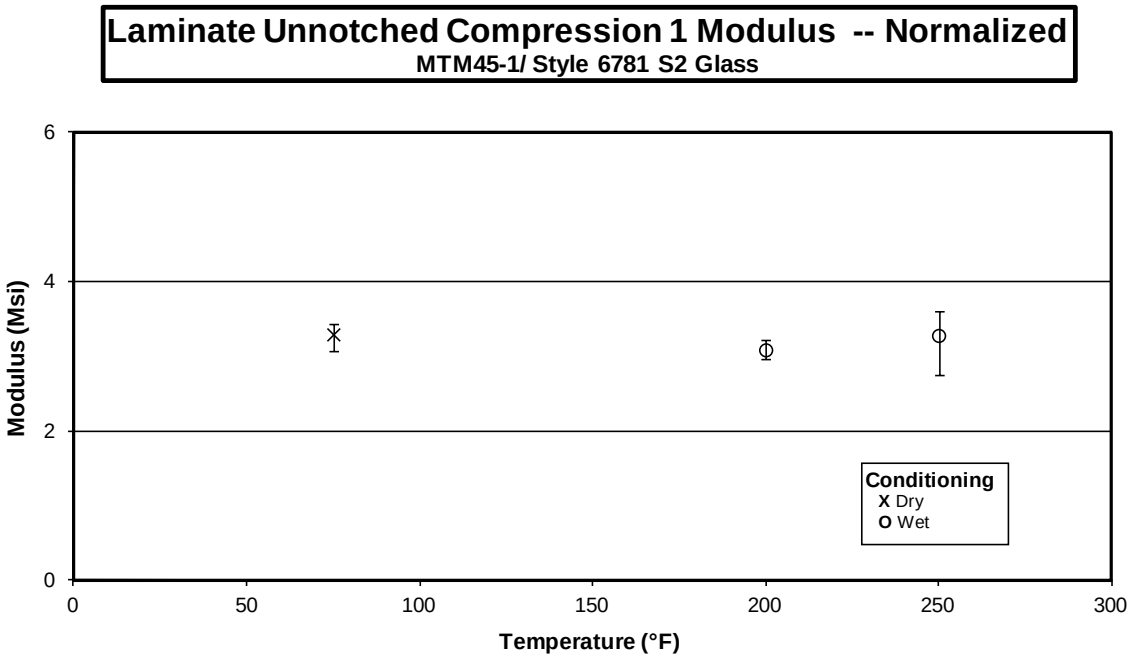
3.6 Unnotched Tension 1 Properties



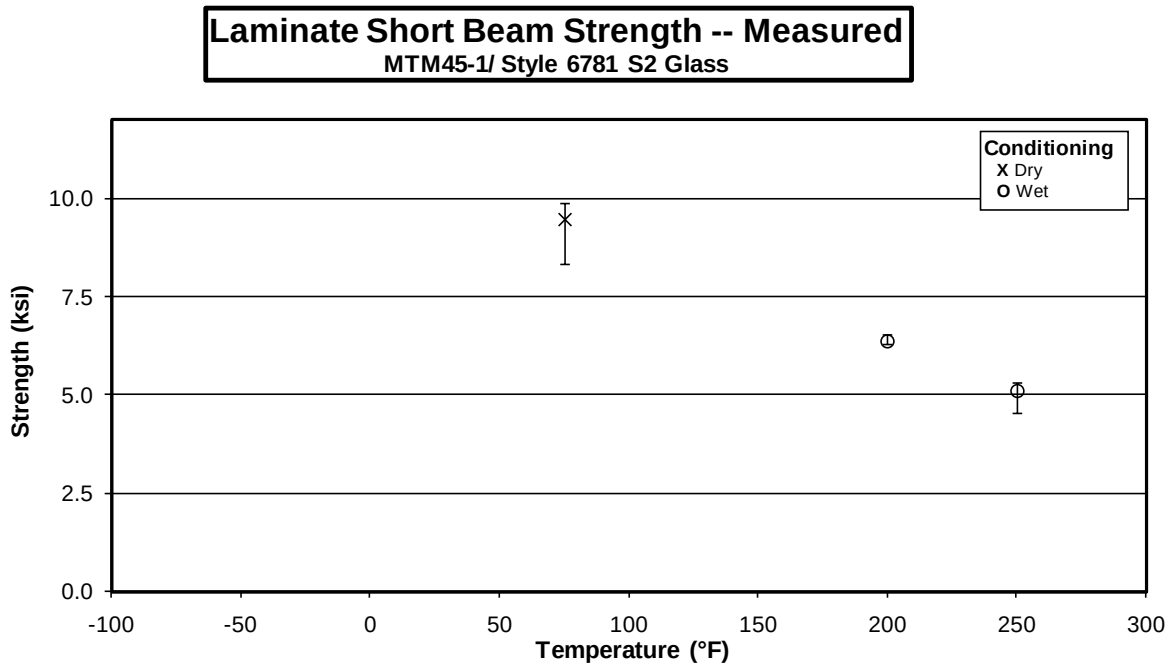


3.7 Unnotched Compression 1 Properties

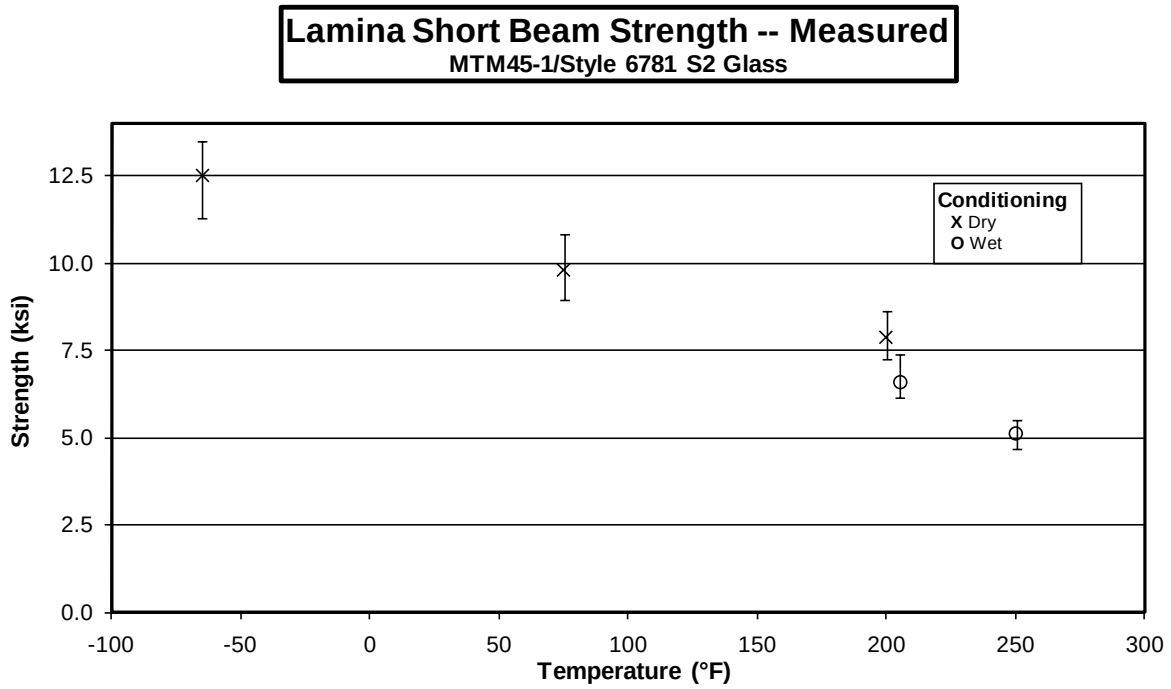




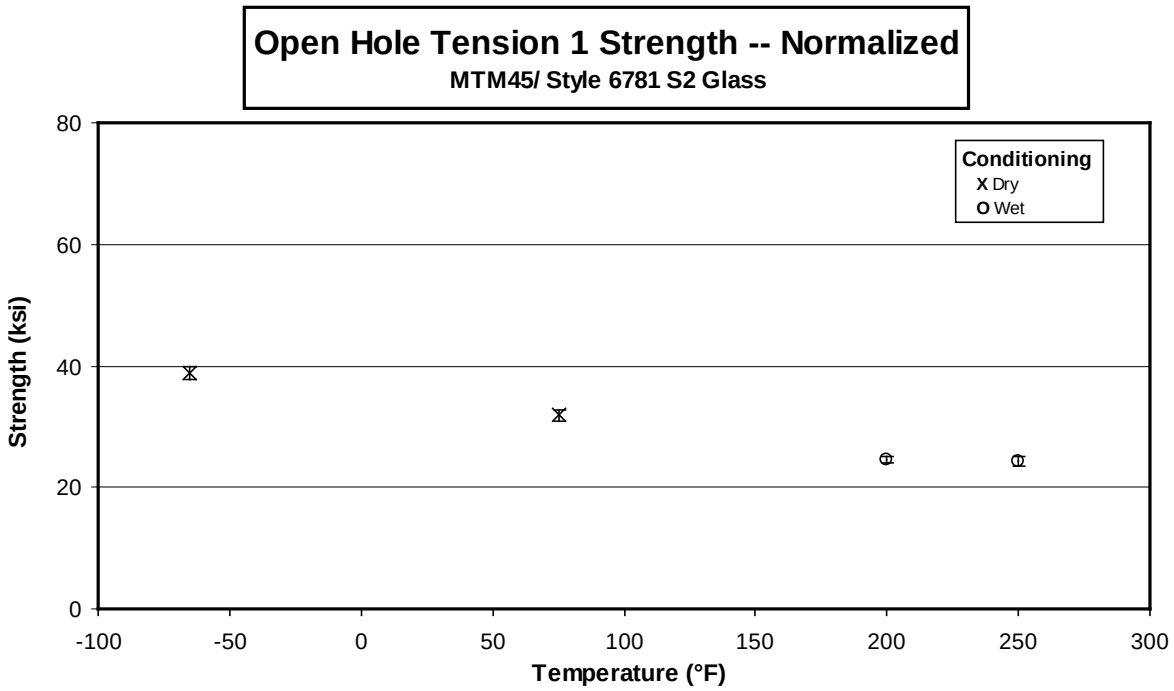
3.8 Laminate Short Beam Strength Properties



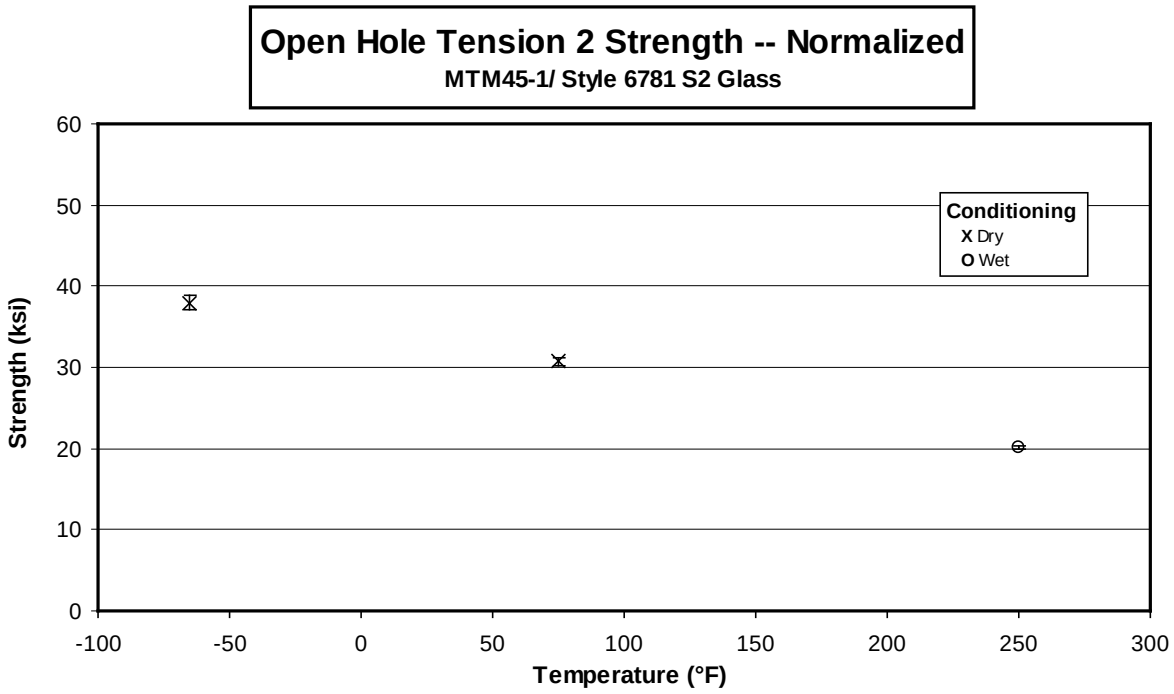
3.9 Lamina Short Beam Strength Properties



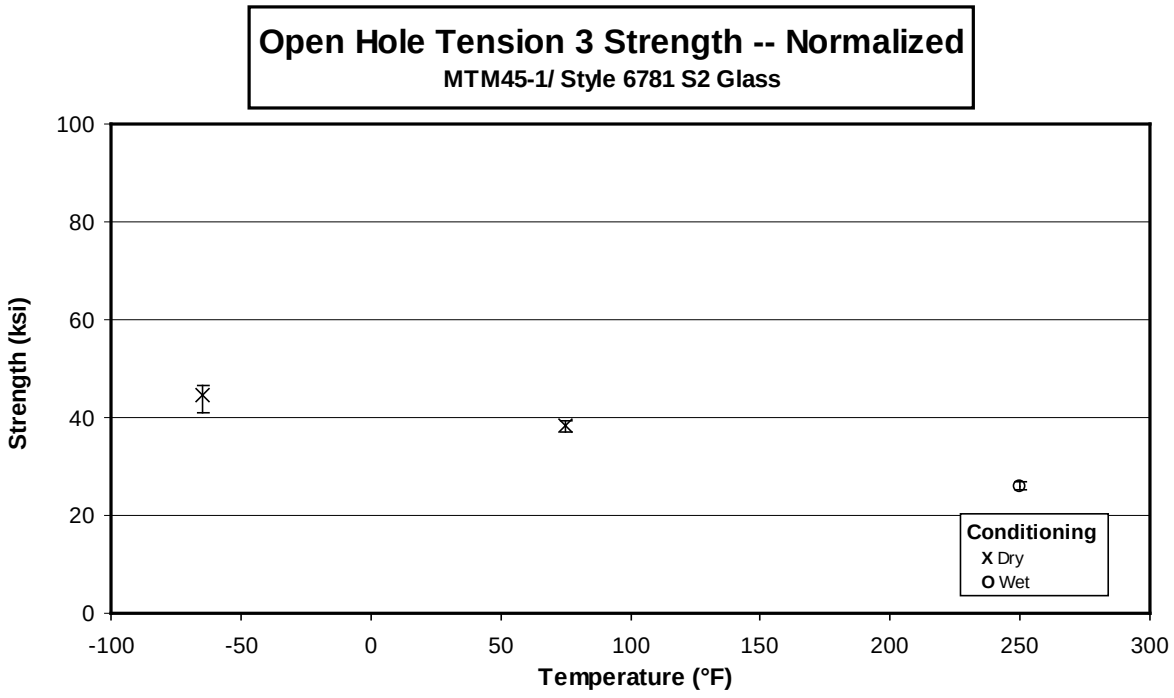
3.10 Open Hole Tension 1 Properties



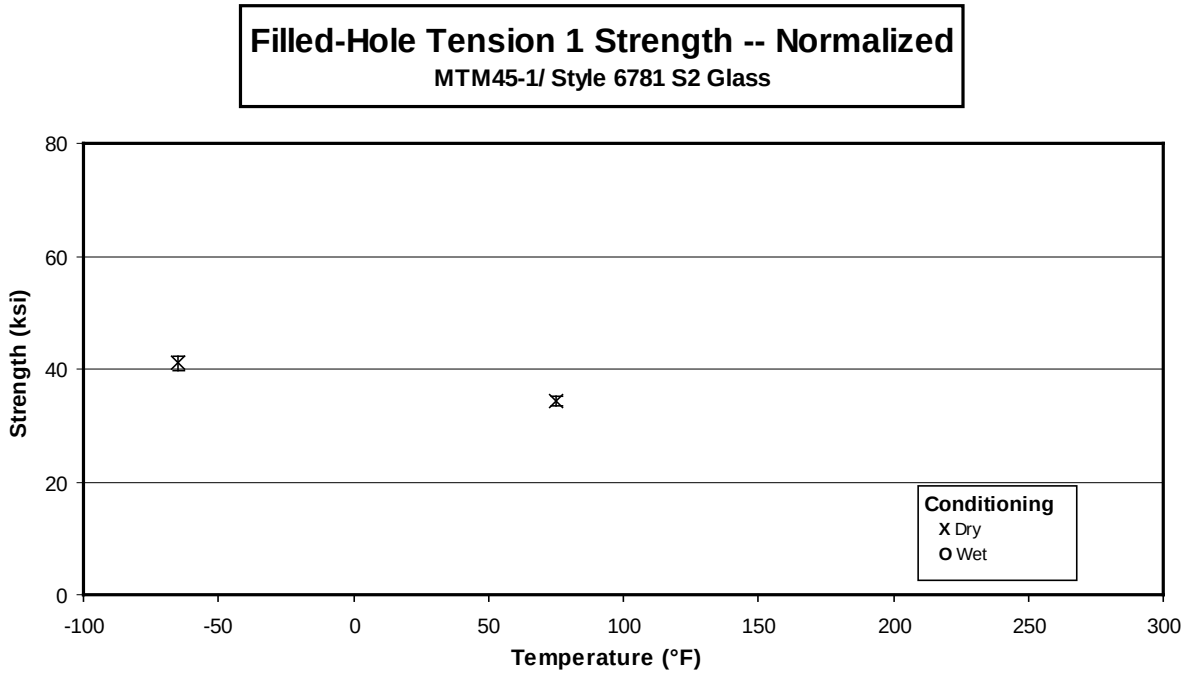
3.11 Open Hole Tension 2 Properties



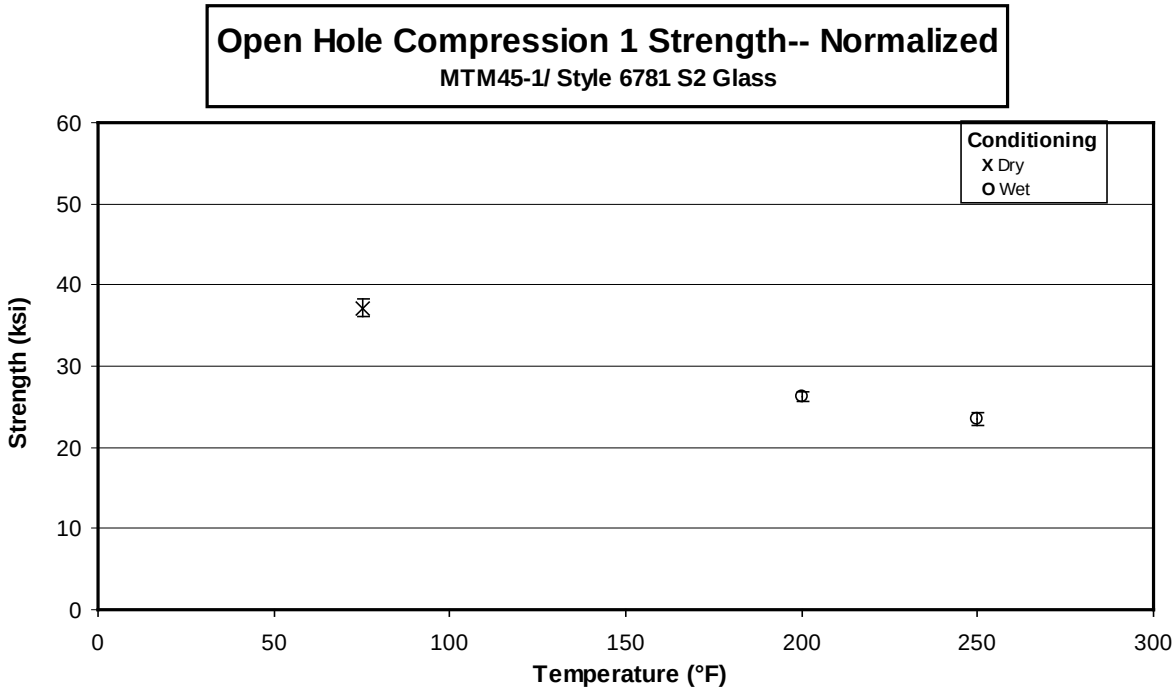
3.12 Open Hole Tension 3 Properties



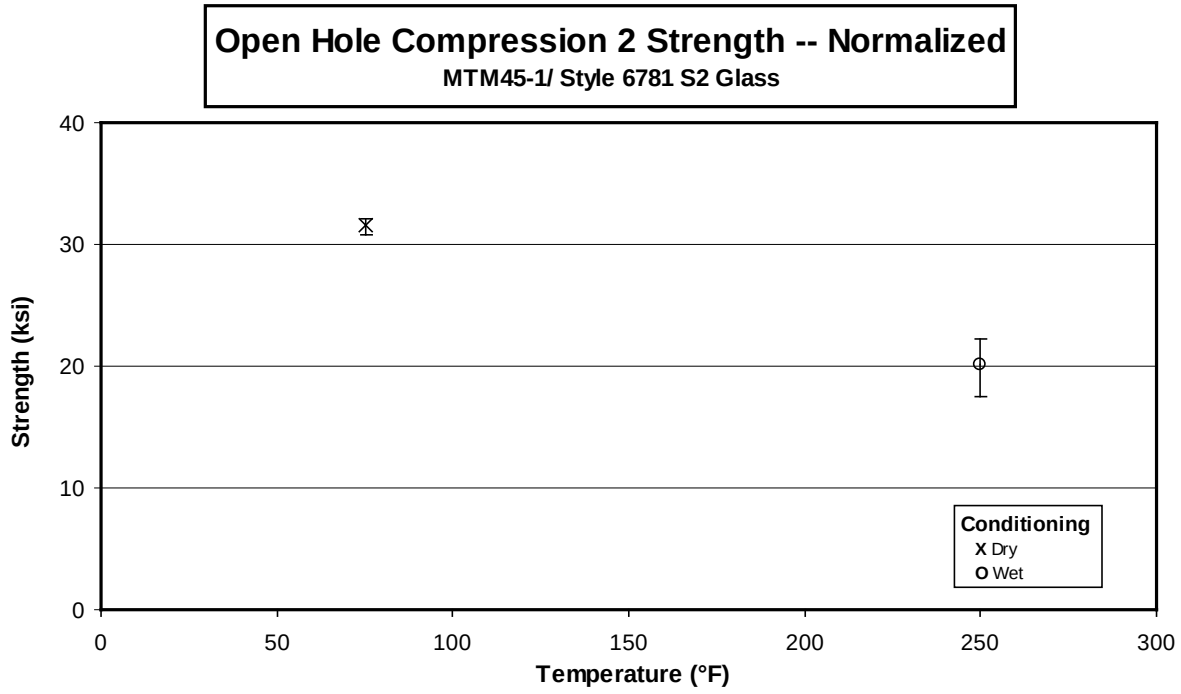
3.13 Filled Hole Tension 1 Properties



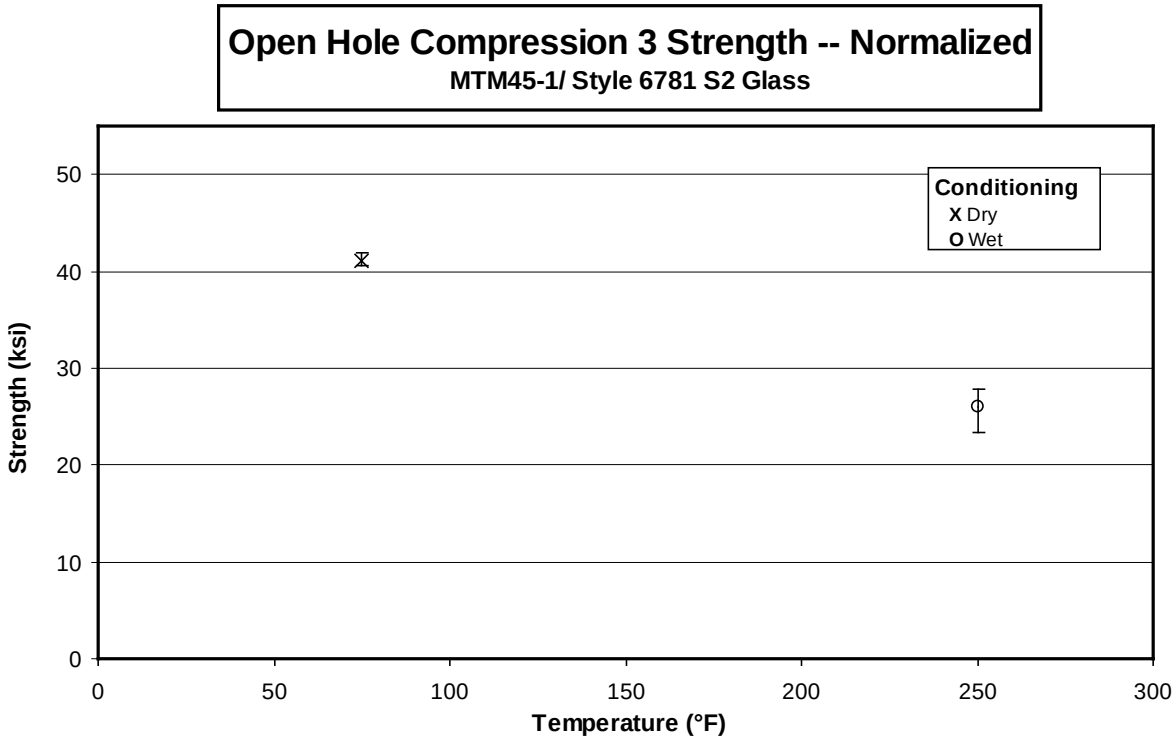
3.14 Open Hole Compression 1 Properties



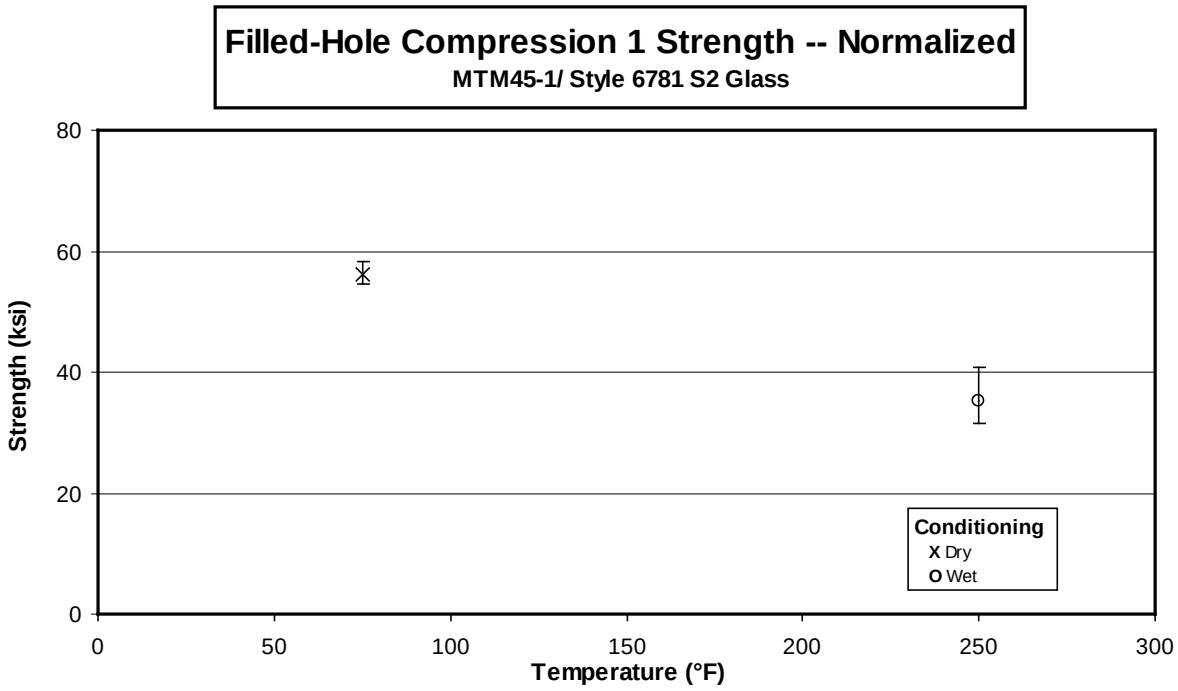
3.15 Open Hole Compression 2 Properties



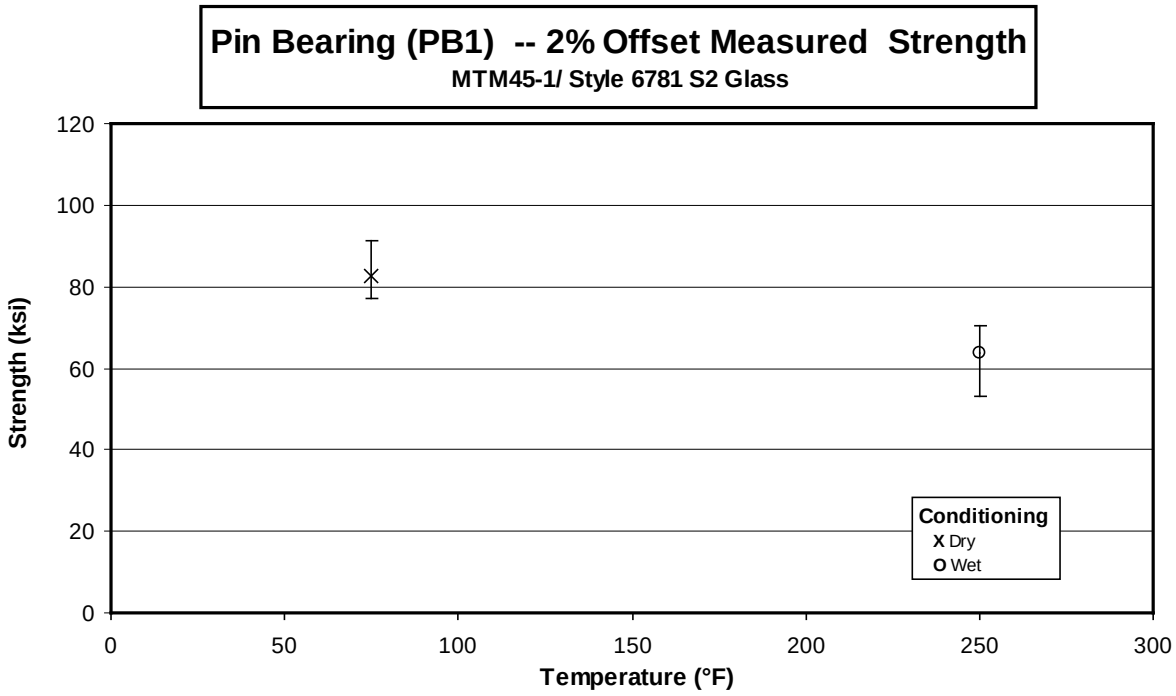
3.16 Open Hole Compression 3 Properties



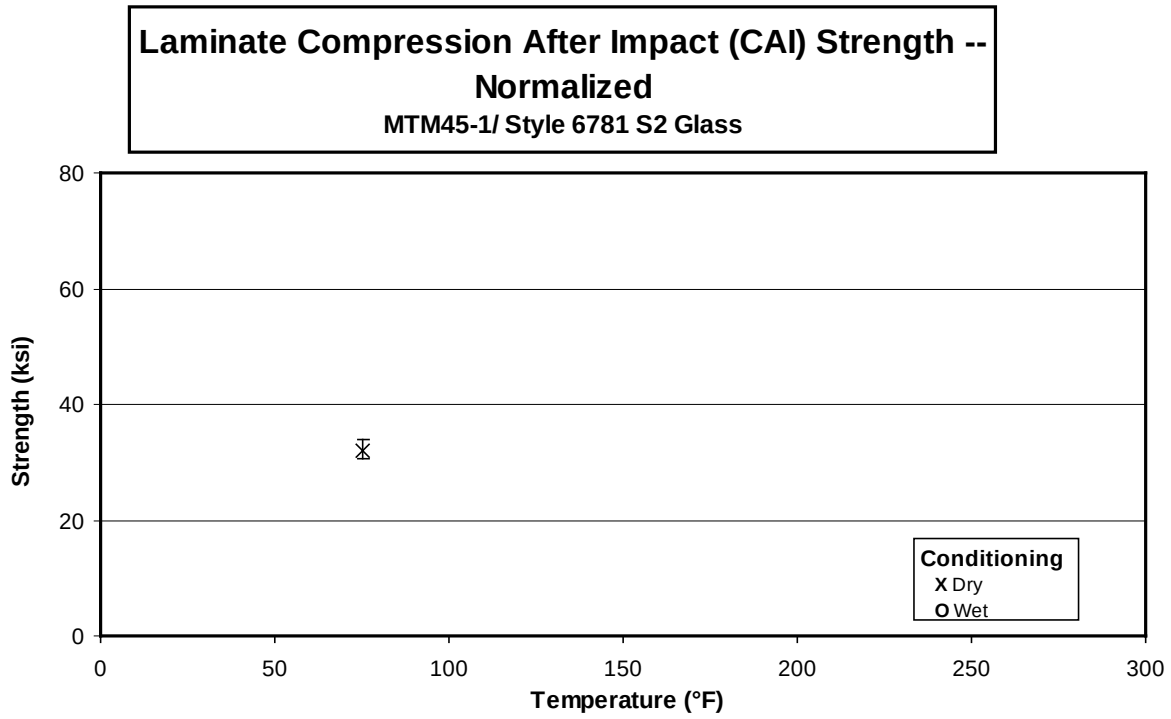
3.17 Filled Hole Compression 1 Properties



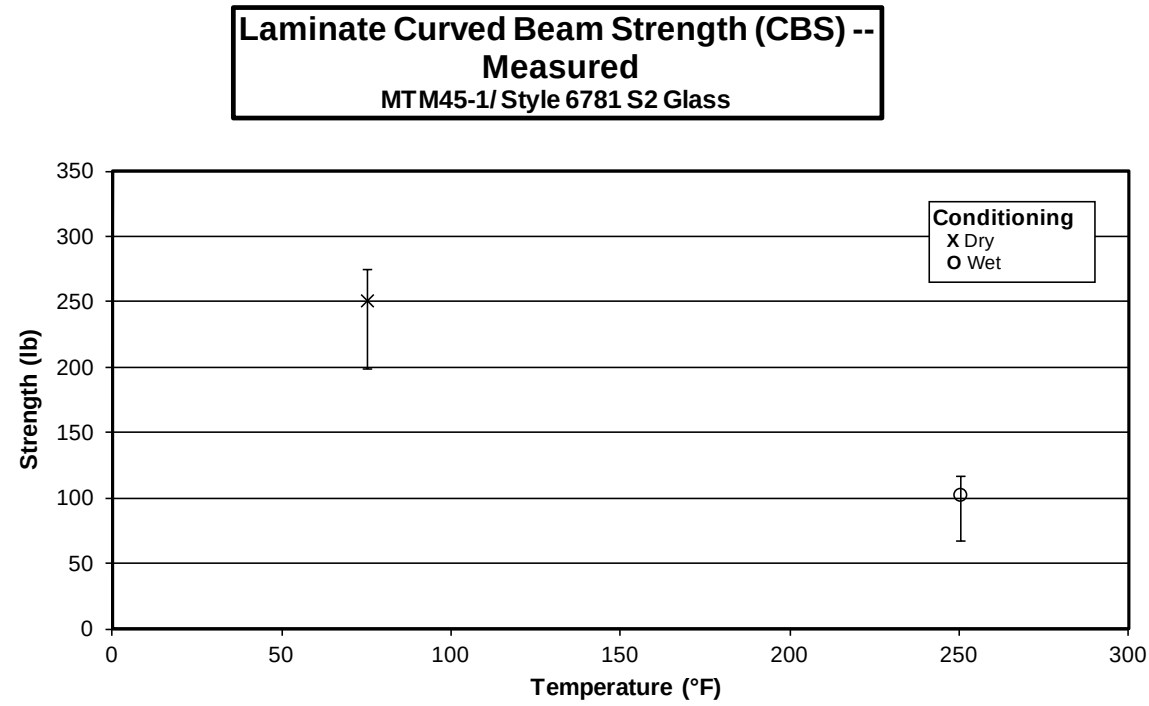
3.18 Pin Bearing 1 Properties

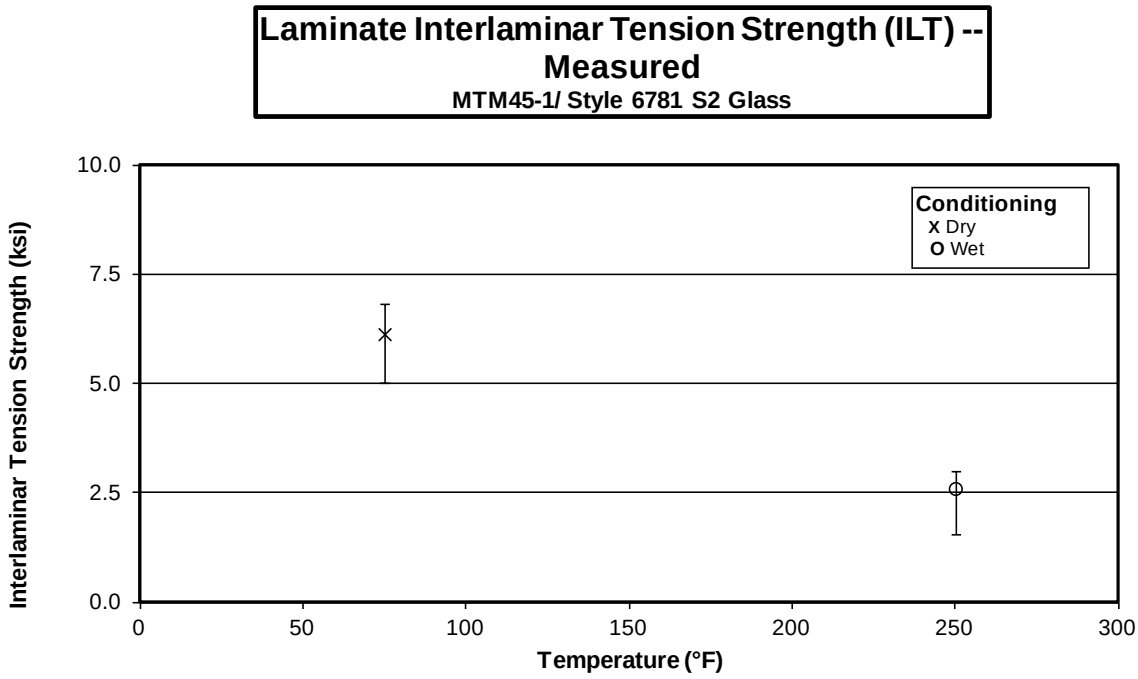


3.19 Compression Strength After Impact 1 Properties



3.20 Interlaminar Tension Properties





4. Raw Data

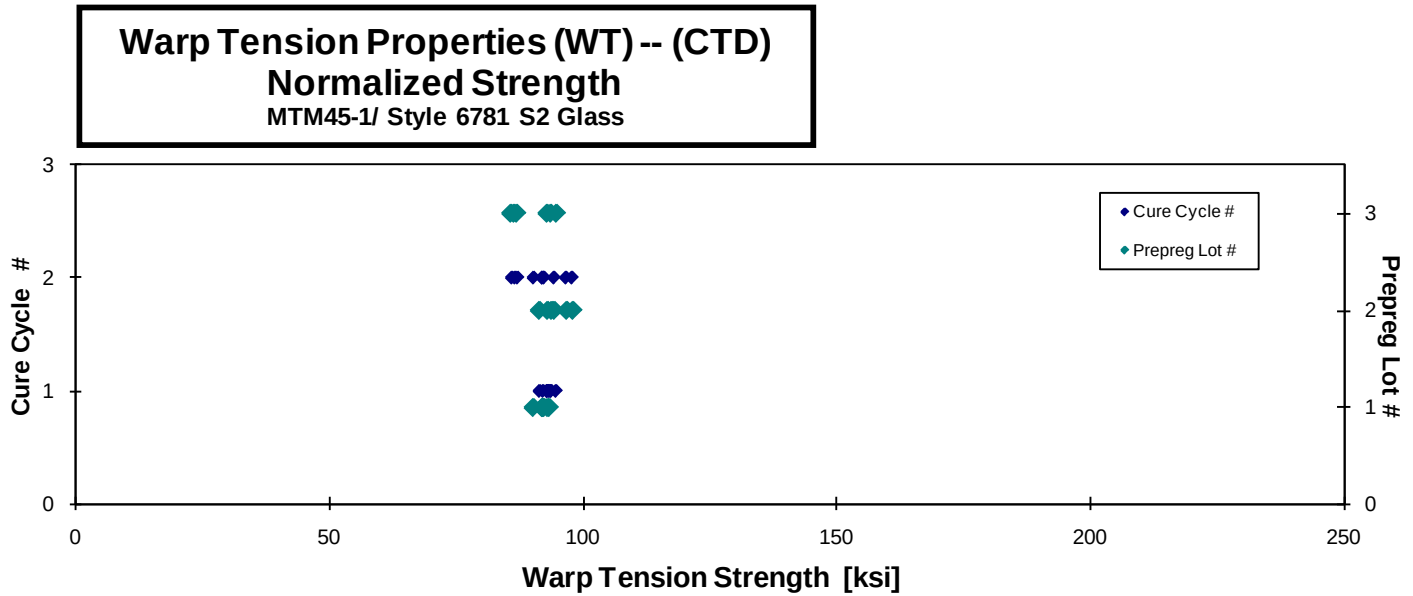
4.1 Warp Tension Properties

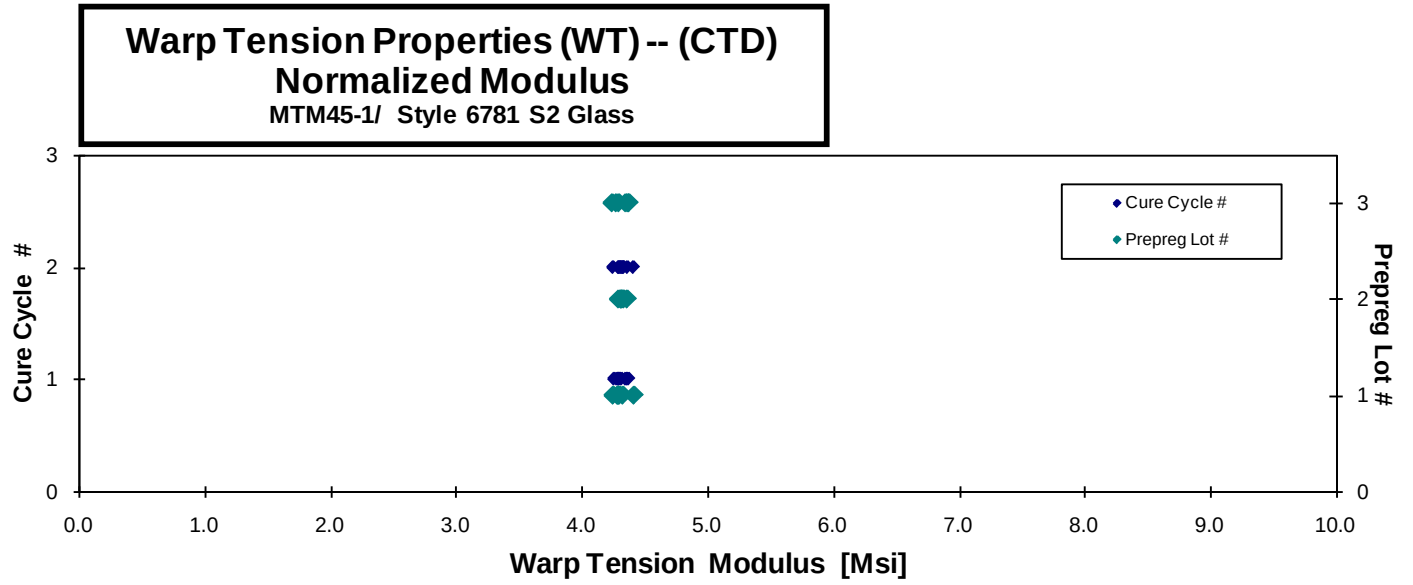
Warp Tension Properties (WT) -- (CTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJJA115B	A	MH1	1	1	92.481	4.256	0.122	12	LAT	0.0102	93.422	4.299
ABJJA116B	A	MH1	1	1	92.068	4.239	0.123	12	DGM	0.0102	93.094	4.286
ABJJA117B	A	MH1	1	1	91.310	4.209	0.122	12	LAT	0.0102	92.214	4.251
ABJJA118B	A	MH1	1	2	89.447	4.246	0.122	12	LAT	0.0102	90.320	4.288
ABJJA215B	A	MH2	1	2	91.182	4.242	0.123	12	DGM	0.0102	92.411	4.299
ABJJA216B	A	MH2	1	2	90.564	4.256	0.123	12	LAT	0.0103	92.046	4.326
ABJJA217B	A	MH2	1	2	90.552	4.337	0.123	12	DGM / LAT	0.0103	92.121	4.412
ABJJB115B	B	MH1	2	1	87.355	4.161	0.127	12	LAT	0.0106	91.511	4.359
ABJJB116B	B	MH1	2	1	90.029	4.117	0.126	12	DGM	0.0105	93.867	4.293
ABJJB117B	B	MH1	2	1	88.415	4.098	0.128	12	DGM/LAT	0.0106	93.096	4.315
ABJJB215B	B	MH2	2	2	91.935	4.198	0.124	12	LAT	0.0104	94.401	4.311
ABJJB216B	B	MH2	2	2	93.985	4.207	0.125	12	DGM / LWB	0.0104	96.802	4.334
ABJJB217B	B	MH2	2	2	94.341	4.160	0.126	12	DGM	0.0105	98.000	4.322
ABJJC115B	C	MH1	3	1	92.736	4.278	0.124	12	LAT	0.0103	94.802	4.374
ABJJC116B	C	MH1	3	1	90.783	4.173	0.124	12	DGM	0.0103	92.992	4.274
ABJJC117B	C	MH1	3	1	91.274	4.235	0.124	12	DGM	0.0104	93.709	4.348
ABJJC215B	C	MH2	3	2	84.208	4.244	0.125	12	DGM	0.0104	86.582	4.363
ABJJC216B	C	MH2	3	2	84.907	4.186	0.124	12	DGM	0.0104	87.114	4.295
ABJJC217B	C	MH2	3	2	83.317	4.112	0.125	12	DGM	0.0104	85.975	4.243

Average	**90.047**	**4.208**		**Average$_{norm}$**	**0.0104**	**92.341**	**4.315**
Standard Dev.	**3.129**	**0.061**		**Standard Dev.$_{norm}$**		**3.119**	**0.043**
Coeff. of Var. [%]	**3.475**	**1.457**		**Coeff. of Var. [%]$_{norm}$**		**3.377**	**0.988**
Min.	**83.317**	**4.098**		**Min.**	**0.0102**	**85.975**	**4.243**
Max.	**94.341**	**4.337**		**Max.**	**0.0106**	**98.000**	**4.412**
Number of Spec.	**19**	**19**		**Number of Spec.**		**19**	**19**


Warp Tension Properties (WT) -- (CTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Strength [ksi]
0
50
100
150
200
250
0
1
2
3

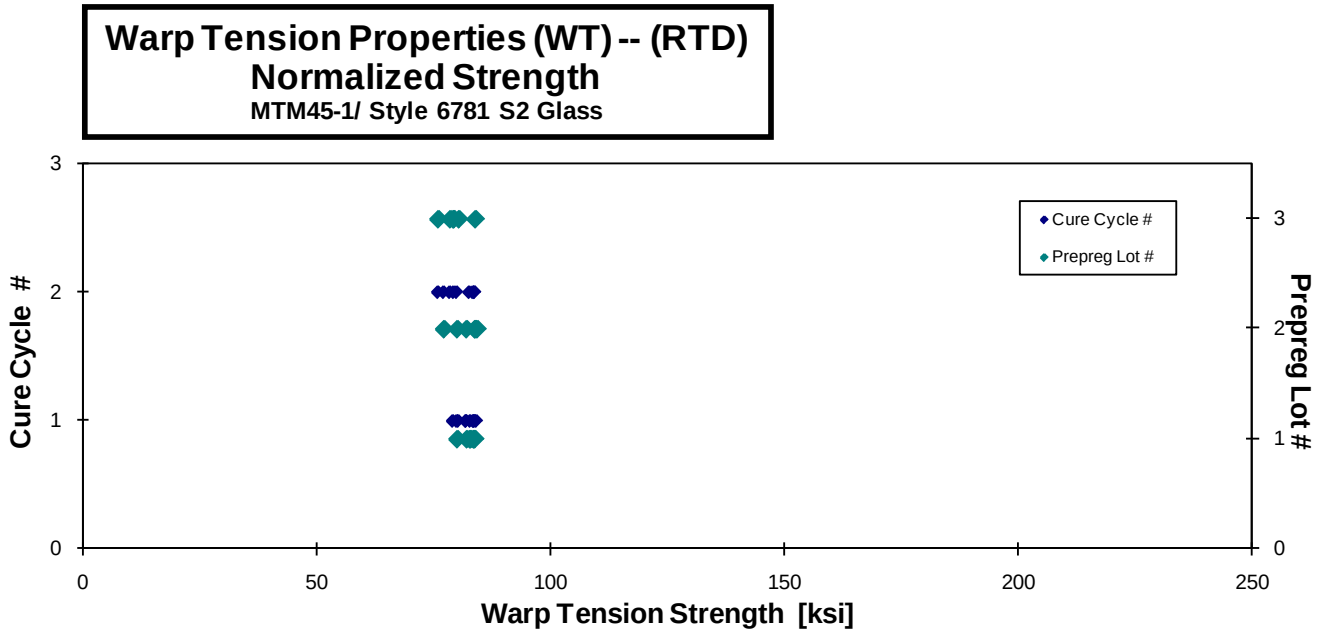

Warp Tension Properties (WT) -- (CTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

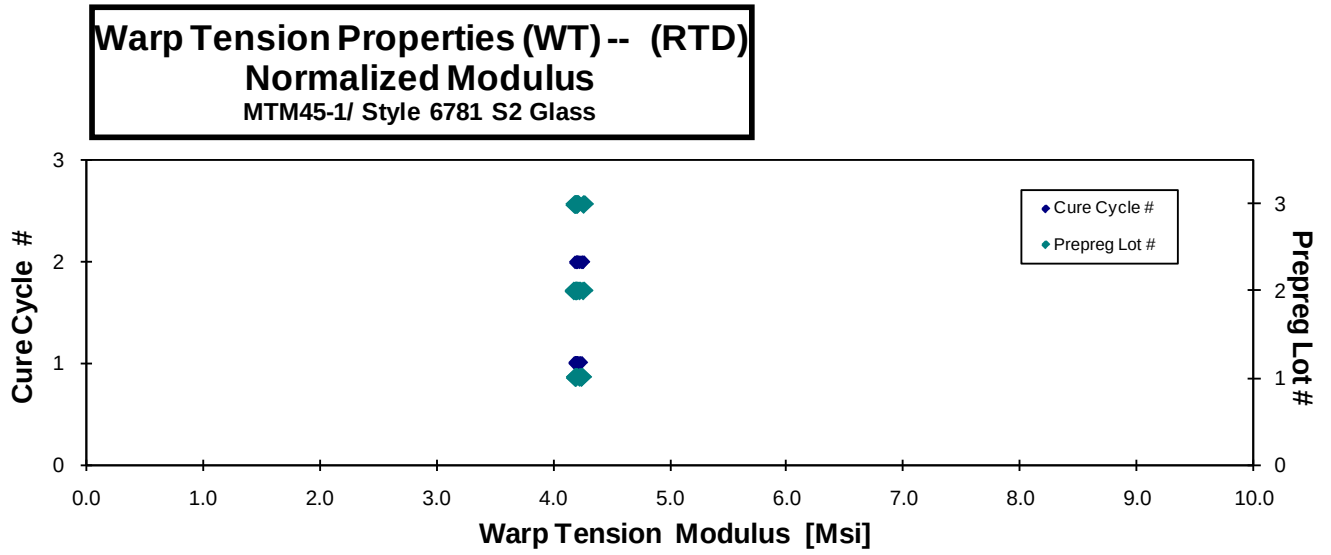
Warp Tension Properties (WT) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJJA111A	A	MH1	1	1	79.314	4.164	0.122	12	LAT	0.0102	80.056	4.202
ABJJA112A	A	MH1	1	1	82.985	4.163	0.122	12	LAT	0.0102	83.647	4.196
ABJJA113A	A	MH1	1	1	81.563	4.172	0.122	12	LAB	0.0102	82.102	4.199
ABJJA114A	A	MH1	1	1	82.459	4.219	0.122	12	LAB	0.0102	82.970	4.246
ABJJA211A	A	MH2	1	2	82.577	4.154	0.123	12	LAB	0.0102	83.542	4.203
ABJJA212A	A	MH2	1	2	82.470	4.163	0.123	12	LAB	0.0103	83.843	4.232
ABJJA213A	A	MH2	1	2	81.613	4.190	0.123	12	LWB	0.0102	82.757	4.249
ABJJB111A	B	MH1	2	1	79.990	4.095	0.124	12	DGM / LAT	0.0104	82.025	4.199
ABJJB112A	B	MH1	2	1	80.490	4.063	0.126	12	LAB	0.0105	83.811	4.231
ABJJB113A	B	MH1	2	1	80.478	3.994	0.127	12	DGM / LWT / LWB	0.0106	84.330	4.185
ABJJB211A	B	MH2	2	2	76.637	4.230	0.122	12	LAB	0.0102	77.206	4.261
ABJJB212A	B	MH2	2	2	78.903	4.150	0.123	12	LAB	0.0102	80.042	4.210
ABJJB213A	B	MH2	2	2	82.583	4.137	0.123	12	LAT	0.0103	83.946	4.205
ABJJC111A	C	MH1	3	1	77.095	4.090	0.125	12	LGM	0.0104	79.205	4.202
ABJJC112A	C	MH1	3	1	81.725	4.088	0.124	12	LGM	0.0104	83.939	4.198
ABJJC113A	C	MH1	3	1	78.253	4.098	0.125	12	LGM	0.0104	80.406	4.210
ABJJC211A	C	MH2	3	2	78.265	4.134	0.123	12	AGM / DGM	0.0102	79.362	4.192
ABJJC212A	C	MH2	3	2	76.903	4.126	0.124	12	DGM	0.0103	78.543	4.214
ABJJC213A	C	MH2	3	2	74.104	4.160	0.124	12	DGM	0.0104	75.979	4.265

Average	**79.916**	**4.136**	**Average$_{norm}$**	**0.0103**	**81.458**	**4.216**
Standard Dev.	**2.523**	**0.056**	**Standard Dev.$_{norm}$**		**2.547**	**0.024**
Coeff. of Var. [%]	**3.157**	**1.353**	**Coeff. of Var. [%]$_{norm}$**		**3.127**	**0.570**
Min.	**74.104**	**3.994**	**Min.**	**0.0102**	**75.979**	**4.185**
Max.	**82.985**	**4.230**	**Max.**	**0.0106**	**84.330**	**4.265**
Number of Spec.	**19**	**19**	**Number of Spec.**		**19**	**19**


Warp Tension Properties (WT) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Strength [ksi]
0
50
100
150
200
250
0
1
2
3

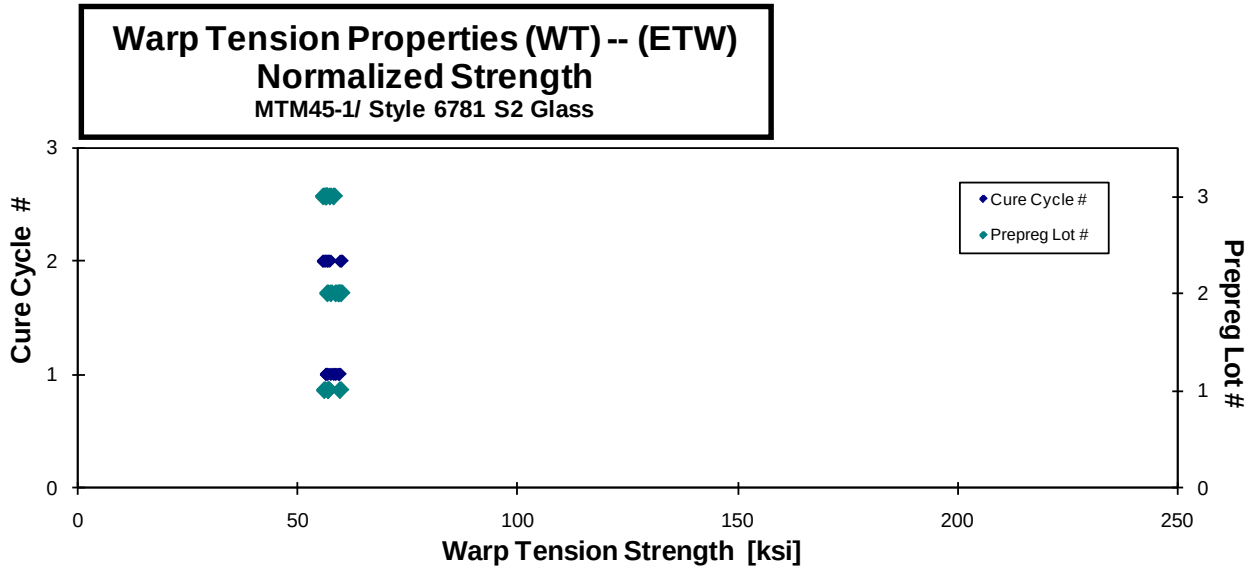

Warp Tension Properties (WT) -- (RTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

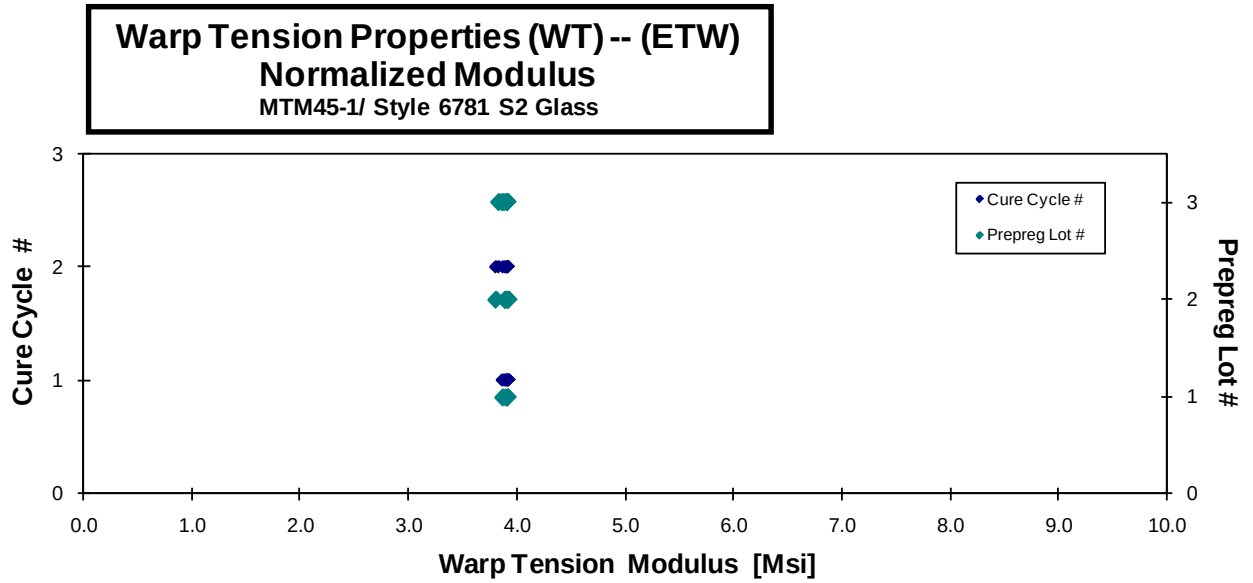
Warp Tension Properties (WT) -- (ETW)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJJA11AN	A	MH1	1	1	58.827	3.924	0.123	12	LWB	0.0102	59.482	3.968
ABJJA11BN	A	MH1	1	1	57.065	3.859	0.123	12	LWB	0.0102	57.834	3.911
ABJJA11CN	A	MH1	1	1	57.285	3.910	0.123	12	LWB	0.0102	57.938	3.955
ABJJA11DN	A	MH1	1	1	56.011	3.864	0.123	12	LWB	0.0102	56.789	3.917
ABJJA219N	A	MH2	1	2	58.584	3.808	0.123	12	LGM	0.0103	59.583	3.873
ABJJA21AN	A	MH2	1	2	55.100	3.862	0.123	12	LWB	0.0103	55.926	3.920
ABJJA21BN	A	MH2	1	2	56.135	3.855	0.123	12	LWB	0.0102	56.845	3.904
ABJJB119N	B	MH1	2	1	56.757	3.732	0.127	12	LAT	0.0106	59.419	3.907
ABJJB11AN	B	MH1	2	1	55.804	3.713	0.127	12	LAT	0.0106	58.566	3.897
ABJJB11CN	B	MH1	2	1	56.760	3.764	0.126	12	LAT	0.0105	59.196	3.926
ABJJB21AN	B	MH2	2	2	57.496	3.740	0.126	12	LAB	0.0105	59.868	3.894
ABJJB21CN	B	MH2	2	2	54.372	3.653	0.126	12	LAB	0.0105	56.652	3.807
ABJJB21DN	B	MH2	2	1	55.332	3.781	0.126	12	LAT	0.0105	57.470	3.927
ABJJC119N	C	MH1	3	1	56.587	3.814	0.124	12	LGM	0.0104	58.112	3.917
ABJJC11AN	C	MH1	3	1	55.184	3.784	0.124	12	LGM	0.0103	56.375	3.866
ABJJC11BN	C	MH1	3	1	54.726	3.772	0.125	12	LAT	0.0104	56.381	3.886
ABJJC219N*	C	MH2	3	2	55.581	3.804	0.125	12	LAB	0.0104	57.240	3.918
ABJJC21AN*	C	MH2	3	2	54.751	3.731	0.125	12	LAT	0.0104	56.256	3.834
ABJJC21BN*	C	MH2	3	2	53.748	3.777	0.126	12	LAB	0.0105	55.670	3.912

Average	**56.111**	**3.797**	**Average$_{norm}$**	**0.0104**	**57.663**	**3.902**
Standard Dev.	**1.375**	**0.070**	**Standard Dev.$_{norm}$**		**1.361**	**0.038**
Coeff. of Var. [%]	**2.450**	**1.835**	**Coeff. of Var. [%]$_{norm}$**		**2.360**	**0.971**
Min.	**53.748**	**3.653**	**Min.**	**0.0102**	**55.670**	**3.807**
Max.	**58.827**	**3.924**	**Max.**	**0.0106**	**59.868**	**3.968**
Number of Spec.	**19**	**19**	**Number of Spec.**		**19**	**19**


Warp Tension Properties (WT) -- (ETW)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Tension Strength [ksi]
0
50
100
150
200
250
0
1
2
3


Warp Tension Properties (WT) -- (ETW)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

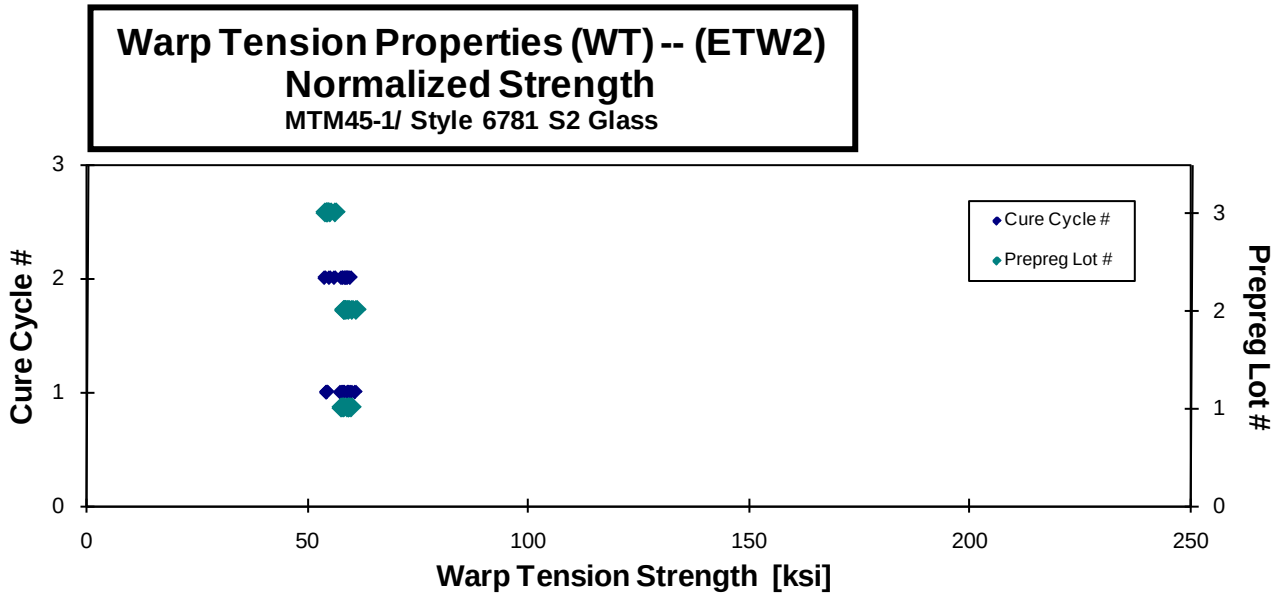
Warp Tension Properties (WT) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

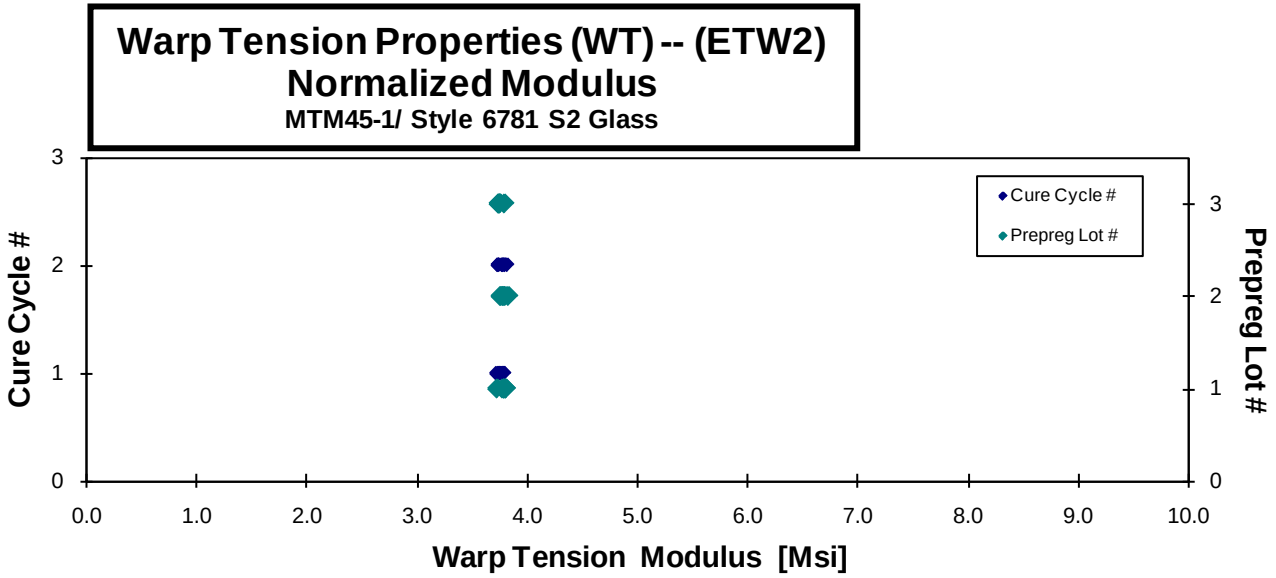
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJJA119D	A	MH1	1	1	58.447	3.729	0.123	12	LGM	0.0102	59.130	3.772
ABJJA11GD	A	MH1	1	1	58.772	3.759	0.122	12	LAT	0.0102	59.192	3.786
ABJJA11HD	A	MH1	1	1	57.083	3.698	0.122	12	LGM	0.0102	57.468	3.723
ABJJA11JD	A	MH1	1	1	57.632	3.764	0.122	12	LWT	0.0102	58.068	3.792
ABJJA21ED	A	MH2	1	2	57.238	3.772	0.122	12	LGM	0.0102	57.703	3.802
ABJJA21FD	A	MH2	1	2	58.344	3.773	0.122	12	LGM	0.0102	58.802	3.802
ABJJA21GD	A	MH2	1	2	59.223	3.756	0.122	12	LGM	0.0102	59.687	3.785
ABJJB11DD	B	MH1	2	1	58.407	3.615	0.126	12	LWB	0.0105	60.784	3.762
ABJJB11ED	B	MH1	2	1	55.883	3.604	0.126	12	LWT	0.0105	58.181	3.753
ABJJB11FD	B	MH1	2	1	58.144	3.687	0.125	12	LAT	0.0104	59.871	3.797
ABJJB21FD	B	MH2	2	2	57.132	3.658	0.125	12	LAT	0.0104	59.089	3.783
ABJJB21GD	B	MH2	2	2	56.010	3.689	0.126	12	LAB	0.0105	58.067	3.825
ABJJB21HD	B	MH2	2	2	56.673	3.655	0.125	12	LWT	0.0104	58.559	3.777
ABJJC11ED	C	MH1	3	1	52.741	3.681	0.125	12	LGM	0.0104	54.293	3.789
ABJJC11FD	C	MH1	3	1	52.831	3.637	0.125	12	LGM	0.0104	54.415	3.746
ABJJC11GD	C	MH1	3	1	52.924	3.642	0.125	12	LGM	0.0104	54.386	3.743
ABJJC21ED	C	MH2	3	2	52.218	3.632	0.125	12	LGM	0.0104	53.912	3.749
ABJJC21FD	C	MH2	3	2	53.261	3.618	0.125	12	LAT	0.0104	54.989	3.735
ABJJC21GD	C	MH2	3	2	54.492	3.629	0.125	12	LGM	0.0104	56.118	3.738

Average	**56.182**	**3.684**	
Standard Dev.	**2.365**	**0.059**	
Coeff. of Var. [%]	**4.209**	**1.590**	
Min.	**52.218**	**3.604**	
Max.	**59.223**	**3.773**	
Number of Spec.	**19**	**19**	

$Average_{norm}$	**0.0103**	**57.511**	**3.772**
$Standard\ Dev._{norm}$		**2.158**	**0.028**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**3.751**	**0.738**
Min.	**0.0102**	**53.912**	**3.723**
Max.	**0.0105**	**60.784**	**3.825**
Number of Spec.		**19**	**19**


Warp Tension Properties (WT) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Strength [ksi]
0
50
100
150
200
250
0
1
2
3


Warp Tension Properties (WT) -- (ETW2)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

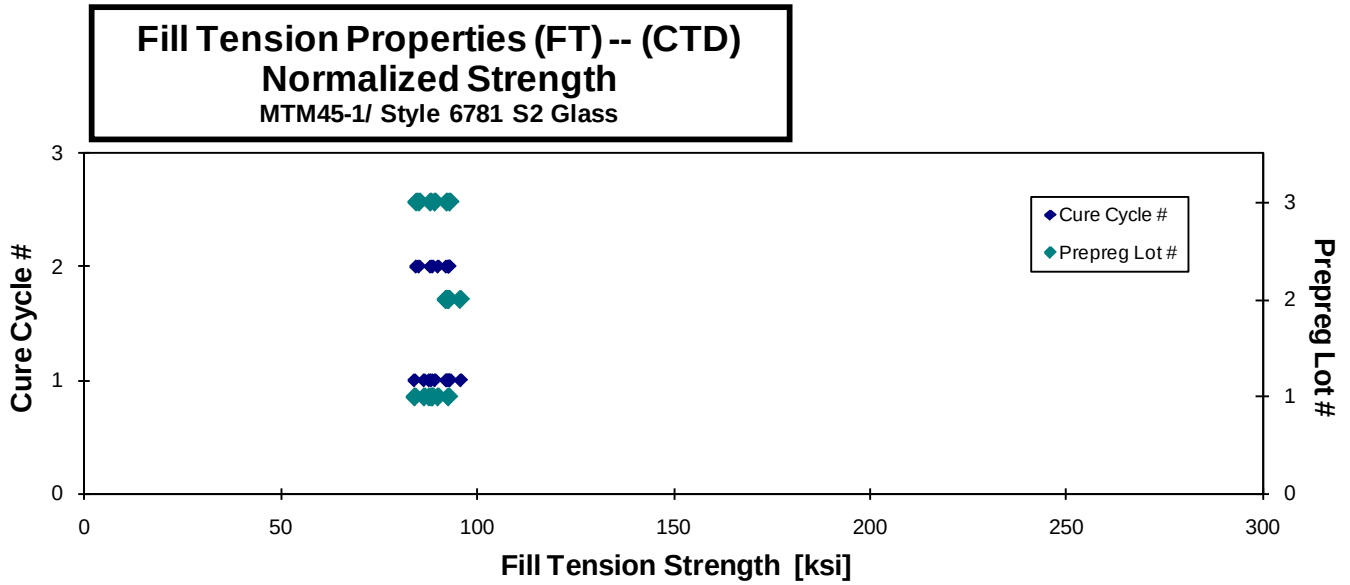
4.2 Fill Tension Properties

Fill Tension Properties (FT) -- (CTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJUA115B	A	MH1	1	1	84.646	4.164	0.121	12	LWT	0.0101	84.239	4.144
ABJUA116B	A	MH1	1	1	87.076	4.153	0.121	12	LWT	0.0101	86.657	4.133
ABJUA117B	A	MH1	1	1	88.381	4.181	0.121	12	LAT	0.0100	87.919	4.159
ABJUA118B	A	MH1	1	1	88.318	4.093	0.121	12	LAT	0.0101	88.488	4.100
ABJUA215B	A	MH2	1	2	88.107	4.033	0.124	12	LWT	0.0103	90.131	4.126
ABJUA216B	A	MH2	1	2	87.066	4.052	0.124	12	LWT	0.0103	88.790	4.132
ABJUA217B	A	MH2	1	2	90.684	4.016	0.124	12	LWT/LWB	0.0103	92.829	4.111
ABJUB115B	B	MH1	2	1	92.947	3.981	0.125	12	DGM/LAT	0.0104	95.810	4.104
ABJUB116B	B	MH1	2	1	89.300	3.984	0.125	12	DGM	0.0104	92.185	4.113
ABJUB117B	B	MH1	2	1	89.611	3.958	0.126	12	DGM	0.0105	92.803	4.099
ABJUB215B	B	MH2	2	2	88.930	3.926	0.126	12	LGM	0.0105	92.195	4.070
ABJUB216B	B	MH2	2	2	90.140	3.945	0.125	12	DGM	0.0104	92.966	4.068
ABJUB217B	B	MH2	2	2	90.053	4.048	0.125	12	LAT	0.0104	92.765	4.170
ABJUC115B	C	MH1	3	1	89.635	4.032	0.125	12	DGM	0.0104	92.434	4.158
ABJUC116B	C	MH1	3	1	90.710	4.049	0.124	12	DGM	0.0104	93.168	4.158
ABJUC117B	C	MH1	3	1	86.323	4.012	0.125	12	DGM	0.0105	89.362	4.153
ABJUC215B	C	MH2	3	2	86.168	4.166	0.124	12	LGM	0.0103	88.265	4.267
ABJUC216B	C	MH2	3	2	84.098	4.166	0.123	12	LGM	0.0103	85.393	4.230
ABJUC217B	C	MH2	3	2	82.984	4.142	0.124	12	LGM/DGM	0.0103	84.672	4.226

Average	**88.167**	**4.058**	**$Average_{norm}$**	**0.0103**	**90.056**	**4.143**
Standard Dev.	**2.526**	**0.083**	**$Standard\ Dev._{norm}$**		**3.309**	**0.053**
Coeff. of Var. [%]	**2.866**	**2.046**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.674**	**1.274**
Min.	**82.984**	**3.926**	**Min.**	**0.0100**	**84.239**	**4.068**
Max.	**92.947**	**4.181**	**Max.**	**0.0105**	**95.810**	**4.267**
Number of Spec.	**19**	**19**	**Number of Spec.**		**19**	**19**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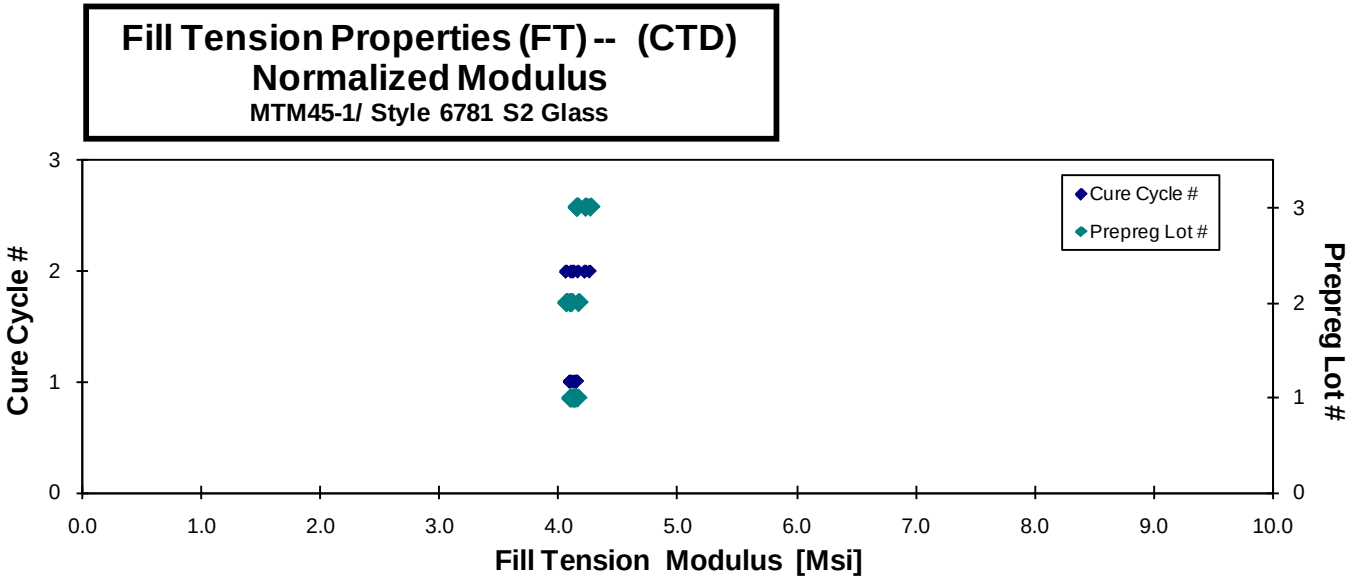
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Fill Tension Strength [ksi]
0
50
100
150
200
250
300
0
1
2
3


Fill Tension Properties (FT) -- (CTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Fill Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

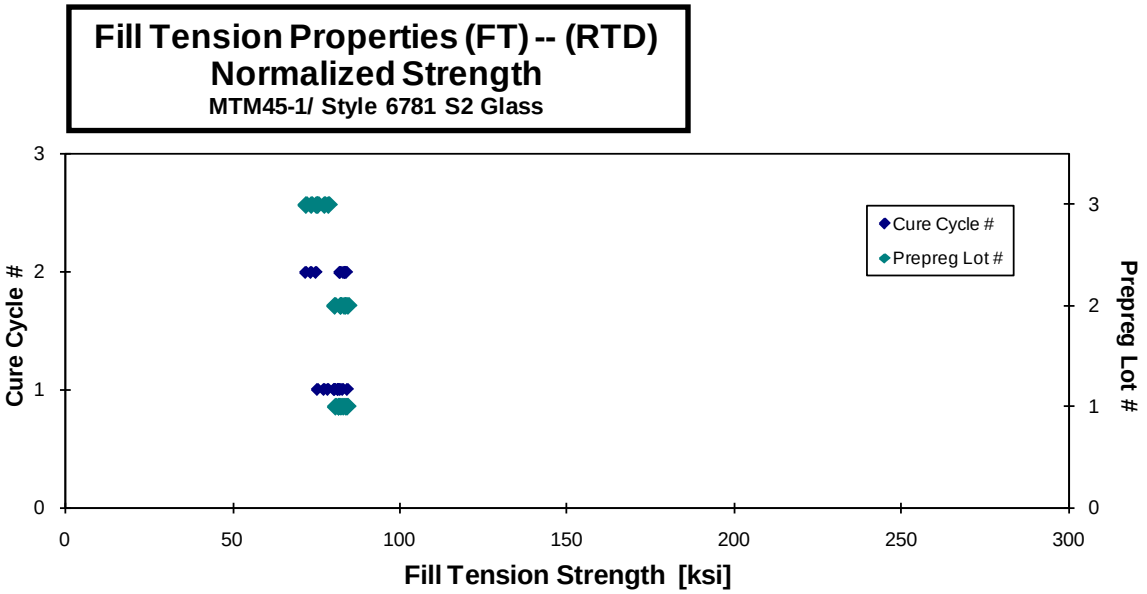
Fill Tension Properties (FT) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJUA111A	A	MH1	1	1	82.176	4.080	0.121	12	LWB	0.0101	81.860	4.065
ABJUA112A	A	MH1	1	1	83.630	4.084	0.121	12	LWT	0.0101	83.216	4.064
ABJUA113A	A	MH1	1	1	81.238	4.070	0.121	12	LWT	0.0101	80.892	4.053
ABJUA114A	A	MH1	1	1	82.156	4.081	0.121	12	LWT	0.0101	81.829	4.065
ABJUA211A	A	MH2	1	2	82.952	3.989	0.123	12	LWB	0.0103	84.343	4.056
ABJUA212A	A	MH2	1	2	82.722	3.954	0.123	12	LWB	0.0103	83.962	4.013
ABJUA213A	A	MH2	1	2	81.004	3.947	0.124	12	LAB	0.0103	82.541	4.022
ABJUB111A	B	MH1	2	1	78.547	3.916	0.124	12	LWT	0.0104	80.675	4.022
ABJUB112A	B	MH1	2	1	79.907	3.910	0.125	12	LWB	0.0104	82.467	4.035
ABJUB113A	B	MH1	2	1	81.678	3.904	0.126	12	LGM	0.0105	84.598	4.044
ABJUB211A	B	MH2	2	2	80.467	3.861	0.126	12	LWB	0.0105	83.455	4.005
ABJUB212A	B	MH2	2	2	80.975	3.912	0.126	12	LGM	0.0105	83.881	4.053
ABJUB213A	B	MH2	2	2	79.415	3.891	0.126	12	LWB	0.0105	82.353	4.035
ABJUC111A	C	MH1	3	1	73.894	3.996	0.124	12	DGM / LWB	0.0103	75.703	4.094
ABJUC112A	C	MH1	3	1	76.700	3.986	0.125	12	LAT	0.0104	78.820	4.096
ABJUC113A	C	MH1	3	1	75.342	3.980	0.125	12	LAT	0.0104	77.652	4.102
ABJUC211A	C	MH2	3	2	70.917	4.083	0.123	12	LGM	0.0103	72.214	4.158
ABJUC212A	C	MH2	3	2	73.338	4.074	0.124	12	LGM	0.0104	75.274	4.182
ABJUC213A	C	MH2	3	2	72.393	4.107	0.124	12	LGM	0.0103	73.786	4.186

Average	**78.918**	**3.991**	
Standard Dev.	**3.944**	**0.080**	
Coeff. of Var. [%]	**4.998**	**2.013**	
Min.	**70.917**	**3.861**	
Max.	**83.630**	**4.107**	
Number of Spec.	**19**	**19**	

$Average_{norm}$	**0.0103**	**80.501**	**4.071**
$Standard\ Dev._{norm}$		**3.810**	**0.054**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**4.733**	**1.323**
Min.	**0.0101**	**72.214**	**4.005**
Max.	**0.0105**	**84.598**	**4.186**
Number of Spec.		**19**	**19**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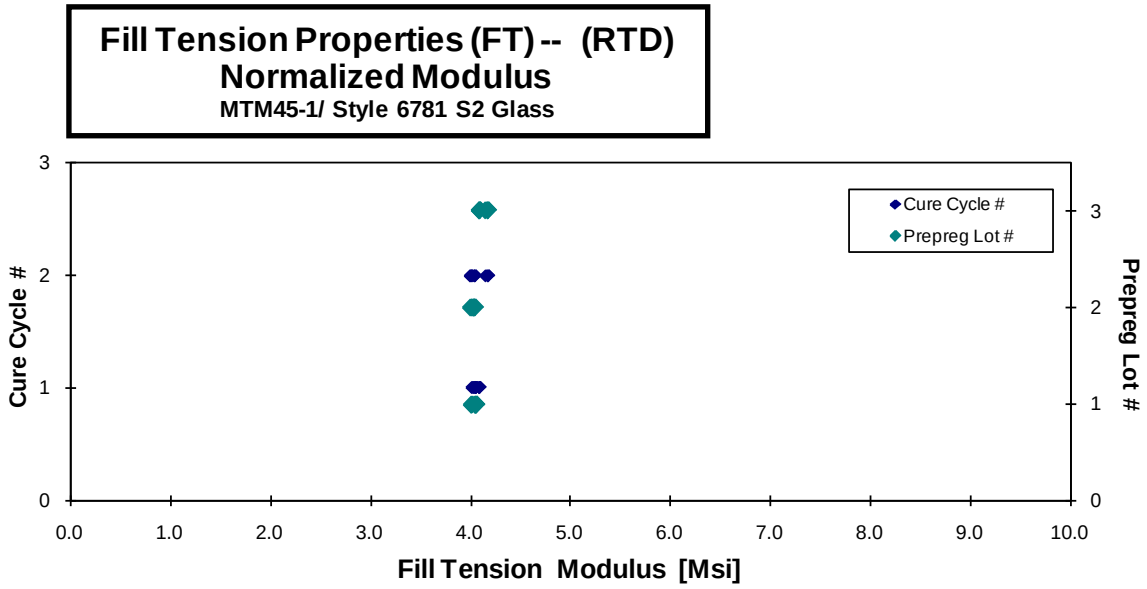
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Strength [ksi]
0
50
100
150
200
250
300
0
1
2
3


Fill Tension Properties (FT) -- (RTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

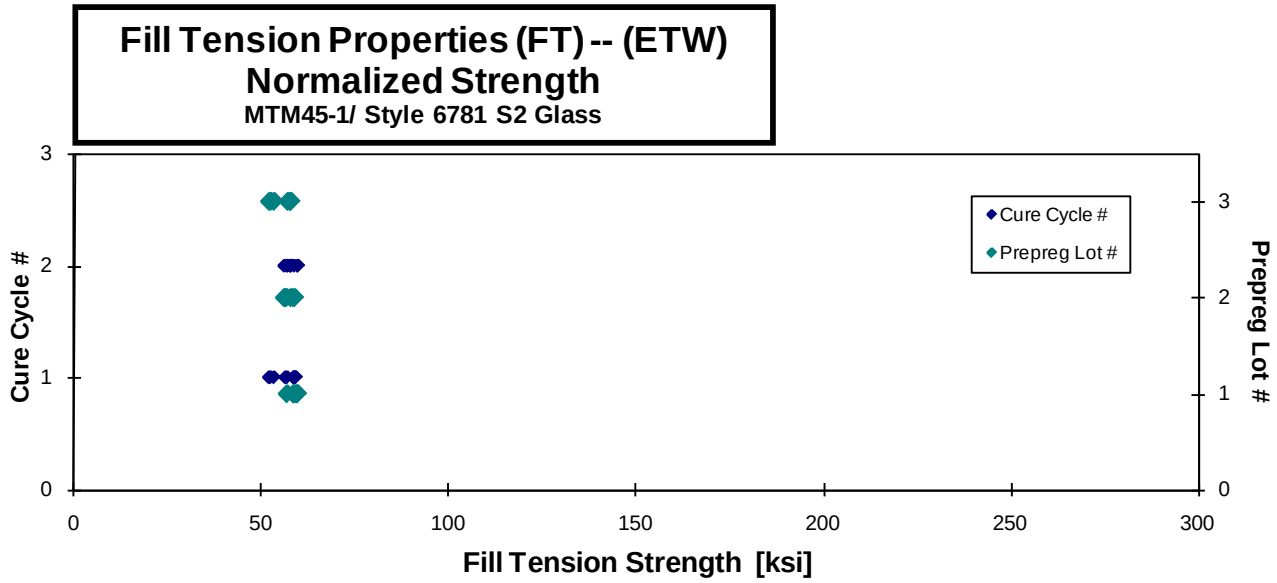
Fill Tension Properties (FT) -- (ETW)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

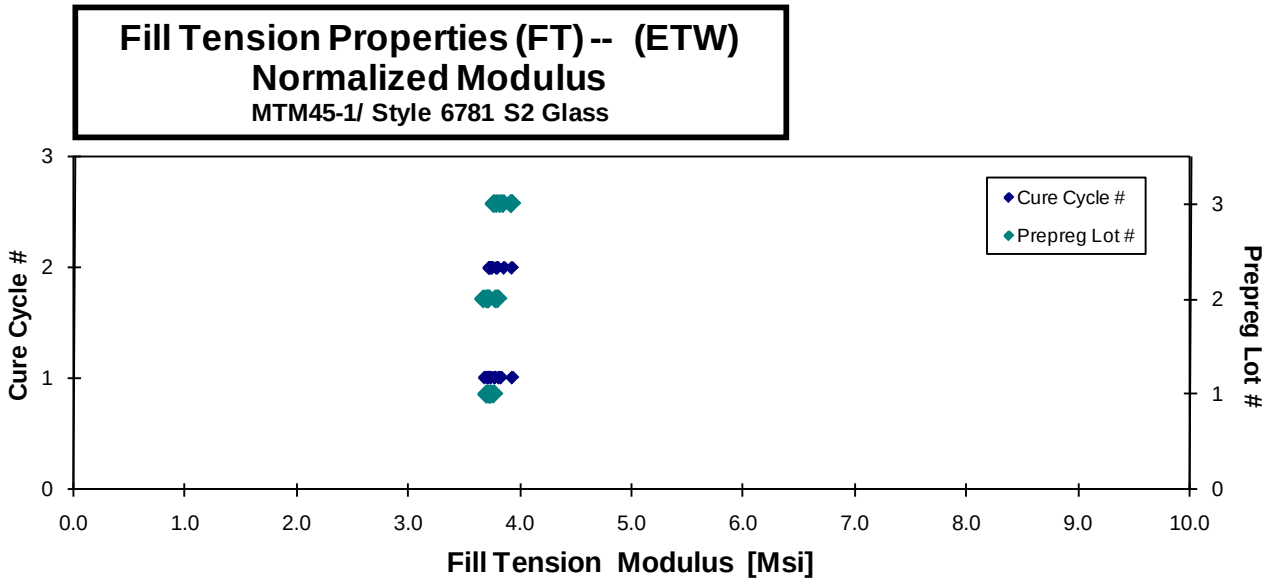
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJUA11FN	A	MH1	1	1	58.860	3.740	0.121	12	LWT	0.0101	58.706	3.730
ABJUA11GN	A	MH1	1	1	59.080	3.700	0.121	12	LGM	0.0101	59.194	3.707
ABJUA11HN	A	MH1	1	1	57.047	3.710	0.121	12	LWT	0.0101	56.890	3.700
ABJUA11JN	A	MH1	1	1	58.801	3.771	0.121	12	LGM	0.0101	58.688	3.764
ABJUA21FN	A	MH2	1	2	57.186	3.641	0.125	12	LGM	0.0104	58.775	3.742
ABJUA21GN	A	MH2	1	2	58.177	3.623	0.125	12	LGM	0.0104	59.769	3.722
ABJUA21HN	A	MH2	1	2	58.172	3.645	0.124	12	LGM	0.0104	59.628	3.736
ABJUB11EN	B	MH1	2	1	57.235	3.687	0.125	12	LWT	0.0104	58.990	3.800
ABJUB11FN	B	MH1	2	1	56.331	3.534	0.126	12	LGM	0.0105	58.546	3.673
ABJUB11GN	B	MH1	2	1	54.557	3.580	0.125	12	LWB	0.0104	56.395	3.701
ABJUB21EN	B	MH2	2	2	54.474	3.603	0.125	12	LGM	0.0104	56.129	3.712
ABJUB21FN	B	MH2	2	2	56.075	3.661	0.125	12	LGM	0.0104	57.903	3.780
ABJUB21GN	B	MH2	2	2	55.243	3.619	0.125	12	LAT	0.0104	56.778	3.720
ABJUC11EN	C	MH1	3	1	51.185	3.822	0.124	12	LWT	0.0104	52.522	3.922
ABJUC11FN	C	MH1	3	1	50.785	3.671	0.124	12	LAT	0.0104	52.091	3.766
ABJUC11GN	C	MH1	3	1	52.153	3.732	0.124	12	LWT	0.0103	53.394	3.820
ABJUC21EN	C	MH2	3	2	56.843	3.730	0.123	12	LAT	0.0103	57.757	3.790
ABJUC21FN	C	MH2	3	2	56.996	3.782	0.123	12	LGM	0.0103	57.992	3.848
ABJUC21GN	C	MH2	3	2	56.191	3.855	0.123	12	LAT	0.0103	57.126	3.919

Average	**56.073**	**3.690**	
Standard Dev.	**2.482**	**0.083**	
Coeff. of Var. [%]	**4.427**	**2.260**	
Min.	**50.785**	**3.534**	
Max.	**59.080**	**3.855**	
Number of Spec.	**19**	**19**	

$Average_{norm}$	**0.0104**	**57.225**	**3.766**
$Standard\ Dev._{norm}$		**2.290**	**0.071**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**4.002**	**1.876**
Min.	**0.0103**	**52.091**	**3.673**
Max.	**0.0105**	**59.769**	**3.922**
Number of Spec.		**19**	**19**


Fill Tension Properties (FT) -- (ETW)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Strength [ksi]
0
50
100
150
200
250
300
0
1
2
3


Fill Tension Properties (FT) -- (ETW)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

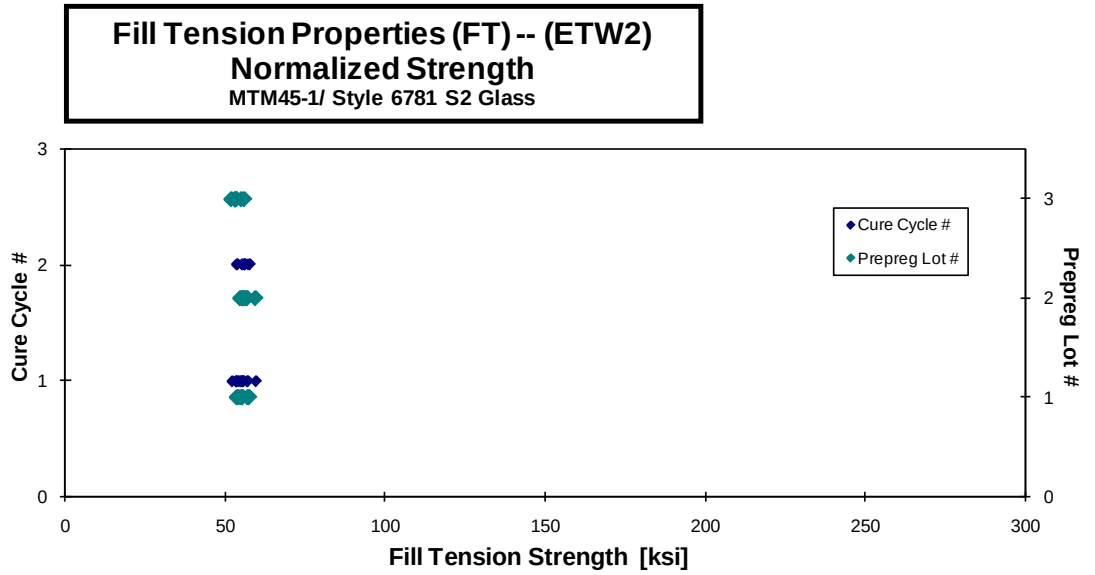
Fill Tension Properties (FT) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

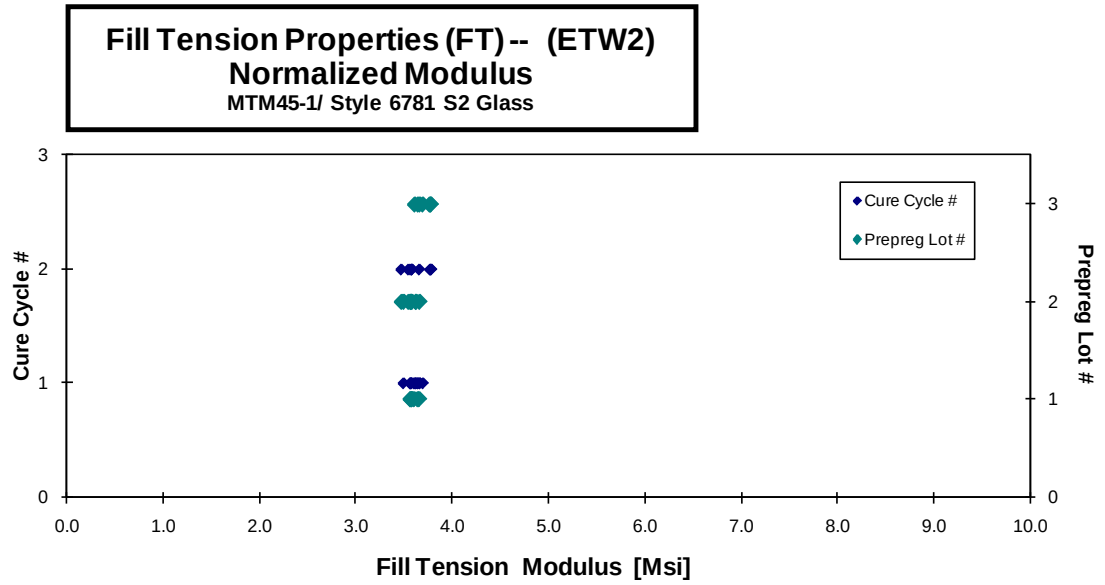
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJUA11BD	A	MH1	1	1	53.853	3.618	0.122	12	LWB	0.0102	54.179	3.640
ABJUA11CD	A	MH1	1	1	55.331	3.558	0.121	12	LWB	0.0101	55.392	3.562
ABJUA11DD	A	MH1	1	1	55.776	3.613	0.121	12	LWB	0.0101	55.630	3.603
ABJUA11ED	A	MH1	1	1	54.712	3.564	0.122	12	LWB	0.0101	54.930	3.578
ABJUA219D	A	MH2	1	2	56.390	3.518	0.123	12	LGM	0.0102	57.150	3.565
ABJUA21AD	A	MH2	1	2	52.765	3.590	0.123	12	LGM	0.0103	53.745	3.657
ABJUA21BD	A	MH2	1	2	56.744	3.523	0.123	12	LGM	0.0103	57.657	3.580
ABJUB119D*	B	MH1	2	1		3.482	0.126	12	LGM	0.0105		3.624
ABJUB119D	B	MH1	2	1	57.269	3.517	0.126	12	LGM	0.0105	59.615	3.661
ABJUB11AD*	B	MH1	2	1		3.439	0.126	12	LGM	0.0105		3.570
ABJUB11AD	B	MH1	2	1	54.961	3.489	0.126	12	LGM	0.0105	57.055	3.622
ABJUB11BD	B	MH1	2	1	53.559	3.442	0.126	12	LGM	0.0105	55.496	3.566
ABJUB11CD	B	MH1	2	1	52.885	3.369	0.126	12	LWT	0.0105	54.819	3.492
ABJUB11DD	B	MH1	2	1	54.883	3.446	0.125	12	LGM	0.0105	56.792	3.566
ABJUB219D	B	MH2	2	2	54.413	3.476	0.125	12	LGM	0.0104	56.059	3.581
ABJUB21AD	B	MH2	2	2	53.727	3.428	0.125	12	LGM	0.0104	55.530	3.543
ABJUB21BD	B	MH2	2	2	54.351	3.365	0.125	12	LGM	0.0104	56.025	3.469
ABJUC119D	C	MH1	3	1	51.755	3.565	0.126	12	LWB	0.0105	53.634	3.694
ABJUC11AD	C	MH1	3	1	51.679	3.496	0.125	12	LAB	0.0104	53.349	3.609
ABJUC11BD	C	MH1	3	1	52.438	3.608	0.123	12	LGM	0.0103	53.231	3.662
ABJUC11CD	C	MH1	3	1	50.795	3.558	0.124	12	LWB	0.0103	52.032	3.644
ABJUC219D	C	MH2	3	2	52.293	3.701	0.124	12	LGM	0.0103	53.451	3.783
ABJUC21AD	C	MH2	3	2	54.240	3.714	0.123	12	LGM	0.0103	55.165	3.777
ABJUC21BD	C	MH2	3	2	55.346	3.720	0.123	12	LGM	0.0102	56.077	3.769

* Modulus recorded twice; so strength not repeated

Average	**54.098**	**3.533**	**$Average_{norm}$**	**0.0104**	**55.319**	**3.617**
Standard Dev.	**1.720**	**0.098**	**$Standard\ Dev._{norm}$**		**1.744**	**0.081**
Coeff. of Var. [%]	**3.179**	**2.780**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.152**	**2.230**
Min.	**50.795**	**3.365**	**Min.**	**0.0101**	**52.032**	**3.469**
Max.	**57.269**	**3.720**	**Max.**	**0.0105**	**59.615**	**3.783**
Number of Spec.	**22**	**24**	**Number of Spec.**		**22**	**24**


Fill Tension Properties (FT) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Strength [ksi]
0
50
100
150
200
250
300
0
1
2
3


Fill Tension Properties (FT) -- (ETW2)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Tension Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

4.3 Warp Compression Properties

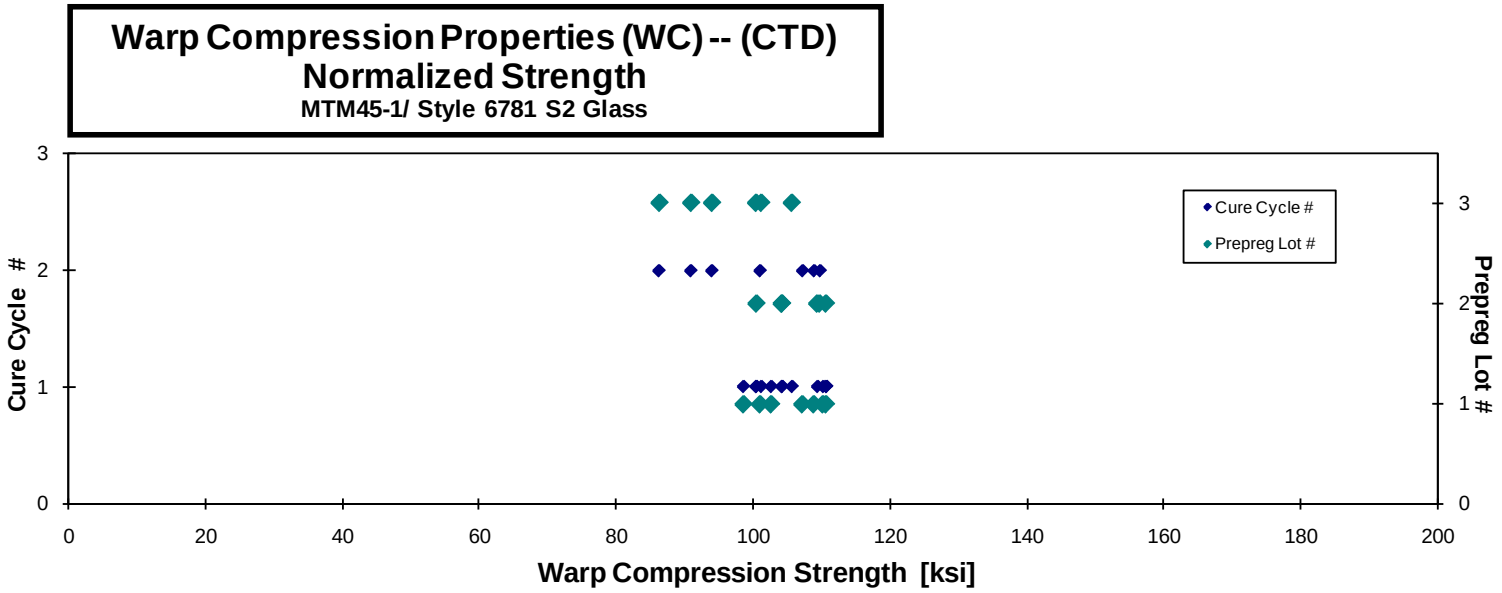
Warp Compression Properties (WC) -- (CTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

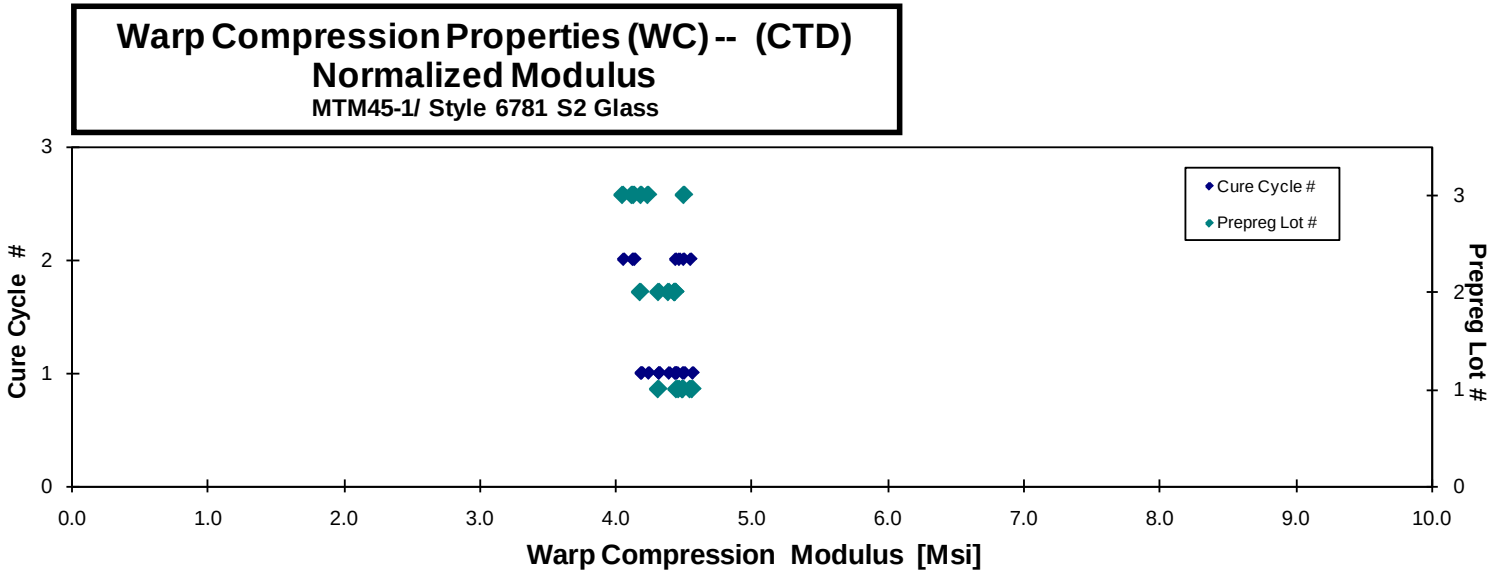
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJLA116B	A	MH1	1	1	103.133	4.510	0.137	0.121	12	BAT	0.0100	102.551	4.485
ABJLA117B	A	MH1	1	1	109.636	4.537	0.143	0.122	12	HAT	0.0101	110.118	4.556
ABJLA118B	A	MH1	1	1	110.032	4.288	0.146	0.122	12	BGM	0.0102	110.577	4.309
ABJLA11AB	A	MH1	1	1	98.424	4.437	0.157	0.121	12	BGM	0.0101	98.519	4.441
ABJLA215B	A	MH2	1	2	107.939	4.505	0.150	0.122	12	BGM	0.0102	108.786	4.540
ABJLA216B	A	MH2	1	2	99.856	4.410	0.132	0.123	12	BGM	0.0102	100.927	4.458
ABJLA217B	A	MH2	1	2	106.615	4.469	0.145	0.122	12	BGM	0.0101	107.113	4.489
ABJLB114B	B	MH1	2	1	99.639	4.196	0.137	0.127	12	BGM	0.0106	104.092	4.383
ABJLB115B	B	MH1	2	1	99.989	4.139	0.134	0.126	12	BGM	0.0105	104.155	4.311
ABJLB116B	B	MH1	2	1	95.683	4.224	0.147	0.127	12	BGM	0.0106	100.407	4.433
ABJLB216B	B	MH2	2	1	105.151	3.973	0.137	0.127	12	BGM	0.0106	110.573	4.178
ABJLB217B	B	MH2	2	1	104.184	4.220	0.154	0.127	12	BGM	0.0106	109.284	4.427
ABJLB218B	B	MH2	2	2	105.156	4.249	0.148	0.126	12	BGM	0.0105	109.653	4.431
ABJLC114B	C	MH1	3	1	96.835	4.055	0.156	0.127	12	HGM / BGM	0.0105	101.110	4.234
ABJLC115B	C	MH1	3	1	100.849	4.294	0.141	0.127	12	BGM	0.0106	105.578	4.496
ABJLC11EB	C	MH1	3	1	96.338	4.016	0.131	0.126	12	BGM	0.0105	100.353	4.184
ABJLC215B	C	MH2	3	2	87.483	3.965	0.114	0.126	12	HGM / BGM	0.0105	90.863	4.118
ABJLC218B	C	MH2	3	2	83.174	3.984	0.139	0.126	12	BGM	0.0105	86.228	4.131
ABJLC21FB	C	MH2	3	2	90.518	3.903	0.118	0.126	12	HGM / BGM	0.0105	93.916	4.050

Average	**100.033**	**4.230**	**0.140**
Standard Dev.	**7.287**	**0.208**	**0.012**
Coeff. of Var. [%]	**7.285**	**4.914**	**8.290**
Min.	**83.174**	**3.903**	**0.114**
Max.	**110.032**	**4.537**	**0.157**
Number of Spec.	**19**	**19**	**19**

$Average_{norm}$	**0.0104**	**102.884**	**4.350**
$Standard\ Dev._{norm}$		**6.918**	**0.157**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**6.724**	**3.611**
Min.	**0.0100**	**86.228**	**4.050**
Max.	**0.0106**	**110.577**	**4.556**
Number of Spec.		**19**	**19**


Warp Compression Properties (WC) -- (CTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200


Warp Compression Properties (WC) -- (CTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

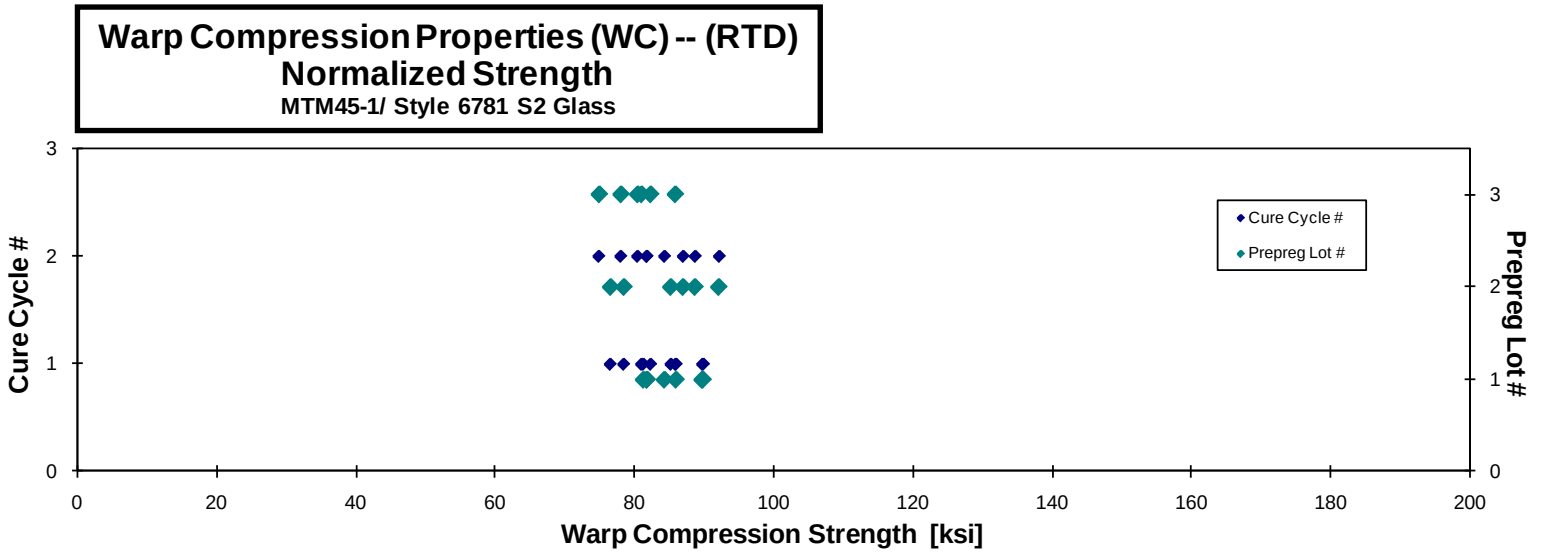
Warp Compression Properties (WC) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

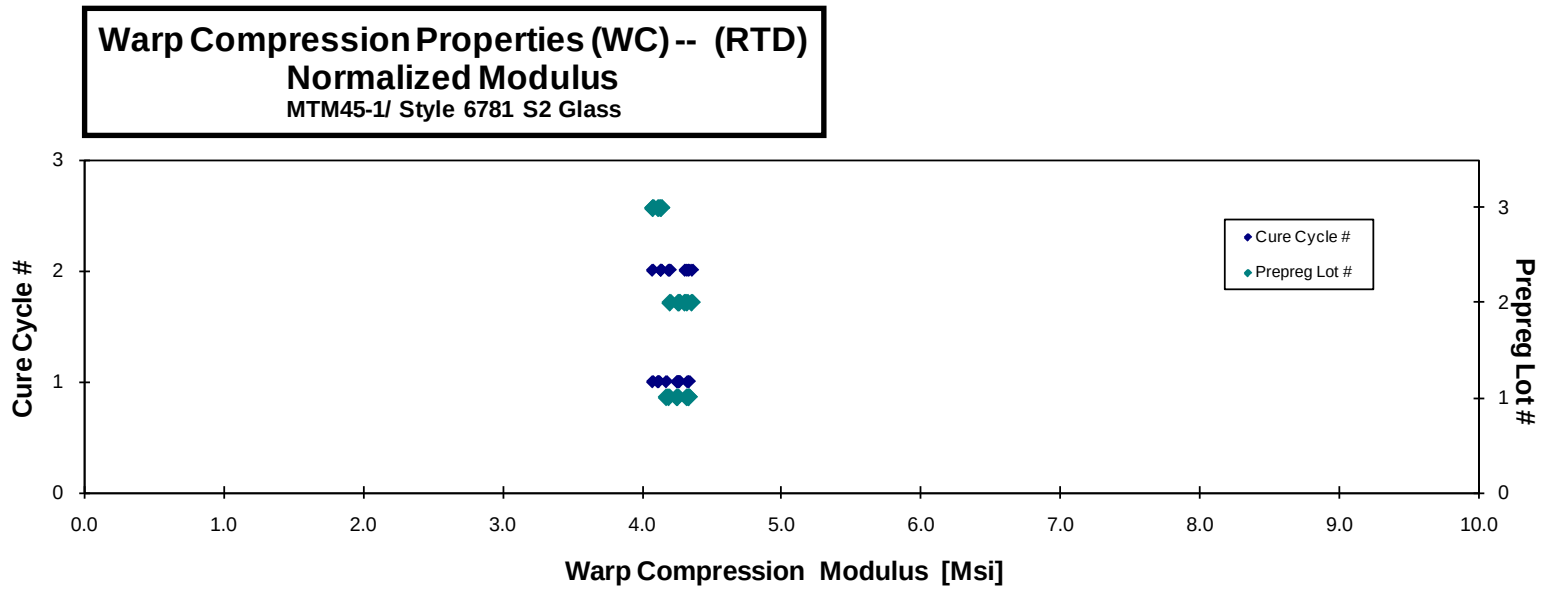
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJLA111A	A	MH1	1	1	90.015	4.176	0.161	0.121	12	BGM	0.0101	89.892	4.171
ABJLA112A	A	MH1	1	1	81.636	4.351	0.167	0.121	12	BGM	0.0101	81.266	4.332
ABJLA113A	A	MH1	1	1	85.506	4.228	0.155	0.122	12	BGM	0.0102	85.976	4.252
ABJLA114A	A	MH1	1	1	89.516	4.236	0.147	0.122	12	BGM	0.0101	89.750	4.247
ABJLA211A	A	MH2	1	2	83.419	4.286	0.133	0.122	12	BGM	0.0102	84.303	4.331
ABJLA212A	A	MH2	1	2	81.314	4.295	0.131	0.122	12	BGM	0.0102	81.750	4.318
ABJLA213A	A	MH2	1	2	81.265	4.161	0.135	0.122	12	BGM	0.0102	81.779	4.188
ABJLB111A	B	MH1	2	1	73.803	4.107	0.126	0.126	12	BGM	0.0105	76.503	4.257
ABJLB112A	B	MH1	2	1	75.406	4.154	0.124	0.126	12	HGM	0.0105	78.434	4.321
ABJLB113A	B	MH1	2	1	81.957	4.101	0.131	0.126	12	BGM	0.0105	85.214	4.264
ABJLB211A	B	MH2	2	2	84.921	4.119	0.152	0.127	12	BGM	0.0106	88.716	4.303
ABJLB212A	B	MH2	2	2	87.913	4.003	0.146	0.127	12	BGM/HGM	0.0106	92.168	4.197
ABJLB213A	B	MH2	2	2	82.863	4.147	0.142	0.127	12	BGM	0.0106	86.988	4.354
ABJLC111A	C	MH1	3	1	79.753	4.055	0.126	0.123	12	BGM	0.0103	80.992	4.118
ABJLC112A	C	MH1	3	1	79.399	3.930	0.126	0.126	12	BGM	0.0105	82.303	4.074
ABJLC113A	C	MH1	3	1	82.663	3.957	0.124	0.126	12	BGM	0.0105	85.880	4.111
ABJLC212A	C	MH2	3	2	75.754	3.955	0.133	0.125	12	BGM	0.0104	78.014	4.073
ABJLC213A	C	MH2	3	2	72.168	3.984	0.136	0.126	12	BGM	0.0105	74.867	4.133
ABJLC214A	C	MH2	3	2	77.435	3.979	0.135	0.126	12	HGM	0.0105	80.427	4.133

Average	**81.406**	**4.117**	**0.138**
Standard Dev.	**5.018**	**0.127**	**0.013**
Coeff. of Var. [%]	**6.164**	**3.083**	**9.283**
Min.	**72.168**	**3.930**	**0.124**
Max.	**90.015**	**4.351**	**0.167**
Number of Spec.	**19**	**19**	**19**

$Average_{norm}$	**0.0104**	**83.433**	**4.220**
Standard $Dev._{norm}$		**4.814**	**0.094**
Coeff. of Var. $[\%]_{norm}$		**5.770**	**2.225**
Min.	**0.0101**	**74.867**	**4.073**
Max.	**0.0106**	**92.168**	**4.354**
Number of Spec.		**19**	**19**


Warp Compression Properties (WC) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3

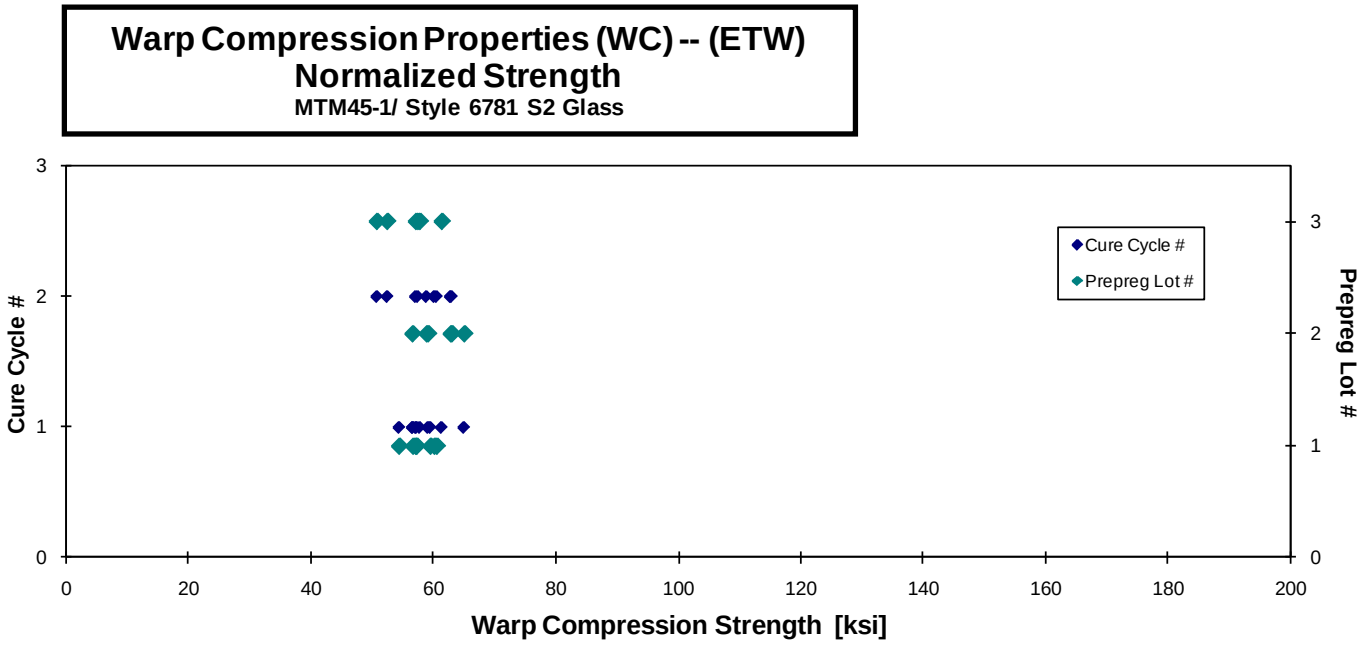

Warp Compression Properties (WC) -- (RTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

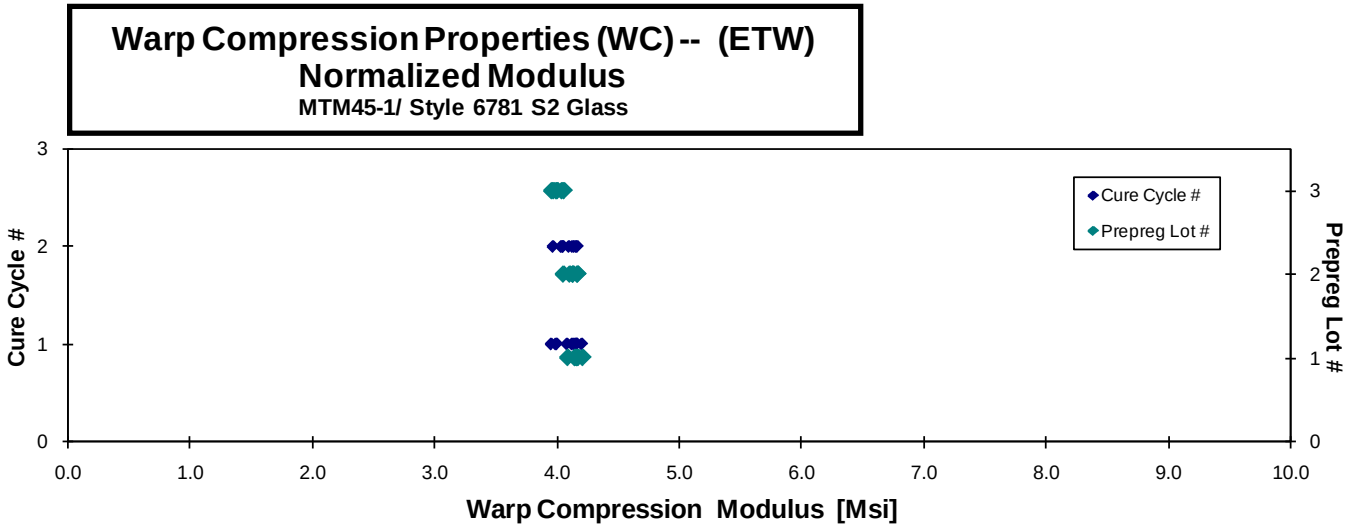
Warp Compression Properties (WC) -- (ETW)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJLA11BN	A	MH1	1	1	56.397	4.184	0.112	0.122	12	HGM	0.0101	56.646	4.203
ABJLA11CN	A	MH1	1	1	54.112	4.120	0.117	0.122	12	HGM	0.0101	54.373	4.139
ABJLA11DN	A	MH1	1	1	58.887	4.040	0.119	0.122	12	BGM	0.0102	59.478	4.081
ABJLA11EN	A	MH1	1	1	56.884	4.128	0.115	0.122	12	HGM	0.0102	57.243	4.154
ABJLA219N	A	MH2	1	2	57.069	4.157	0.118	0.121	12	HGM	0.0101	57.069	4.157
ABJLA21AN	A	MH2	1	2	60.326	4.154	0.119	0.122	12	HGM	0.0101	60.517	4.167
ABJLA21BN	A	MH2	1	2	60.204	4.146	0.120	0.121	12	HAB	0.0101	60.121	4.140
ABJLB118N	B	MH1	2	1	56.581	3.985	0.112	0.127	12	BGM	0.0106	59.102	4.163
ABJLB119N	B	MH1	2	1	52.813	3.850	0.119	0.130	12	HAT	0.0108	56.553	4.123
ABJLB11AN	B	MH1	2	1	62.312	3.987	0.118	0.126	12	HGM	0.0105	64.994	4.159
ABJLB21AN	B	MH2	2	2	60.152	3.952	0.107	0.127	12	HAT	0.0105	62.782	4.125
ABJLB21BN	B	MH2	2	2	60.595	3.942	0.116	0.126	12	HGM	0.0105	62.978	4.097
ABJLB21CN	B	MH2	2	2	56.618	3.892	0.115	0.126	12	BGM	0.0105	58.852	4.045
ABJLC116N	C	MH1	3	1	55.188	3.775	0.110	0.127	12	HGM	0.0106	57.753	3.951
ABJLC117N	C	MH1	3	1	58.751	3.830	0.115	0.127	12	HGM	0.0105	61.320	3.997
ABJLC11BN	C	MH1	3	1	54.776	3.826	0.116	0.126	12	HGM	0.0105	57.103	3.988
ABJLC219N	C	MH2	3	2	48.980	3.910	0.129	0.126	12	HGM	0.0105	50.738	4.050
ABJLC21AN	C	MH2	3	2	50.760	3.840	0.107	0.125	12	HGM	0.0104	52.429	3.966
ABJLC21BN	C	MH2	3	2	55.535	3.899	0.118	0.125	12	HGM	0.0104	57.436	4.033

Average	**56.681**	**3.980**	**0.116**	**$Average_{norm}$**	**0.0104**	**58.289**	**4.091**
Standard Dev.	**3.475**	**0.134**	**0.005**	**$Standard\ Dev._{norm}$**		**3.531**	**0.076**
Coeff. of Var. [%]	**6.130**	**3.360**	**4.332**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**6.058**	**1.867**
Min.	**48.980**	**3.775**	**0.107**	**Min.**	**0.0101**	**50.738**	**3.951**
Max.	**62.312**	**4.184**	**0.129**	**Max.**	**0.0108**	**64.994**	**4.203**
Number of Spec.	**19**	**19**	**19**	**Number of Spec.**		**19**	**19**

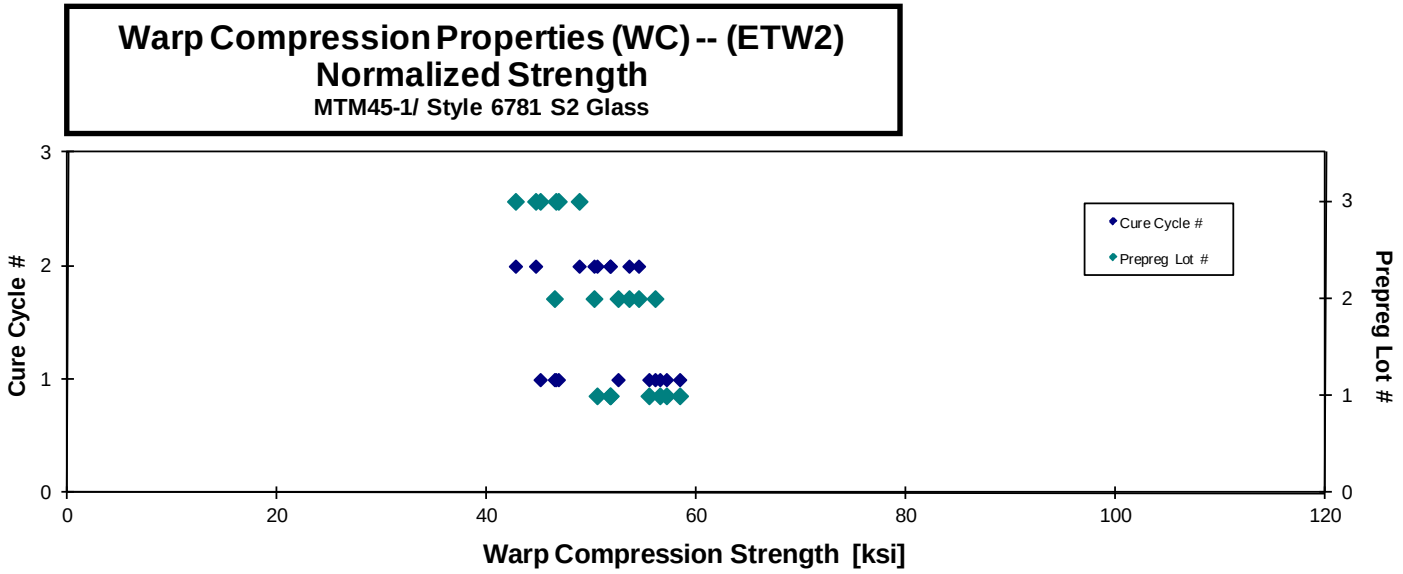

Warp Compression Properties (WC) -- (ETW)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3

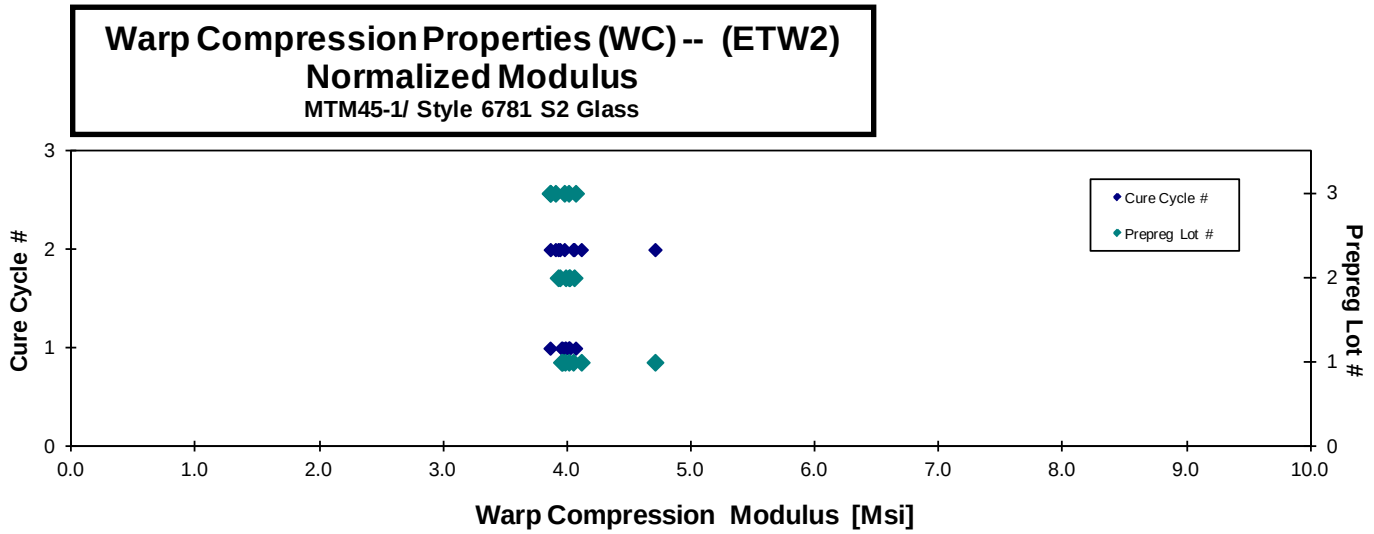

Warp Compression Properties (WC) -- (ETW)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Warp Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

Warp Compression Properties (WC) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJLA11HD	A	MH1	1	1	58.007	3.929	0.097	0.122	12	HGM	0.0102	58.342	3.952
ABJLA11ID	A	MH1	1	1	56.443	3.958	0.108	0.121	12	HGM	0.0101	56.450	3.958
ABJLA11JD	A	MH1	1	1	56.724	3.956	0.111	0.122	12	HGM	0.0102	57.075	3.980
ABJLA11KD	A	MH1	1	1	55.083	3.988	0.102	0.122	12	HGM	0.0102	55.409	4.011
ABJLA21DD	A	MH2	1	2	51.911	4.130	0.098	0.121	12	HGM	0.0101	51.690	4.112
ABJLA21ED	A	MH2	1	2	50.742	4.734	0.111	0.121	12	BGM	0.0100	50.456	4.707
ABJLA21FD	A	MH2	1	2	51.852	4.056	0.097	0.121	12	HGM	0.0101	51.724	4.046
ABJLB11DD	B	MH1	2	1	44.470	3.846	0.098	0.126	12	HGM	0.0105	46.396	4.013
ABJLB11ED	B	MH1	2	1	53.674	3.820	0.118	0.126	12	HGM	0.0105	55.992	3.985
ABJLB11FD	B	MH1	2	1	50.318	3.853	0.105	0.126	12	HGM	0.0105	52.463	4.017
ABJLB21FD	B	MH2	2	2	51.987	3.750	0.105	0.127	12	HAT	0.0106	54.418	3.925
ABJLB21GD	B	MH2	2	2	51.485	3.790	0.107	0.126	12	HGM	0.0105	53.509	3.939
ABJLB21HD	B	MH2	2	2	48.312	3.904	0.113	0.126	12	BAT	0.0105	50.172	4.054
ABJLC118D	C	MH1	3	1	43.354	3.860	0.091	0.126	12	BGM	0.0105	45.036	4.010
ABJLC11AD	C	MH1	3	1	44.968	3.712	0.088	0.126	12	HGM	0.0105	46.767	3.860
ABJLC11GD	C	MH1	3	1	44.700	3.906	0.091	0.126	12	BGM	0.0105	46.525	4.066
ABJLC21ED	C	MH2	3	2	41.055	3.755	0.094	0.126	12	HGB	0.0105	42.675	3.903
ABJLC21GD	C	MH2	3	2	42.972	3.830	0.099	0.126	12	BAT	0.0105	44.597	3.975
ABJLC21HD	C	MH2	3	2	47.518	3.764	0.094	0.124	12	HGM	0.0104	48.753	3.862
				Average	**49.767**	**3.923**	**0.101**			**$Average_{norm}$**	**0.0104**	**50.971**	**4.020**
				Standard Dev.	**5.108**	**0.224**	**0.008**			**Standard $Dev._{norm}$**		**4.696**	**0.179**
				Coeff. of Var. [%]	**10.263**	**5.714**	**8.305**			**Coeff. of Var. $[\%]_{norm}$**		**9.214**	**4.456**
				Min.	**41.055**	**3.712**	**0.088**			**Min.**	**0.0100**	**42.675**	**3.860**
				Max.	**58.007**	**4.734**	**0.118**			**Max.**	**0.0106**	**58.342**	**4.707**
				Number of Spec.	**19**	**19**	**19**			**Number of Spec.**		**19**	**19**


Warp Compression Properties (WC) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Compression Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3


Warp Compression Properties (WC) -- (ETW2)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Warp Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

4.4 Fill Compression Properties

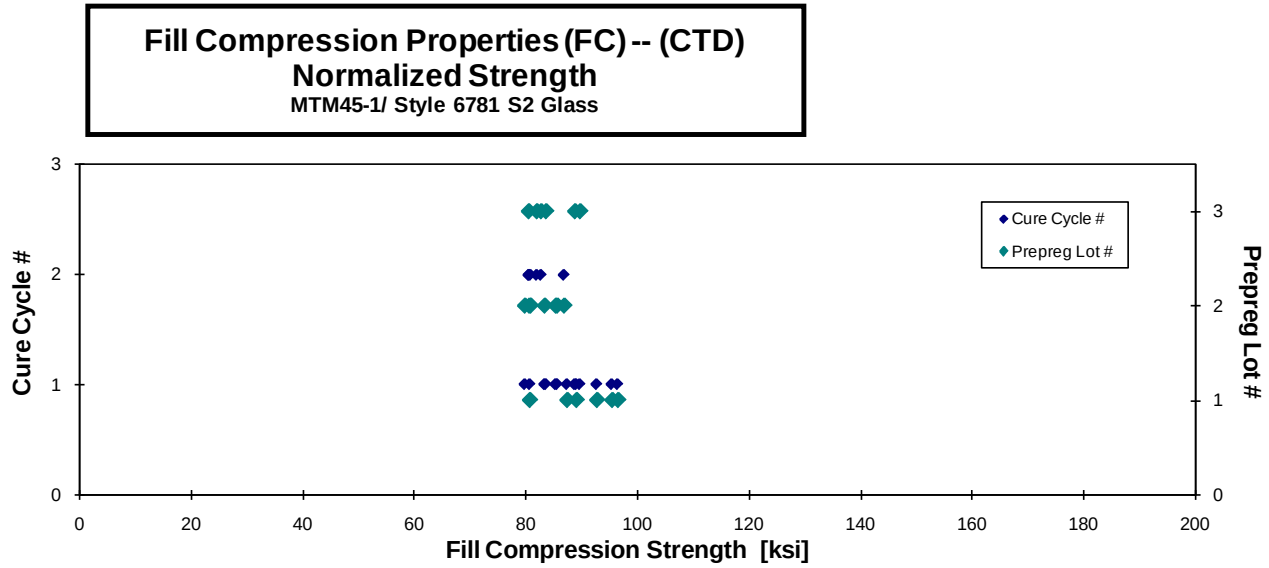
Fill Compression Properties (FC) -- (CTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

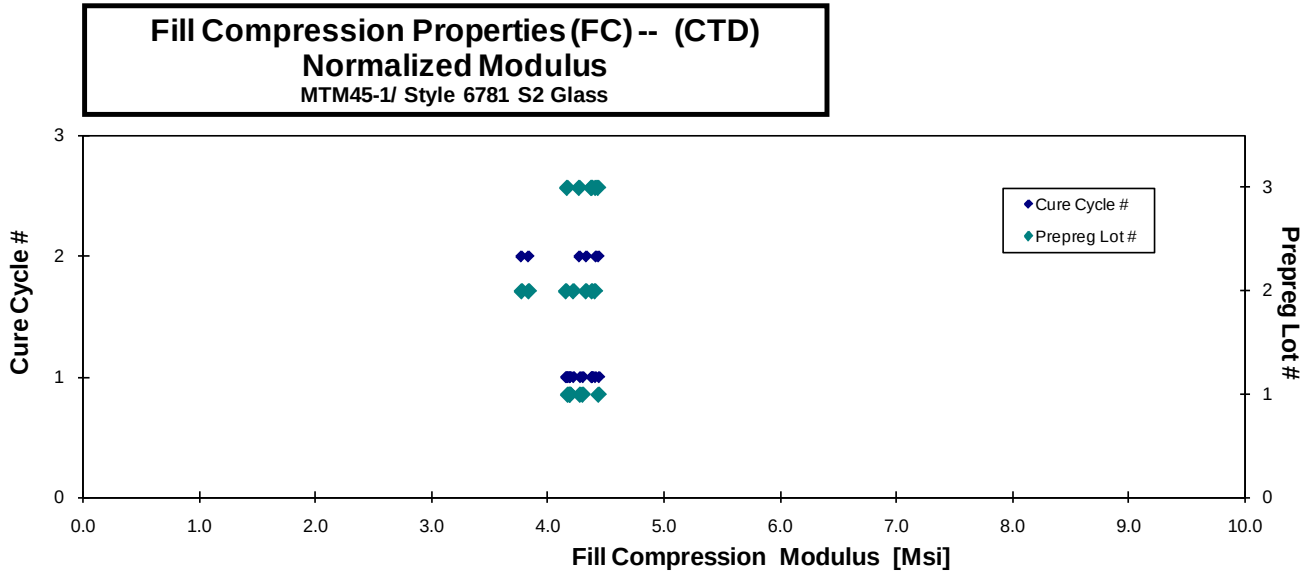
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJZA117B	A	MH1	1	1	81.549	4.347	0.131	0.120	12	BAB	0.0100	80.641	4.298
ABJZA118B	A	MH1	1	1	91.894	4.155	0.145	0.122	12	BGM	0.0102	92.652	4.189
ABJZA119B	A	MH1	1	1	95.905	4.253	0.139	0.122	12	BGM	0.0102	96.419	4.275
ABJZA11AB	A	MH1	1	1	94.607	4.400	0.131	0.122	12	BGM	0.0102	95.374	4.436
ABJZA11BB	A	MH1	1	1	87.004	4.154	0.144	0.122	12	BGM	0.0101	87.327	4.170
ABJZA11CB	A	MH1	1	1	88.301	4.154	0.134	0.122	12	BGM	0.0102	88.994	4.187
ABJZB116B	B	MH1	2	1	80.138	4.212	0.182	0.126	12	BGM	0.0105	83.300	4.378
ABJZB117B	B	MH1	2	1	82.861	4.265	0.156	0.125	12	BGM	0.0104	85.561	4.404
ABJZB118B	B	MH1	2	1	77.346	4.089	0.125	0.125	12	BGM	0.0104	79.760	4.217
ABJZB119B	B	MH1	2	1	82.725	4.028	0.121	0.125	12	BGM	0.0104	85.284	4.153
ABJZB216B	B	MH2	2	2	77.017	3.651	0.125	0.127	12	BGM	0.0106	80.798	3.830
ABJZB217B	B	MH2	2	2	83.151	3.611	0.112	0.127	12	BGM	0.0105	86.787	3.769
ABJZB218B	B	MH2	2	2	76.858	4.128	0.127	0.127	12	BGM	0.0106	80.546	4.326
ABJZC116B	C	MH1	3	1	78.921	3.932	0.117	0.128	12	BGM	0.0107	83.544	4.162
ABJZC117B	C	MH1	3	1	84.037	4.099	0.128	0.129	12	BGM	0.0108	89.630	4.372
ABJZC118B	C	MH1	3	1	83.178	4.105	0.141	0.129	12	BGM	0.0108	88.714	4.378
ABJZC216B	C	MH2	3	2	79.883	4.123	0.113	0.125	12	BGM	0.0105	82.663	4.267
ABJZC217B	C	MH2	3	2	77.526	4.248	0.139	0.126	12	BGM/HGM	0.0105	80.447	4.408
ABJZC218B	C	MH2	3	2	78.386	4.240	0.114	0.127	12	BGM	0.0106	81.900	4.430

*Batch A cure Cycle 2 Specimens: Orientation of plies are in 0 degree direction so results omitted

Average	**83.226**	**4.115**	**0.133**	**$Average_{norm}$**	**0.0104**	**85.807**	**4.245**
Standard Dev.	**5.860**	**0.202**	**0.017**	**$Standard\ Dev._{norm}$**		**5.105**	**0.184**
Coeff. of Var. [%]	**7.041**	**4.911**	**12.613**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.950**	**4.344**
Min.	**76.858**	**3.611**	**0.112**	**Min.**	**0.0100**	**79.760**	**3.769**
Max.	**95.905**	**4.400**	**0.182**	**Max.**	**0.0108**	**96.419**	**4.436**
Number of Spec.	**19**	**19**	**19**	**Number of Spec.**		**19**	**19**


Fill Compression Properties (FC) -- (CTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3


Fill Compression Properties (FC) -- (CTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

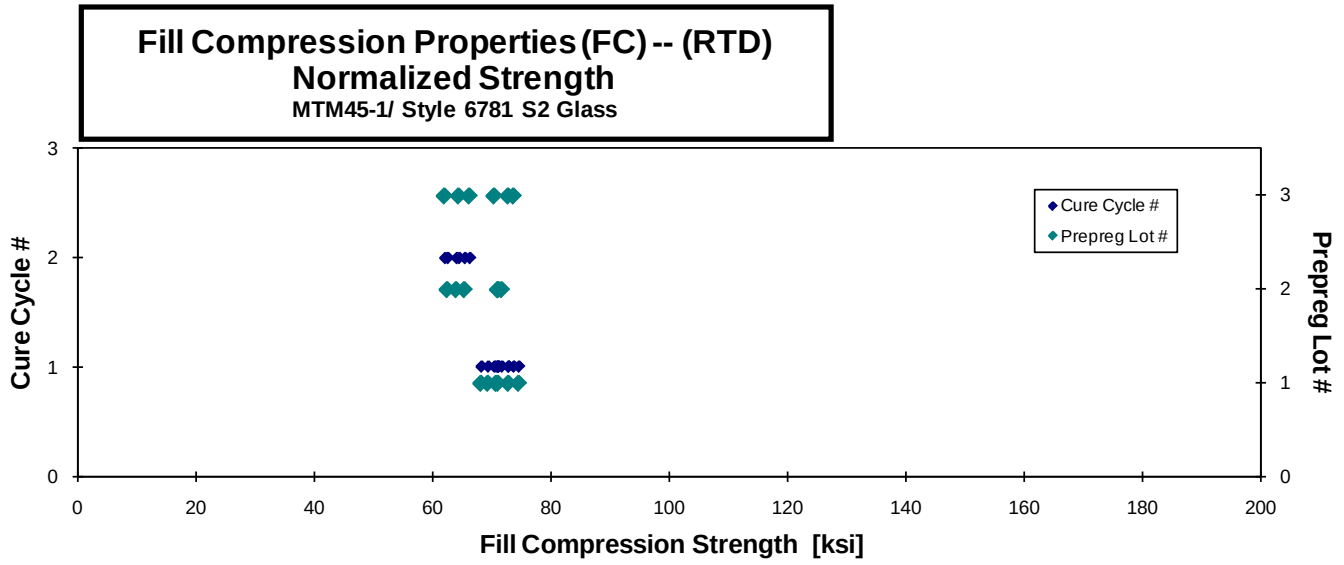
Fill Compression Properties (FC) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJZA111A	A	MH1	1	1	69.445	3.988	0.139	0.124	12	BGM	0.0103	70.811	4.066
ABJZA112A	A	MH1	1	1	67.576	4.046	0.136	0.122	12	BGM	0.0102	68.264	4.087
ABJZA113A	A	MH1	1	1	68.854	4.062	0.149	0.122	12	BGM	0.0102	69.422	4.095
ABJZA114A	A	MH1	1	1	72.381	4.068	0.124	0.122	12	BGM	0.0102	72.899	4.097
ABJZA115A	A	MH1	1	1	70.165	3.942	0.131	0.123	12	BGM	0.0102	71.139	3.997
ABJZA116A	A	MH1	1	1	73.686	4.023	0.116	0.123	12	BGM	0.0102	74.638	4.075
ABJZB111A	B	MH1	2	1	68.875	3.990	0.142	0.125	12	BGM / HGM	0.0104	71.081	4.118
ABJZB112A	B	MH1	2	1	69.139	3.987	0.126	0.126	12	BGM	0.0105	71.763	4.138
ABJZB113A	B	MH1	2	1	68.747	3.869	0.138	0.126	12	BGM	0.0105	71.224	4.008
ABJZB211A	B	MH2	2	2	61.555	3.824	0.102	0.126	12	BGM	0.0105	64.069	3.980
ABJZB212A	B	MH2	2	2	60.339	3.811	0.128	0.126	12	BGM	0.0105	62.555	3.951
ABJZB213A	B	MH2	2	2	62.782	3.892	0.129	0.126	12	BGM	0.0105	65.458	4.058
ABJZC111A	C	MH1	3	1	67.198	3.693	0.122	0.127	12	BGM / HGM	0.0106	70.488	3.874
ABJZC112A	C	MH1	3	1	69.538	3.798	0.144	0.127	12	BGM	0.0106	72.856	3.980
ABJZC113A	C	MH1	3	1	70.381	3.791	0.152	0.127	12	BGM / HGM	0.0106	73.759	3.973
ABJZC211A	C	MH2	3	2	59.927	3.682	0.126	0.126	12	BGM / HGM	0.0105	62.086	3.815
ABJZC212A	C	MH2	3	2	62.860	3.862	0.116	0.124	12	BGM	0.0104	64.485	3.962
ABJZC213A	C	MH2	3	2	63.951	3.888	0.108	0.126	12	BGM	0.0105	66.290	4.030

*Batch A cure Cycle 2 Specimens: Orientation of plies are in 0 degree direction so results omitted

Average	**67.078**	**3.901**	**0.129**	**Average$_{norm}$**	**0.0104**	**69.072**	**4.017**
Standard Dev.	**4.135**	**0.120**	**0.014**	**Standard Dev.$_{norm}$**		**3.956**	**0.085**
Coeff. of Var. [%]	**6.164**	**3.074**	**10.492**	**Coeff. of Var. [%]$_{norm}$**		**5.727**	**2.122**
Min.	**59.927**	**3.682**	**0.102**	**Min.**	**0.0102**	**62.086**	**3.815**
Max.	**73.686**	**4.068**	**0.152**	**Max.**	**0.0106**	**74.638**	**4.138**
Number of Spec.	**18**	**18**	**18**	**Number of Spec.**		**18**	**18**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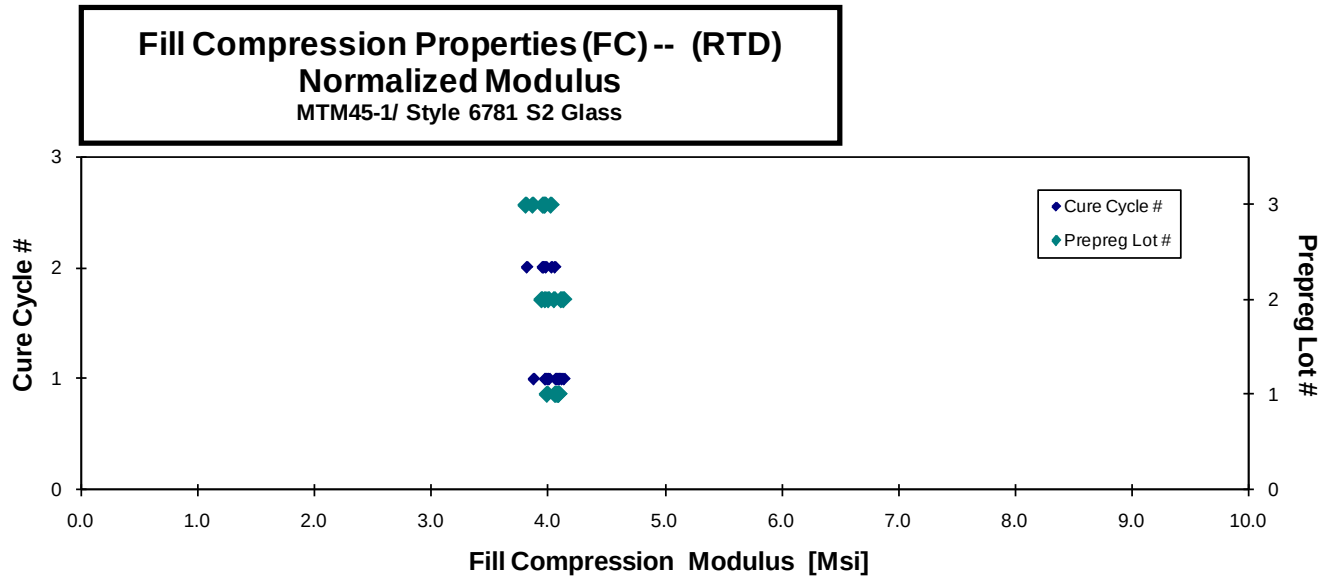
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3


Fill Compression Properties (FC) -- (RTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

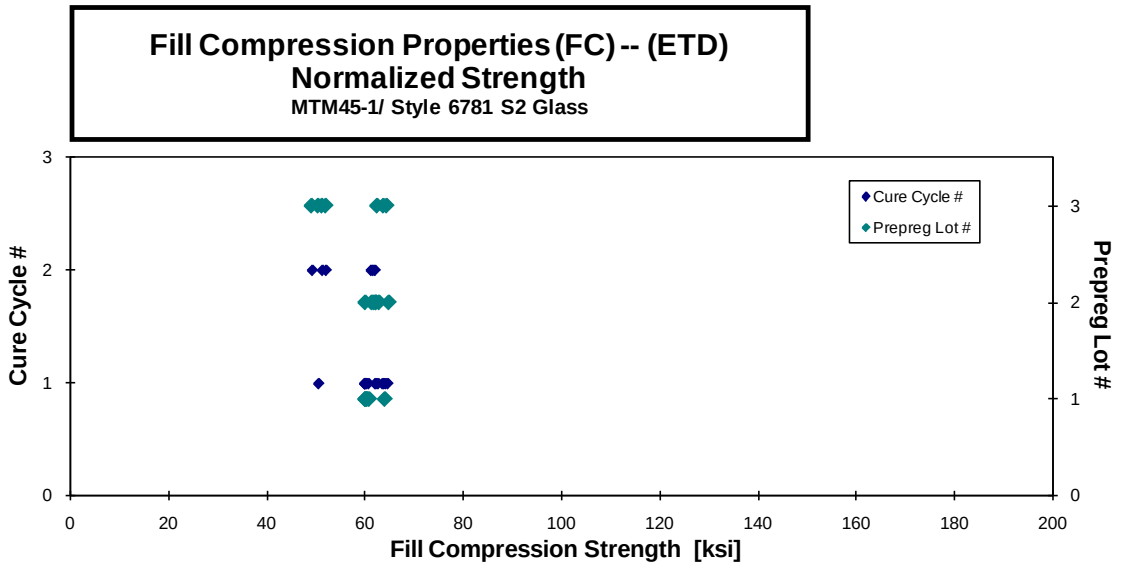
Fill Compression Properties (FC) -- (ETD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJZA11DC	A	MH1	1	1	60.194	3.954	0.123	0.122	12	HGM	0.0101	60.393	3.967
ABJZA11EC	A	MH1	1	1	60.154	3.934	0.122	0.123	12	HGM	0.0102	60.824	3.978
ABJZA11FC	A	MH1	1	1	59.372	3.952	0.118	0.123	12	BGM	0.0102	60.041	3.996
ABJZA11GC	A	MH1	1	1	59.567	3.906	0.121	0.122	12	HGM	0.0102	60.026	3.936
ABJZA11HC	A	MH1	1	1	59.373	3.950	0.108	0.123	12	BGM	0.0103	60.296	4.012
ABJZA11IC	A	MH1	1	1	63.355	3.951	0.122	0.122	12	BGM	0.0102	63.991	3.991
ABJZB11BC	B	MH1	2	1	60.847	3.869	0.127	0.125	12	HGM/BGM	0.0104	62.822	3.995
ABJZB11CC	B	MH1	2	1	58.111	3.804	0.119	0.125	12	HGM	0.0104	60.029	3.930
ABJZB11DC	B	MH1	2	1	62.514	3.907	0.128	0.126	12	HGM/BGM	0.0105	64.792	4.049
ABJZB11EC	B	MH1	2	1	60.300	3.823	0.114	0.125	12	HGM	0.0104	62.191	3.943
ABJZB21BC	B	MH2	2	2	59.141	3.805	0.123	0.127	12	BGM	0.0105	61.736	3.972
ABJZB21CC	B	MH2	2	2	59.342	3.809	0.100	0.125	12	HGM	0.0104	61.341	3.937
ABJZB21DC	B	MH2	2	2	59.917	3.893	0.101	0.126	12	BGM	0.0105	62.166	4.039
ABJZC11BC	C	MH1	3	1	47.721	3.672	0.100	0.128	12	HGM	0.0107	50.484	3.885
ABJZC11CC	C	MH1	3	1	59.336	3.663	0.101	0.128	12	HGM	0.0106	62.420	3.853
ABJZC11DC	C	MH1	3	1	61.445	3.727	0.124	0.127	12	BGM	0.0106	64.343	3.903
ABJZC11EC	C	MH1	3	1	60.589	3.660	0.118	0.127	12	BGM	0.0106	63.688	3.847
ABJZC21BC	C	MH2	3	2	49.818	3.750	0.113	0.127	12	BGM	0.0105	52.024	3.916
ABJZC21CC	C	MH2	3	2	46.818	3.704	0.112	0.127	12	BGM	0.0106	49.180	3.891
ABJZC21DC	C	MH2	3	2	49.131	3.654	0.106	0.126	12	BGM	0.0105	51.260	3.812

*Batch A cure Cycle 2 Specimens: Orientation of plies are in 0 degree direction so results omitted

Average	**57.852**	**3.819**	**0.115**	**$Average_{norm}$**	**0.0104**	**59.702**	**3.943**
Standard Dev.	**5.032**	**0.111**	**0.009**	**$Standard\ Dev._{norm}$**		**4.846**	**0.064**
Coeff. of Var. [%]	**8.698**	**2.896**	**8.168**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**8.118**	**1.632**
Min.	**46.818**	**3.654**	**0.100**	**Min.**	**0.0101**	**49.180**	**3.812**
Max.	**63.355**	**3.954**	**0.128**	**Max.**	**0.0107**	**64.792**	**4.049**
Number of Spec.	**20**	**20**	**20**	**Number of Spec.**		**20**	**20**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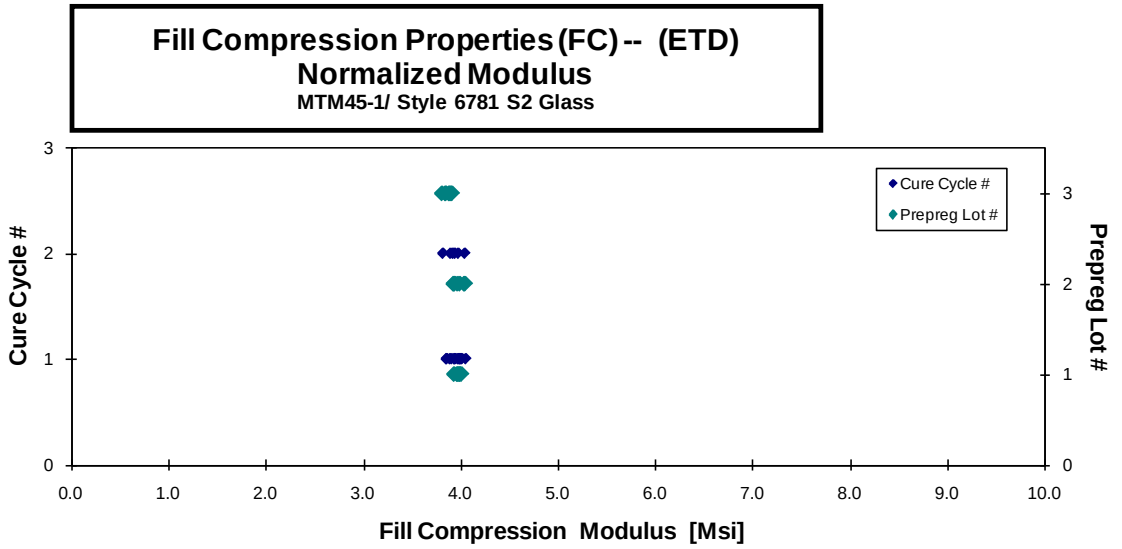
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3


Fill Compression Properties (FC) -- (ETD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

Fill Compression Properties (FC) -- (ETW)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

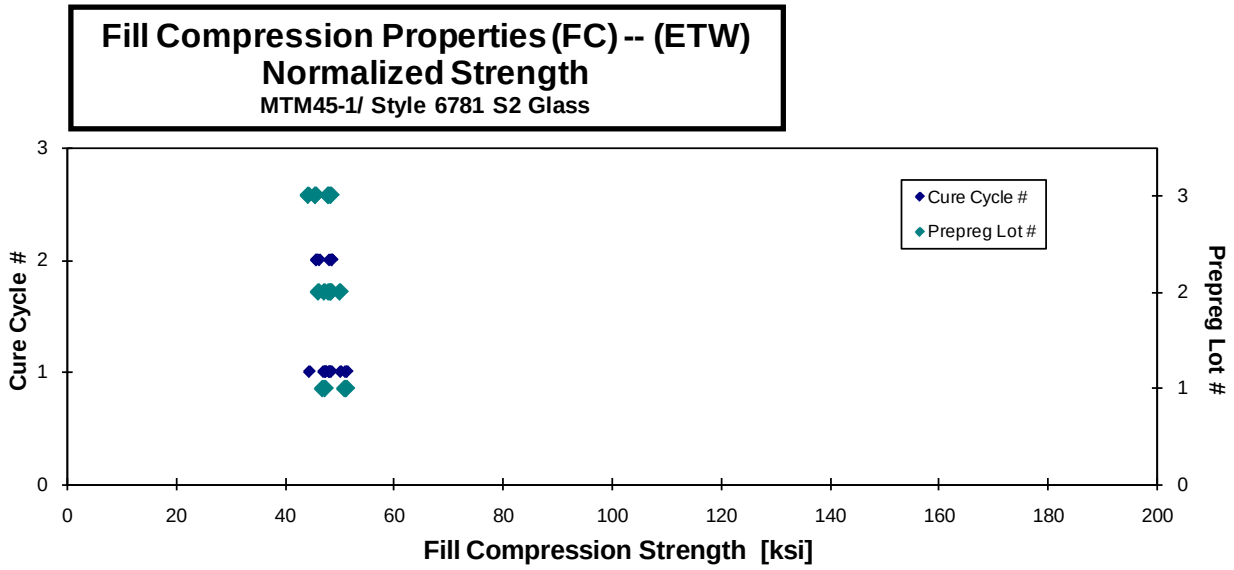
normalizing t_{ply} [in]
0.0101

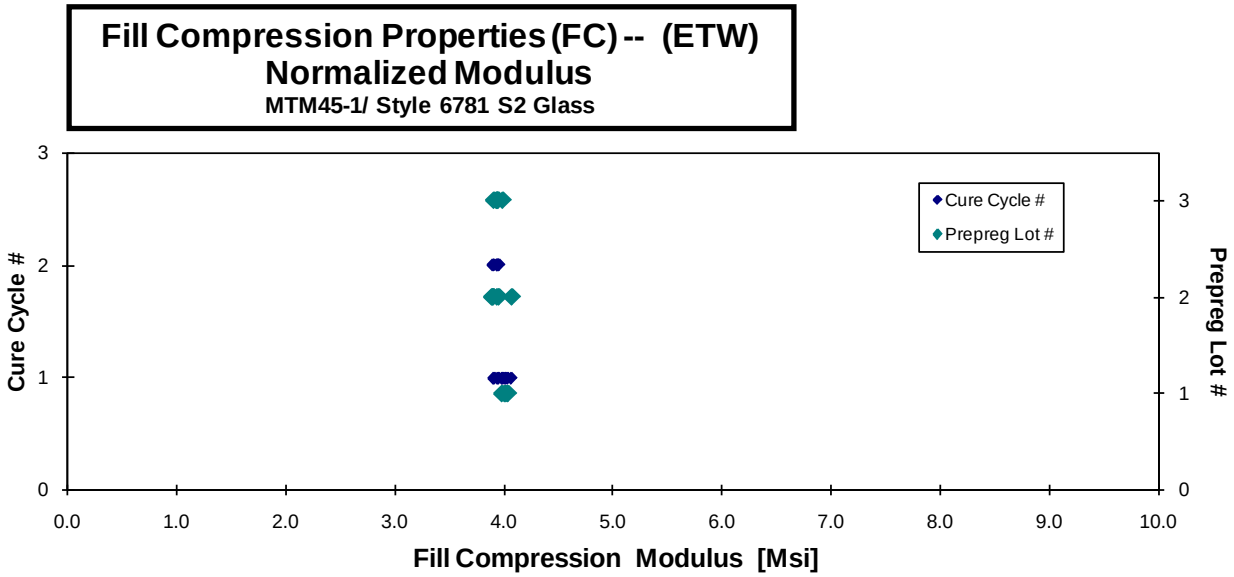
Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJZA127N	A	MH1	1	1	50.764	3.958	0.112	0.123	12	HGM	0.0102	51.358	4.004
ABJZA128N	A	MH1	1	1	46.759	3.978	0.117	0.123	12	BGM	0.0102	47.415	4.034
ABJZA129N	A	MH1	1	1	50.045	3.902	0.103	0.124	12	BGM	0.0103	51.043	3.980
ABJZA12AN	A	MH1	1	1	46.320	3.962	0.102	0.123	12	HGM/BGM	0.0102	46.976	4.018
ABJZB127N	B	MH1	2	1	49.177	3.988	0.107	0.124	12	HGM	0.0103	50.164	4.068
ABJZB128N	B	MH1	2	1	47.165	3.835	0.109	0.124	12	BGM	0.0104	48.417	3.937
ABJZB12AN	B	MH1	2	1	46.261	3.813	0.115	0.124	12	HGM	0.0103	47.298	3.898
ABJZB227N	B	MH2	2	2	44.216	3.736	0.116	0.127	12	HGM	0.0106	46.211	3.904
ABJZB228N	B	MH2	2	2	46.481	3.783	0.102	0.127	12	BGM	0.0106	48.558	3.952
ABJZB229N	B	MH2	2	2	46.094	3.730	0.098	0.126	12	BGM	0.0105	48.078	3.890
ABJZC127N	C	MH1	3	1	45.436	3.687	0.118	0.128	12	HGM	0.0107	48.154	3.908
ABJZC128N	C	MH1	3	1	45.395	3.770	0.112	0.128	12	HGT	0.0107	47.998	3.986
ABJZC129N	C	MH1	3	1	41.907	3.731	0.103	0.128	12	HAB	0.0107	44.339	3.948
ABJZC227N	C	MH2	3	2	45.950	3.728	0.108	0.128	12	HGM/BGM	0.0107	48.502	3.935
ABJZC228N	C	MH2	3	2	43.154	3.714	0.100	0.128	12	BGM	0.0107	45.688	3.932
ABJZC229N	C	MH2	3	2	43.217	3.732	0.102	0.128	12	HAB	0.0107	45.636	3.941

*Batch A cure Cycle 2 Specimens: Orientation of plies are in 0 degree direction so results omitted

Average	**46.146**	**3.815**	**0.108**
Standard Dev.	**2.417**	**0.107**	**0.007**
Coeff. of Var. [%]	**5.237**	**2.799**	**6.108**
Min.	**41.907**	**3.687**	**0.098**
Max.	**50.764**	**3.988**	**0.118**
Number of Spec.	**16**	**16**	**16**

$Average_{norm}$	**0.0105**	**47.865**	**3.958**
$Standard\ Dev._{norm}$		**1.917**	**0.052**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**4.005**	**1.313**
Min.	**0.0102**	**44.339**	**3.890**
Max.	**0.0107**	**51.358**	**4.068**
Number of Spec.		**16**	**16**


Fill Compression Properties (FC) -- (ETW)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]
0
20
40
60
80
100
120
140
160
180
200
0
1
2
3


Fill Compression Properties (FC) -- (ETW)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
0
1
2
3

Fill Compression Properties (FC) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

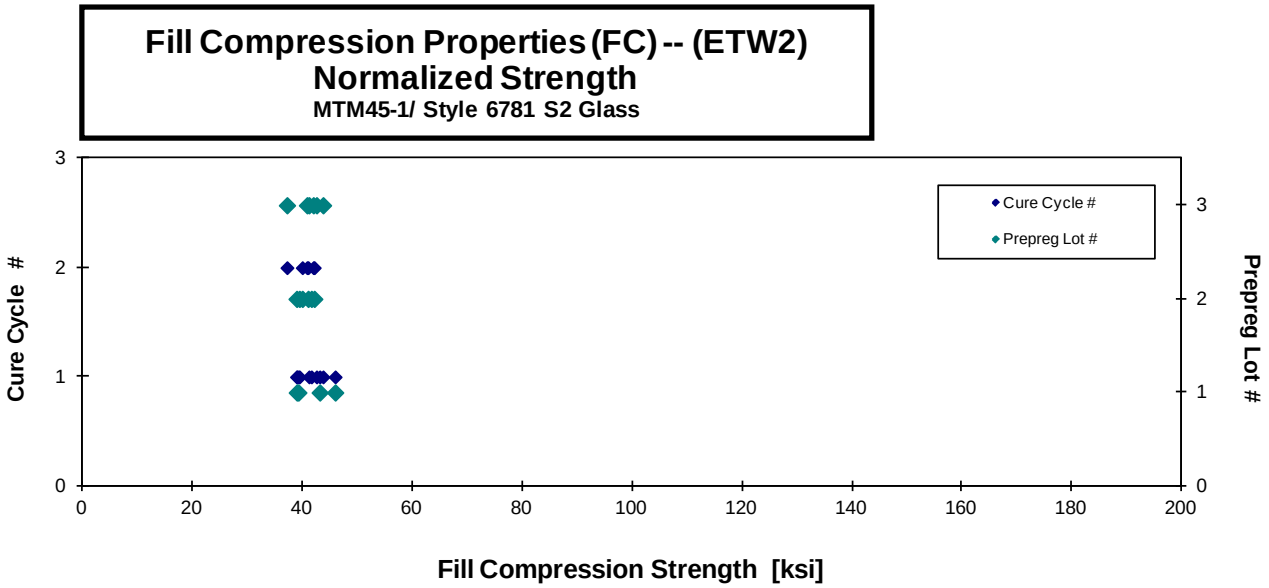
normalizing t_{ply} [in]: 0.0101

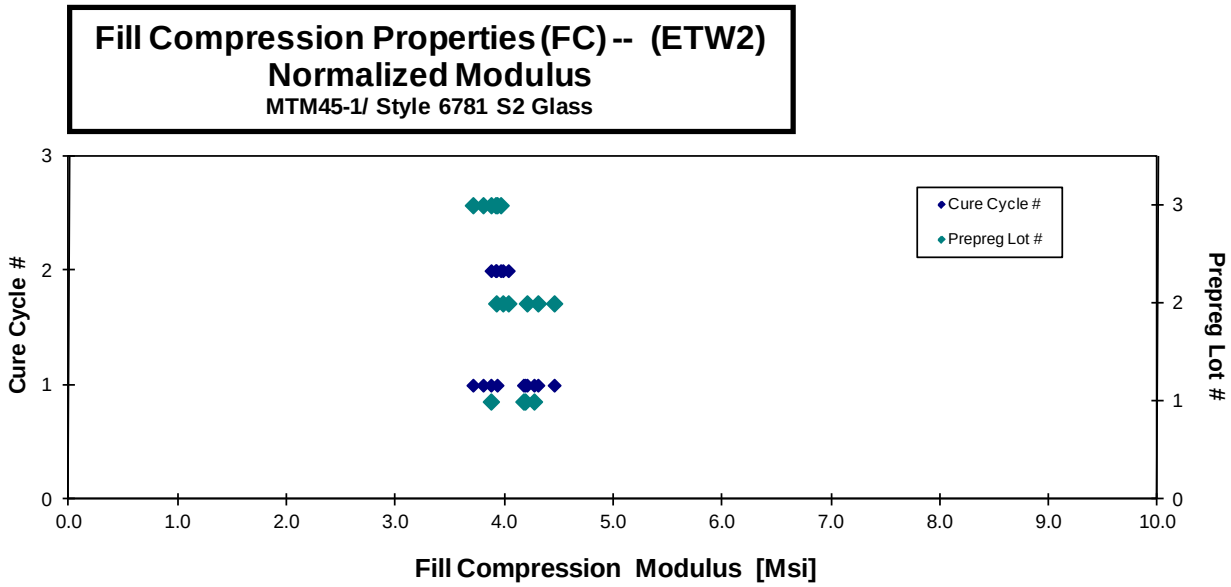
Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJZA121D	A	MH1	1	1	39.099	4.286	0.102	0.121	12	HGM	0.0101	38.948	4.269
ABJZA122D	A	MH1	1	1	42.710	4.148	0.109	0.122	12	HGM	0.0102	43.115	4.187
ABJZA123D	A	MH1	1	1	38.766	4.124	0.100	0.123	12	HAB	0.0102	39.219	4.173
ABJZA124D	A	MH1	1	1	45.446	3.834	0.106	0.122	12	HGM	0.0102	45.921	3.874
ABJZB121D	B	MH1	2	1	38.435	4.344	0.114	0.124	12	HGM	0.0104	39.413	4.455
ABJZB122D	B	MH1	2	1	40.443	4.186	0.096	0.125	12	HGM	0.0104	41.594	4.305
ABJZB123D	B	MH1	2	1	37.666	4.071	0.091	0.125	12	HGM	0.0104	38.909	4.205
ABJZB221D	B	MH2	2	2	40.143	3.739	0.093	0.127	12	HGM	0.0106	42.119	3.923
ABJZB222D	B	MH2	2	2	38.128	3.802	0.080	0.127	12	HGM	0.0106	39.943	3.983
ABJZB223D	B	MH2	2	2	39.164	3.853	0.090	0.127	12	HGM	0.0106	40.995	4.033
ABJZC122D	C	MH1	3	1	39.358	3.636	0.105	0.127	12	HGM	0.0106	41.155	3.802
ABJZC123D	C	MH1	3	1	40.596	3.751	0.106	0.127	12	HGM	0.0106	42.533	3.930
ABJZC124D	C	MH1	3	1	41.559	3.526	0.098	0.127	12	HGM	0.0106	43.713	3.708
ABJZC221D	C	MH2	3	2	39.290	3.772	0.089	0.126	12	HGM	0.0105	40.797	3.916
ABJZC222D	C	MH2	3	2	35.902	3.745	0.091	0.125	12	HGM	0.0105	37.151	3.875
ABJZC223D	C	MH2	3	2	40.426	3.819	0.095	0.126	12	HGM	0.0105	41.949	3.963

*Batch A cure Cycle 2 Specimens: Orientation of plies are in 0 degree direction so results omitted

Average	**39.821**	**3.915**	**0.098**
Standard Dev.	**2.188**	**0.243**	**0.009**
Coeff. of Var. [%]	**5.495**	**6.212**	**8.926**
Min.	**35.902**	**3.526**	**0.080**
Max.	**45.446**	**4.344**	**0.114**
Number of Spec.	**16**	**16**	**16**

$Average_{norm}$	**0.0104**	**41.092**	**4.038**
$Standard\ Dev._{norm}$		**2.176**	**0.205**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.296**	**5.089**
Min.	**0.0101**	**37.151**	**3.708**
Max.	**0.0106**	**45.921**	**4.455**
Number of Spec.		**16**	**16**


Fill Compression Properties (FC) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Strength [ksi]

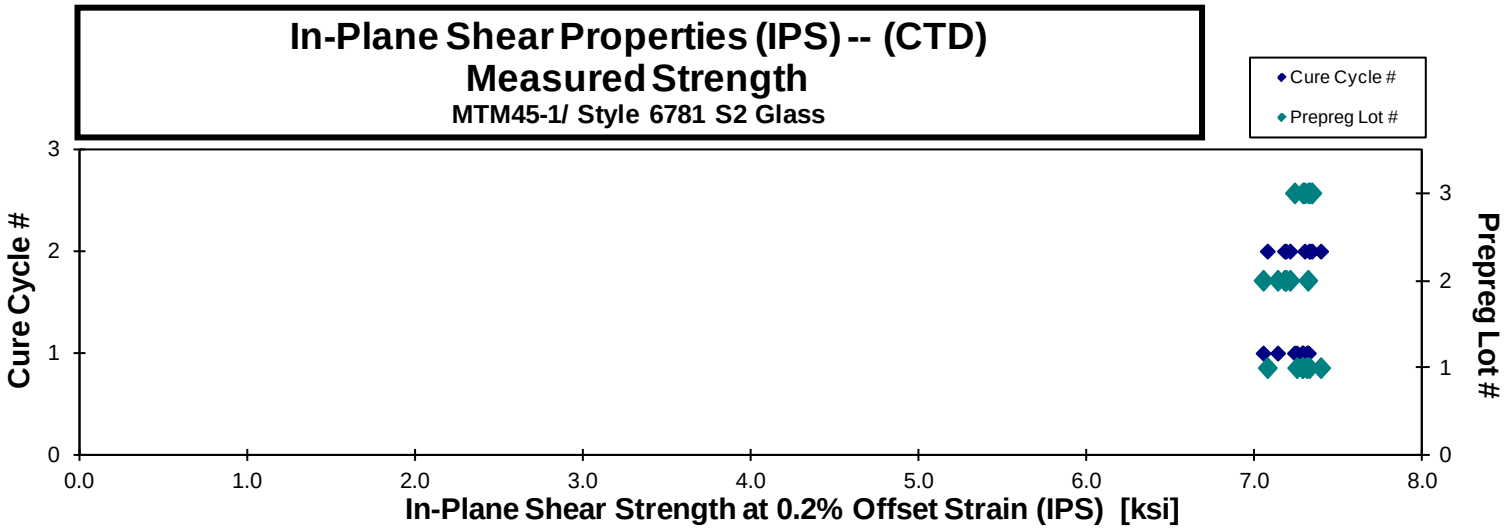

Fill Compression Properties (FC) -- (ETW2)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Fill Compression Modulus [Msi]

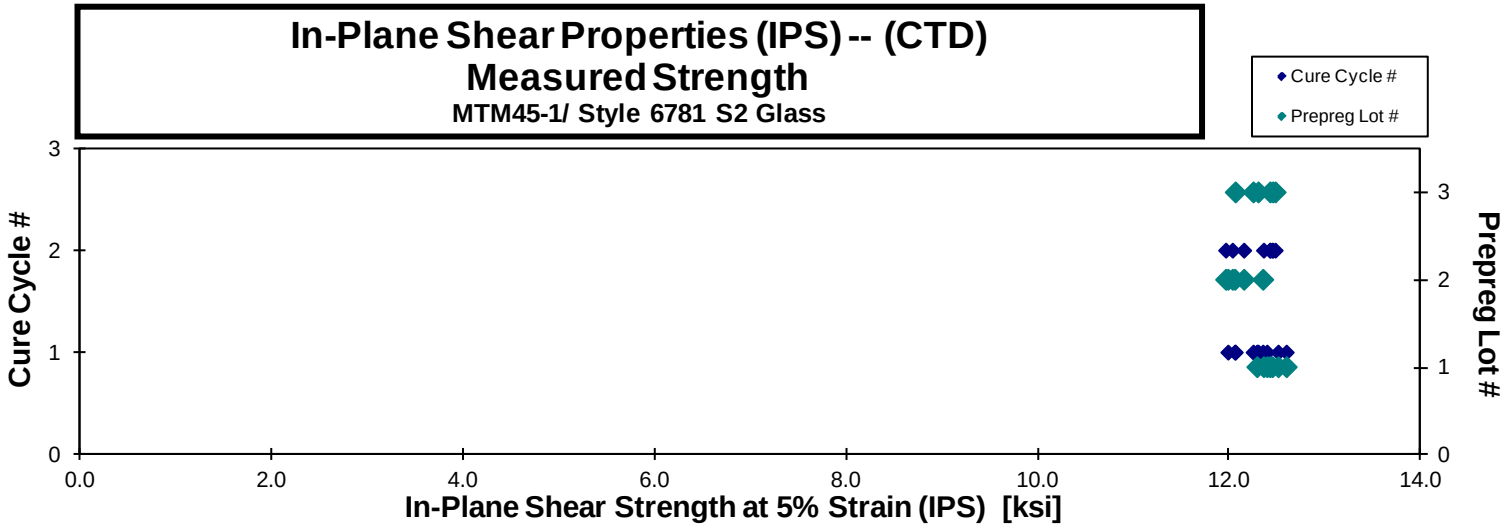
4.5 In-Plane Shear Properties

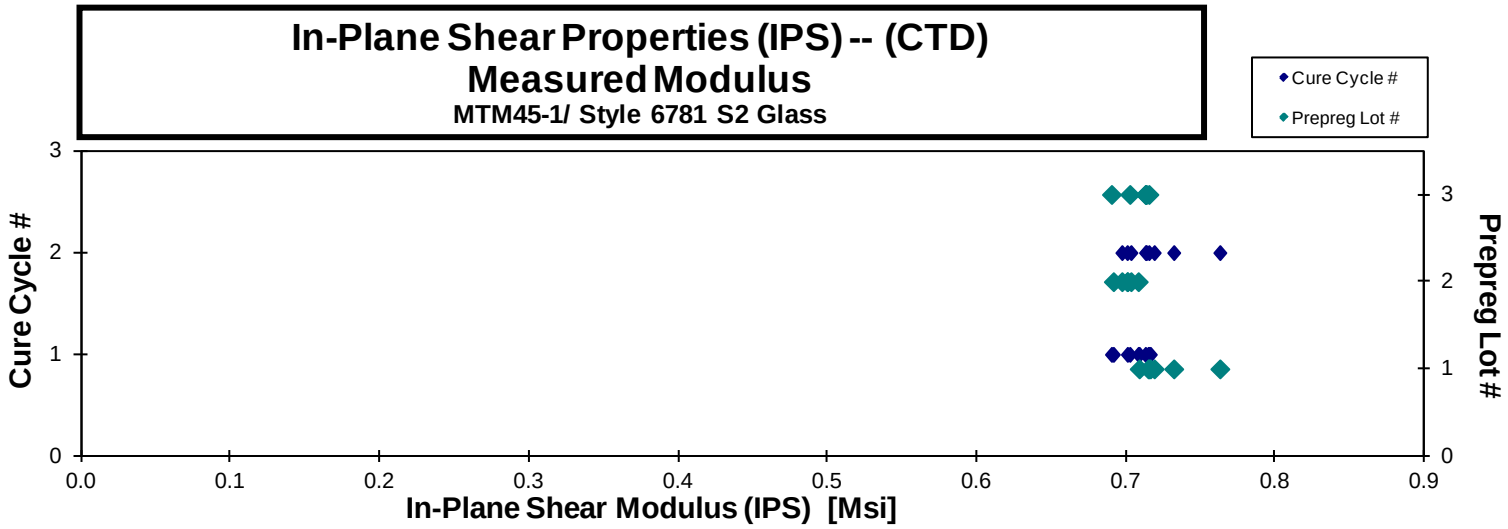
In-Plane Shear Properties (IPS) -- (CTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength at 5% Strain [ksi]	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
ABJNA116B	A	MH1	1	1	12.598	7.281	0.708	0.082	8	0.0103
ABJNA117B	A	MH1	1	1	12.513	7.282	0.714	0.082	8	0.0103
ABJNA118B	A	MH1	1	1	12.396	7.306	0.716	0.083	8	0.0103
ABJNA119B	A	MH1	1	1	12.291	7.248	0.715	0.083	8	0.0104
ABJNA215B	A	MH2	1	2	12.451	7.390	0.732	0.081	8	0.0101
ABJNA216B	A	MH2	1	2	12.360	7.322	0.719	0.081	8	0.0101
ABJNA217B	A	MH2	1	2	12.426	7.072	0.763	0.081	8	0.0102
ABJNB115B	B	MH1	2	1	12.353	7.314	0.701	0.085	8	0.0106
ABJNB116B	B	MH1	2	1	12.060	7.134	0.691	0.085	8	0.0106
ABJNB117B	B	MH1	2	1	11.988	7.047	0.708	0.084	8	0.0105
ABJNB216B	B	MH2	2	2	11.965	7.175	0.697	0.084	8	0.0106
ABJNB217B	B	MH2	2	2	12.035	7.183	0.700	0.085	8	0.0106
ABJNB218B	B	MH2	2	2	12.154	7.207	0.703	0.085	8	0.0106
ABJNC115B	C	MH1	3	1	12.304	7.316	0.702	0.083	8	0.0104
ABJNC116B	C	MH1	3	1	12.252	7.284	0.713	0.083	8	0.0104
ABJNC117B	C	MH1	3	1	12.065	7.234	0.690	0.083	8	0.0104
ABJNC215B	C	MH2	3	2	12.456	7.295	0.715	0.083	8	0.0104
ABJNC216B	C	MH2	3	2	12.482	7.338	0.713	0.083	8	0.0104
ABJNC217B	C	MH2	3	2	12.428	7.325	0.713	0.083	8	0.0104

Average	**12.293**	**7.250**	**0.711**	**Average**	**0.0104**
Standard Dev.	**0.194**	**0.092**	**0.016**	**Standard Dev.**	
Coeff. of Var. [%]	**1.579**	**1.273**	**2.256**	**Coeff. of Var. [%]**	
Min.	**11.965**	**7.047**	**0.690**	**Min.**	**0.0101**
Max.	**12.598**	**7.390**	**0.763**	**Max.**	**0.0106**
Number of Spec.	**19**	**19**	**19**	**Number of Spec.**	**19**


In-Plane Shear Properties (IPS) -- (CTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
In-Plane Shear Strength at 0.2% Offset Strain (IPS) [ksi]

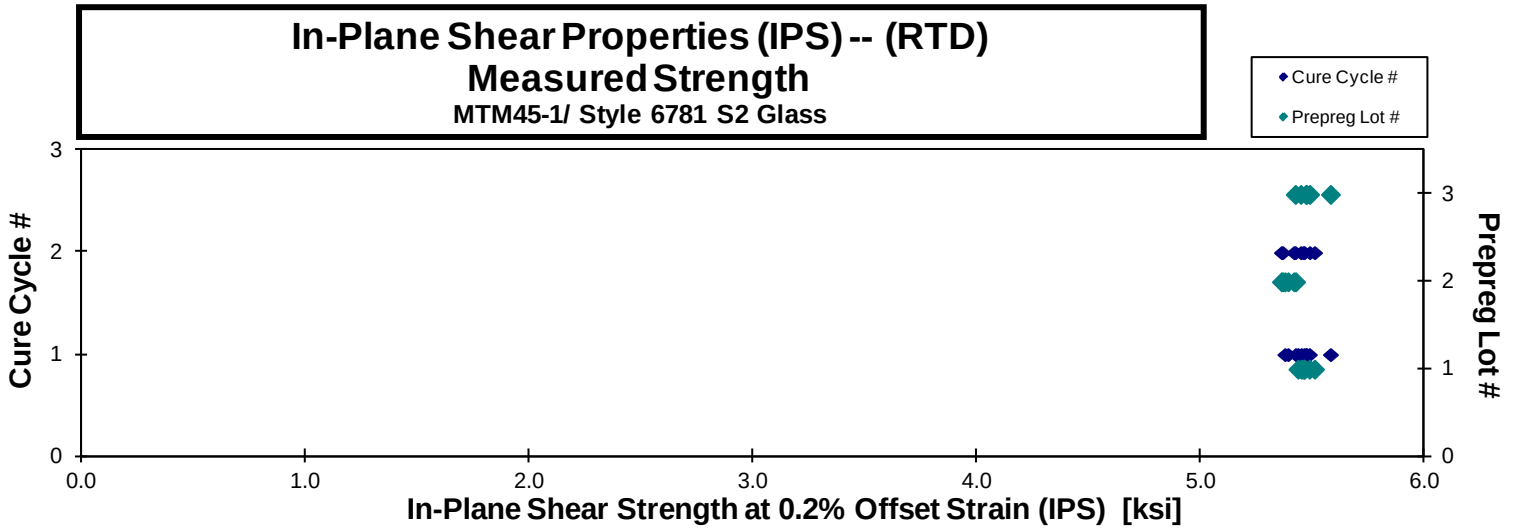

In-Plane Shear Properties (IPS) -- (CTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
In-Plane Shear Strength at 5% Strain (IPS) [ksi]

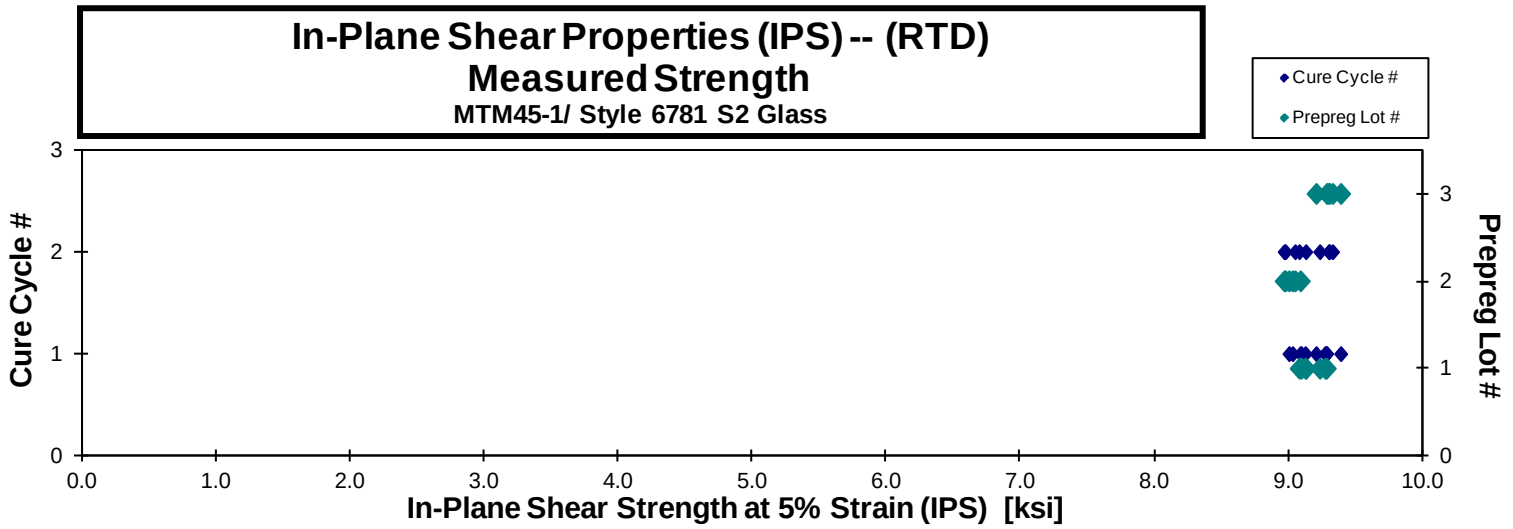

In-Plane Shear Properties (IPS) -- (CTD)
Measured Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus (IPS) [Msi]
0
1
2
3
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9

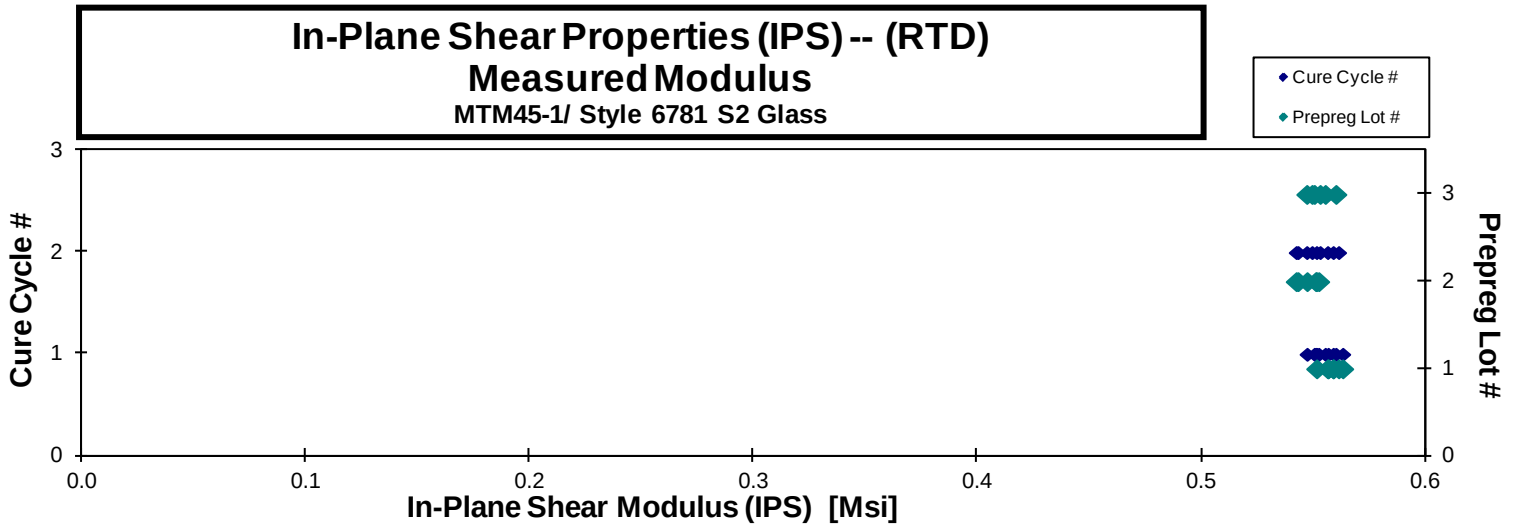
In-Plane Shear Properties (IPS) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength at 5% Strain [ksi]	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
ABJNA111A	A	MH1	1	1	9.121	5.461	0.557	0.082	8	0.0102
ABJNA112A	A	MH1	1	1	9.268	5.485	0.559	0.082	8	0.0102
ABJNA113A	A	MH1	1	1	9.090	5.448	0.563	0.081	8	0.0102
ABJNA114A	A	MH1	1	1	9.278	5.434	0.552	0.082	8	0.0102
ABJNA211A	A	MH2	1	2	9.228	5.508	0.562	0.080	8	0.0100
ABJNA212A	A	MH2	1	2	9.075	5.462	0.557	0.081	8	0.0101
ABJNA213A	A	MH2	1	2	9.124	5.456	0.559	0.081	8	0.0101
ABJNB111A	B	MH1	2	1	9.084	5.423	0.553	0.083	8	0.0104
ABJNB112A	B	MH1	2	1	8.999	5.375	0.548	0.084	8	0.0105
ABJNB113A	B	MH1	2	1	9.026	5.390	0.551	0.084	8	0.0105
ABJNB211A	B	MH2	2	2	9.044	5.415	0.552	0.082	8	0.0103
ABJNB212A	B	MH2	2	2	8.972	5.365	0.543	0.084	8	0.0104
ABJNB213A	B	MH2	2	2	8.963	5.360	0.543	0.084	8	0.0105
ABJNC111A	C	MH1	3	1	9.385	5.579	0.560	0.082	8	0.0103
ABJNC112A	C	MH1	3	1	9.280	5.469	0.556	0.083	8	0.0103
ABJNC113A	C	MH1	3	1	9.201	5.472	0.551	0.083	8	0.0104
ABJNC211A	C	MH2	3	2	9.324	5.486	0.553	0.083	8	0.0103
ABJNC212A	C	MH2	3	2	9.295	5.446	0.550	0.083	8	0.0104
ABJNC213A	C	MH2	3	2	9.301	5.422	0.547	0.084	8	0.0105

Average	**9.161**	**5.445**	**0.553**	**Average**	**0.0103**
Standard Dev.	**0.132**	**0.053**	**0.006**	**Standard Dev.**	
Coeff. of Var. [%]	**1.442**	**0.974**	**1.067**	**Coeff. of Var. [%]**	
Min.	**8.963**	**5.360**	**0.543**	**Min.**	**0.0100**
Max.	**9.385**	**5.579**	**0.563**	**Max.**	**0.0105**
Number of Spec.	**19**	**19**	**19**	**Number of Spec.**	**19**


In-Plane Shear Properties (IPS) -- (RTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
1.0
2.0
3.0
4.0
5.0
6.0
In-Plane Shear Strength at 0.2% Offset Strain (IPS) [ksi]

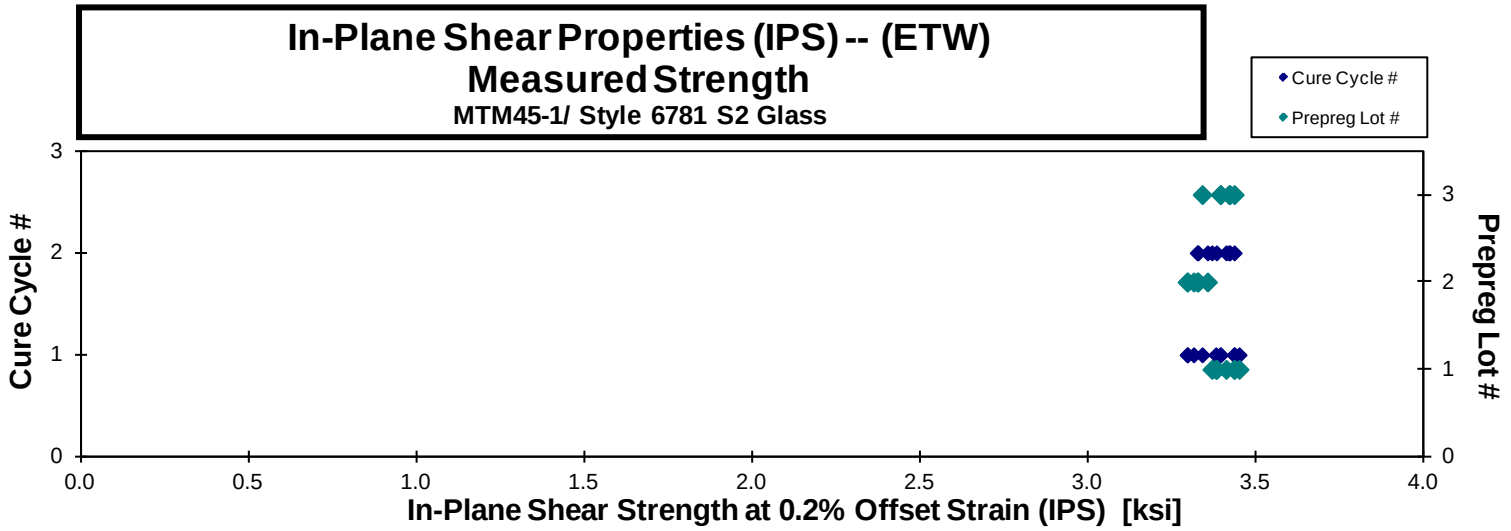

In-Plane Shear Properties (IPS) -- (RTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
In-Plane Shear Strength at 5% Strain (IPS) [ksi]

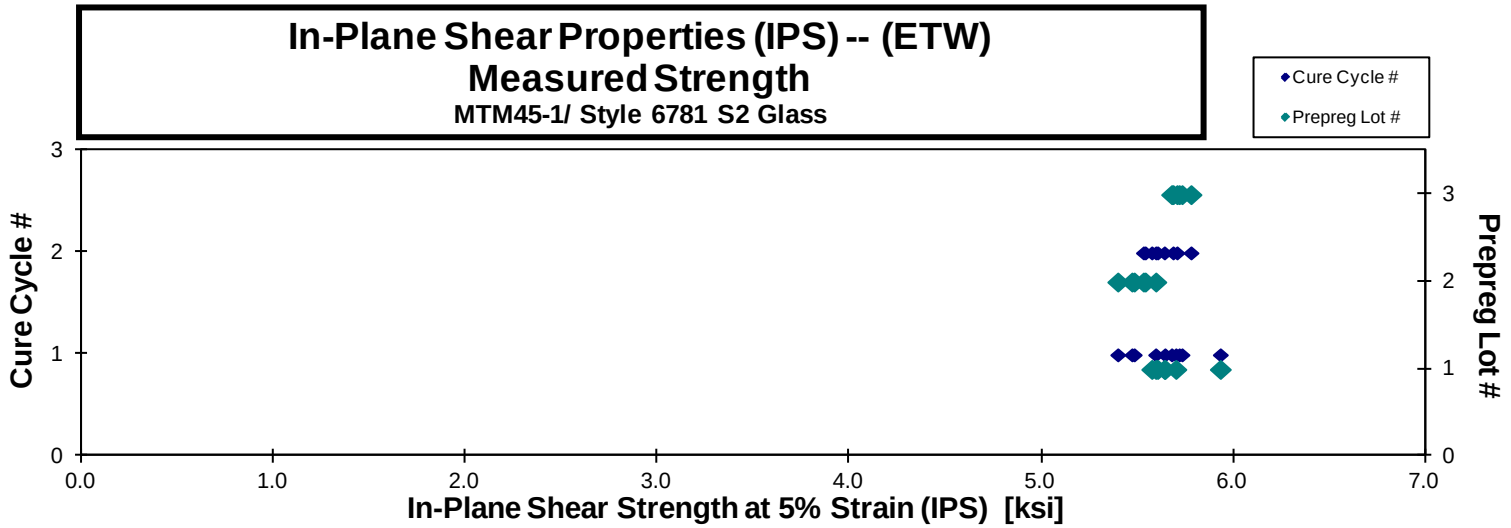

In-Plane Shear Properties (IPS) -- (RTD)
Measured Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus (IPS) [Msi]
0
1
2
3
0.0
0.1
0.2
0.3
0.4
0.5
0.6

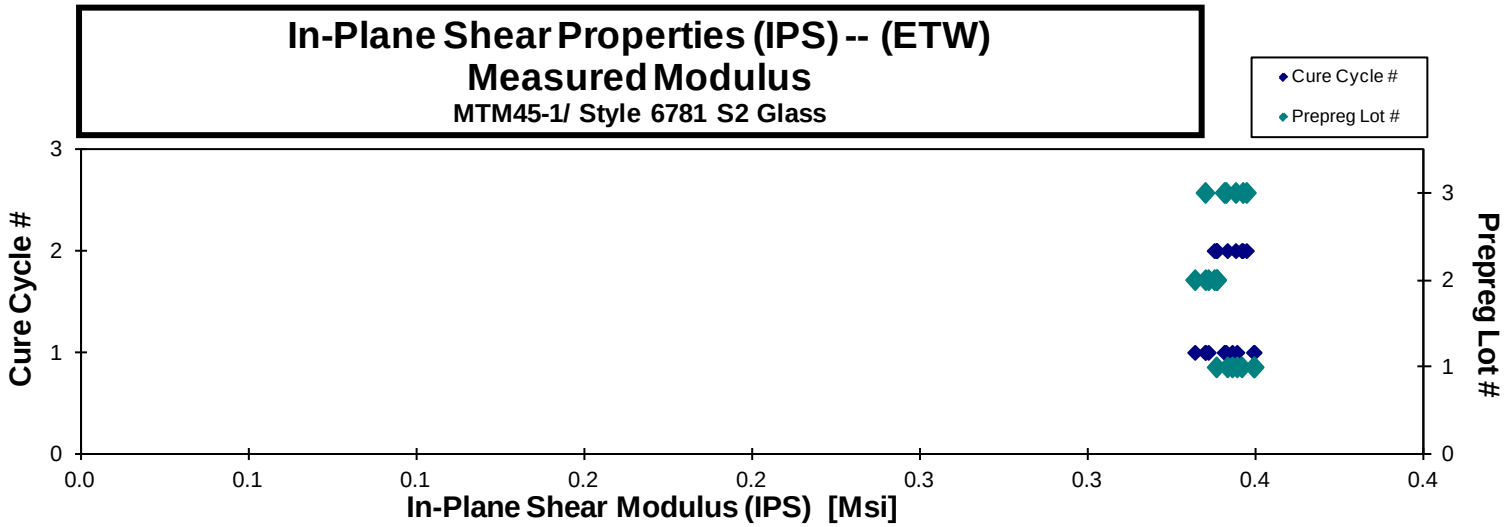
In-Plane Shear Properties (IPS) -- (ETW)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength at 5% Strain [ksi]	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
ABJNA11GN	A	MH1	1	1	5.936	3.448	0.349	0.083	8	0.0103
ABJNA11HN	A	MH1	1	1	5.599	3.378	0.343	0.083	8	0.0103
ABJNA11IN	A	MH1	1	1	5.704	3.433	0.349	0.083	8	0.0103
ABJNA11JN	A	MH1	1	1	5.647	3.433	0.344	0.082	8	0.0103
ABJNA21EN	A	MH2	1	2	5.609	3.409	0.345	0.081	8	0.0102
ABJNA21FN	A	MH2	1	2	5.578	3.380	0.341	0.081	8	0.0102
ABJNA21GN	A	MH2	1	2	5.644	3.366	0.338	0.082	8	0.0102
ABJNB11EN	B	MH1	2	1	5.401	3.293	0.332	0.085	8	0.0106
ABJNB11FN	B	MH1	2	1	5.487	3.312	0.336	0.085	8	0.0106
ABJNB11GN	B	MH1	2	1	5.475	3.293	0.335	0.085	8	0.0106
ABJNB21HN	B	MH2	2	2	5.599	3.353	0.338	0.085	8	0.0107
ABJNB21IN	B	MH2	2	2	5.544	3.325	0.338	0.085	8	0.0106
ABJNB21JN	B	MH2	2	2	5.535	3.323	0.337	0.085	8	0.0106
ABJNC11EN	C	MH1	3	1	5.682	3.338	0.335	0.084	8	0.0105
ABJNC11FN	C	MH1	3	1	5.736	3.392	0.340	0.084	8	0.0105
ABJNC11GN	C	MH1	3	1	5.721	3.392	0.341	0.083	8	0.0104
ABJNC21EN	C	MH2	3	2	5.783	3.433	0.347	0.083	8	0.0103
ABJNC21FN	C	MH2	3	2	5.710	3.420	0.346	0.083	8	0.0104
ABJNC21GN	C	MH2	3	2	5.689	3.417	0.344	0.082	8	0.0103

Average	**5.636**	**3.376**	**0.341**	**Average**	**0.0104**
Standard Dev.	**0.123**	**0.050**	**0.005**	**Standard Dev.**	
Coeff. of Var. [%]	**2.183**	**1.487**	**1.500**	**Coeff. of Var. [%]**	
Min.	**5.401**	**3.293**	**0.332**	**Min.**	**0.0102**
Max.	**5.936**	**3.448**	**0.349**	**Max.**	**0.0107**
Number of Spec.	**19**	**19**	**19**	**Number of Spec.**	**19**


In-Plane Shear Properties (IPS) -- (ETW)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
In-Plane Shear Strength at 0.2% Offset Strain (IPS) [ksi]

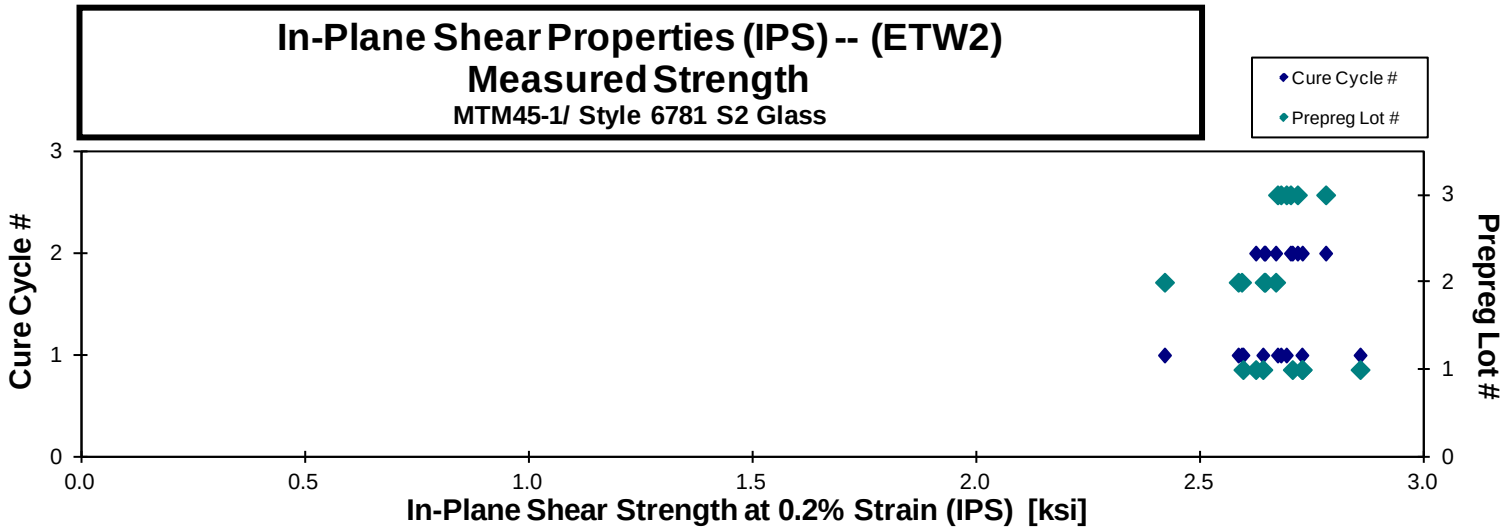

In-Plane Shear Properties (IPS) -- (ETW)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
In-Plane Shear Strength at 5% Strain (IPS) [ksi]

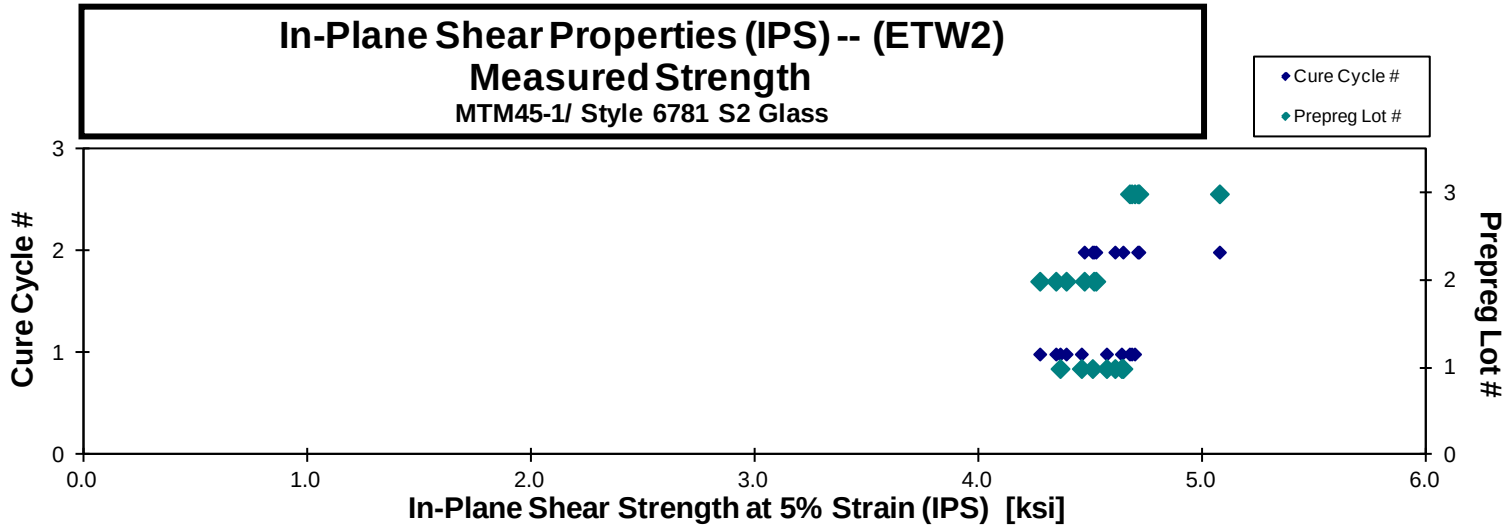

In-Plane Shear Properties (IPS) -- (ETW)
Measured Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus (IPS) [Msi]
0
1
2
3
0.0
0.1
0.1
0.2
0.2
0.3
0.3
0.4
0.4

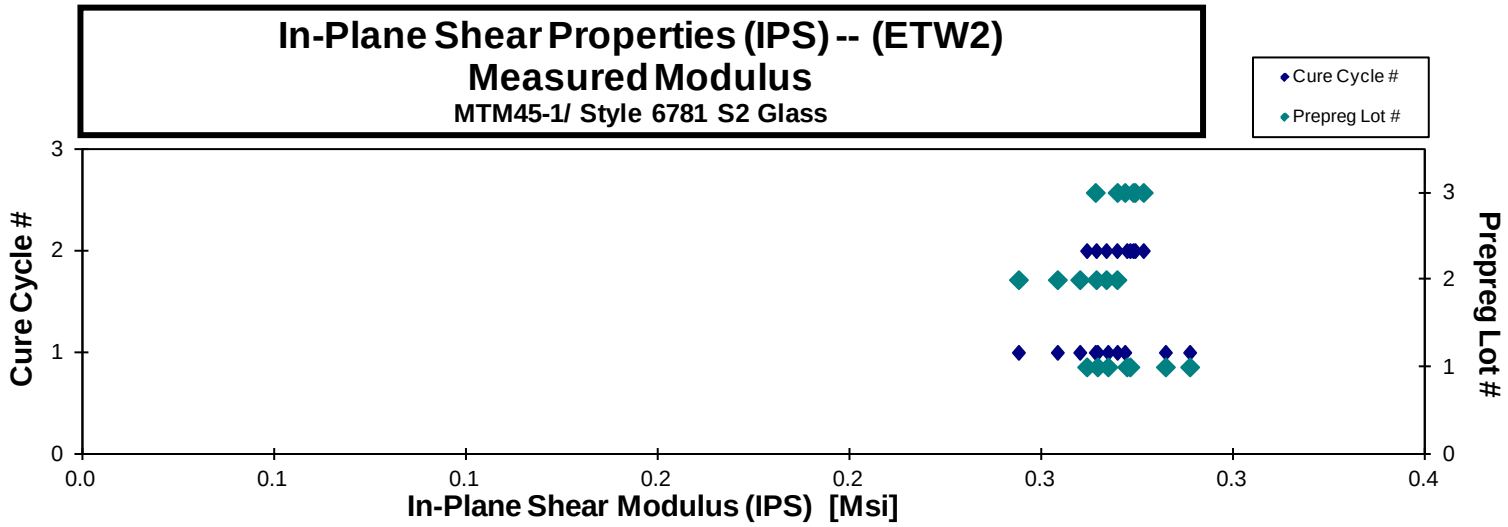
In-Plane Shear Properties (IPS) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength at 5% Strain [ksi]	0.2% Offset Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
ABJNA11BD	A	MH1	1	1	4.635	2.855	0.288	0.082	8	0.0103
ABJNA11CD	A	MH1	1	1	4.568	2.725	0.282	0.083	8	0.0104
ABJNA11DD	A	MH1	1	1	4.456	2.638	0.267	0.082	8	0.0103
ABJNA11ED	A	MH1	1	1	4.361	2.593	0.264	0.083	8	0.0103
ABJNA21AD	A	MH2	1	2	4.641	2.726	0.272	0.081	8	0.0102
ABJNA21BD	A	MH2	1	2	4.606	2.703	0.273	0.081	8	0.0102
ABJNA21CD	A	MH2	1	2	4.505	2.622	0.262	0.082	8	0.0102
ABJNB119D	B	MH1	2	1	4.270	2.418	0.244	0.085	8	0.0106
ABJNB11AD	B	MH1	2	1	4.342	2.590	0.254	0.085	8	0.0106
ABJNB11BD	B	MH1	2	1	4.388	2.583	0.260	0.084	8	0.0105
ABJNB21BD	B	MH2	2	2	4.469	2.642	0.264	0.085	8	0.0106
ABJNB21CD	B	MH2	2	2	4.511	2.666	0.267	0.085	8	0.0106
ABJNB21DD	B	MH2	2	2	4.520	2.641	0.269	0.085	8	0.0107
ABJNC119D	C	MH1	3	1	4.671	2.678	0.264	0.084	8	0.0104
ABJNC11AD	C	MH1	3	1	4.694	2.690	0.271	0.083	8	0.0104
ABJNC11BD	C	MH1	3	1	4.680	2.670	0.270	0.084	8	0.0105
ABJNC219D	C	MH2	3	2	5.072	2.778	0.276	0.083	8	0.0104
ABJNC21CD	C	MH2	3	2	4.707	2.699	0.274	0.083	8	0.0104
ABJNC21DD	C	MH2	3	2	4.713	2.715	0.274	0.083	8	0.0103

Average	**4.569**	**2.665**	**0.268**	**Average**	**0.0104**
Standard Dev.	**0.181**	**0.090**	**0.010**	**Standard Dev.**	
Coeff. of Var. [%]	**3.972**	**3.360**	**3.679**	**Coeff. of Var. [%]**	
Min.	**4.270**	**2.418**	**0.244**	**Min.**	**0.0102**
Max.	**5.072**	**2.855**	**0.288**	**Max.**	**0.0107**
Number of Spec.	**19**	**19**	**19**	**Number of Spec.**	**19**


In-Plane Shear Properties (IPS) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
0.5
1.0
1.5
2.0
2.5
3.0
In-Plane Shear Strength at 0.2% Strain (IPS) [ksi]


In-Plane Shear Properties (IPS) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
1.0
2.0
3.0
4.0
5.0
6.0
In-Plane Shear Strength at 5% Strain (IPS) [ksi]


In-Plane Shear Properties (IPS) -- (ETW2)
Measured Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
In-Plane Shear Modulus (IPS) [Msi]
0
1
2
3
0.0
0.1
0.1
0.2
0.2
0.3
0.3
0.4

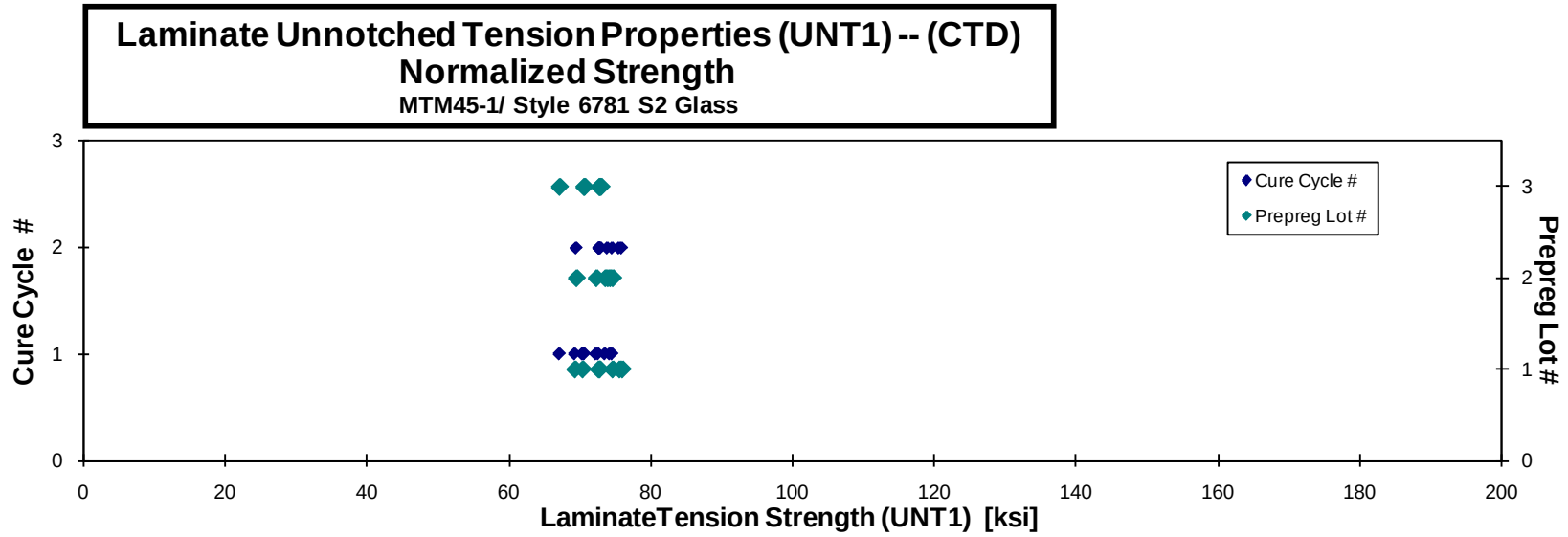
4.6 Unnotched Tension 1 Properties

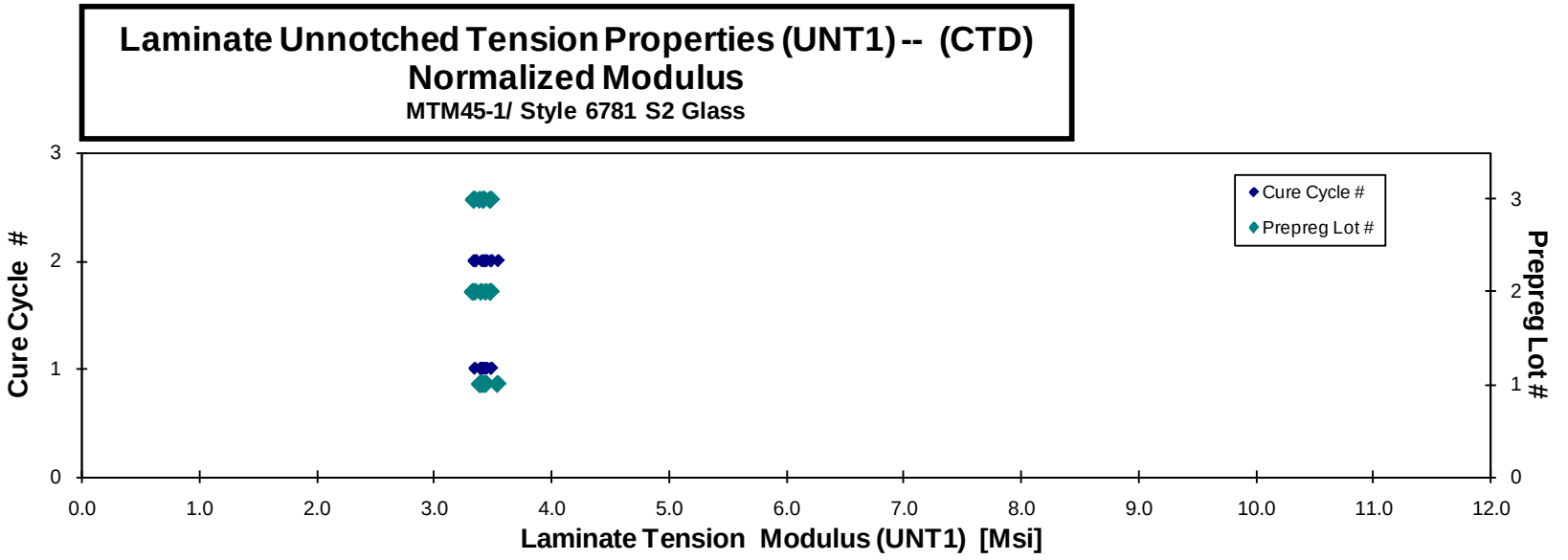
Laminate Unnotched Tension Properties (UNT1) -- (CTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJAA115B	A	MH1	1	1	68.941	3.382	0.122	12	LWB	0.0101	69.273	3.398
ABJAA116B	A	MH1	1	1	73.919	3.365	0.122	12	LAB	0.0102	74.549	3.393
ABJAA117B	A	MH1	1	1	72.249	3.430	0.122	12	LAB	0.0101	72.587	3.446
ABJAA118B	A	MH1	1	1	69.823	3.391	0.122	12	LAB	0.0102	70.342	3.416
ABJAA215B	A	MH2	1	2	75.169	3.510	0.122	12	LAB	0.0102	75.903	3.544
ABJAA216B	A	MH2	1	2	74.582	3.363	0.123	12	LWB	0.0102	75.516	3.405
ABJAA217B	A	MH2	1	2	71.728	3.384	0.123	12	LWB	0.0102	72.734	3.432
ABJAB115B	B	MH1	2	1	69.564	3.221	0.128	12	LAB	0.0107	73.534	3.404
ABJAB116B	B	MH1	2	1	70.264	3.300	0.128	12	AWT	0.0107	74.216	3.486
ABJAB117B	B	MH1	2	1	68.594	3.307	0.128	12	LAT	0.0106	72.272	3.484
ABJAB216B	B	MH2	2	2	70.987	3.222	0.126	12	LAT	0.0105	73.886	3.353
ABJAB217B	B	MH2	2	2	71.812	3.317	0.126	12	LAB	0.0105	74.577	3.444
ABJAB218B	B	MH2	2	2	66.687	3.199	0.126	12	LWB	0.0105	69.484	3.333
ABJAC111B	C	MH1	3	1	69.275	3.363	0.124	12	LAT	0.0103	70.637	3.430
ABJAC112B	C	MH1	3	1	65.084	3.240	0.125	12	LAT	0.0104	67.107	3.341
ABJAC113B	C	MH1	3	1	68.051	3.273	0.126	12	LAT	0.0105	70.531	3.392
ABJAC216B	C	MH2	3	2	69.817	3.348	0.126	12	LAB	0.0105	72.745	3.488
ABJAC217B	C	MH2	3	2	69.920	3.343	0.126	12	LAT	0.0105	72.814	3.481
ABJAC218B	C	MH2	3	2	70.008	3.284	0.126	12	LAB	0.0105	72.944	3.422
ABJAC219B	C	MH2	3	2	69.854	3.218	0.126	12	LAB	0.0105	72.678	3.348

	Strength	Modulus		$Strength_{norm}$	$Modulus_{norm}$
Average	**70.316**	**3.323**	**$Average_{norm}$**	**0.0104**	**72.416**	**3.422**
Standard Dev.	**2.474**	**0.081**	**$Standard\ Dev._{norm}$**		**2.249**	**0.056**
Coeff. of Var. [%]	**3.518**	**2.424**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.105**	**1.638**
Min.	**65.084**	**3.199**	**Min.**	**0.0101**	**67.107**	**3.333**
Max.	**75.169**	**3.510**	**Max.**	**0.0107**	**75.903**	**3.544**
Number of Spec.	**20**	**20**	**Number of Spec.**		**20**	**20**


Laminate Unnotched Tension Properties (UNT1) -- (CTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
20
40
60
80
100
120
140
160
180
200
LaminateTension Strength (UNT1) [ksi]


Laminate Unnotched Tension Properties (UNT1) -- (CTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
Laminate Tension Modulus (UNT1) [Msi]

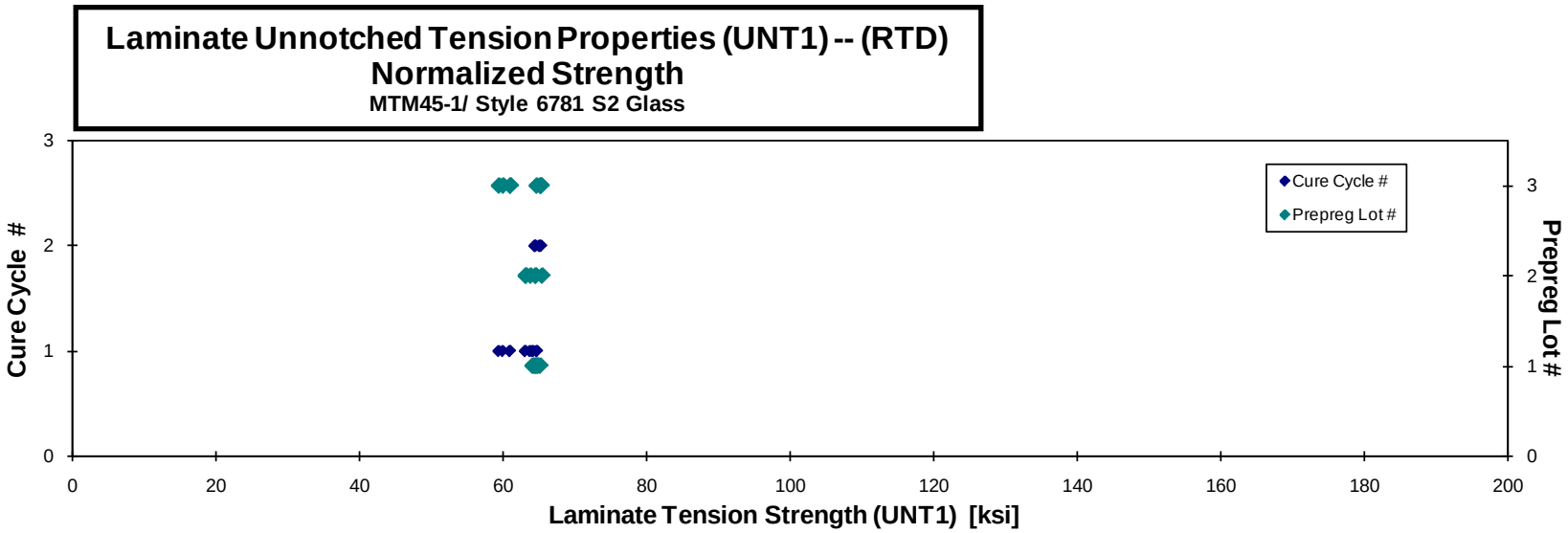
Laminate Unnotched Tension Properties (UNT1) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

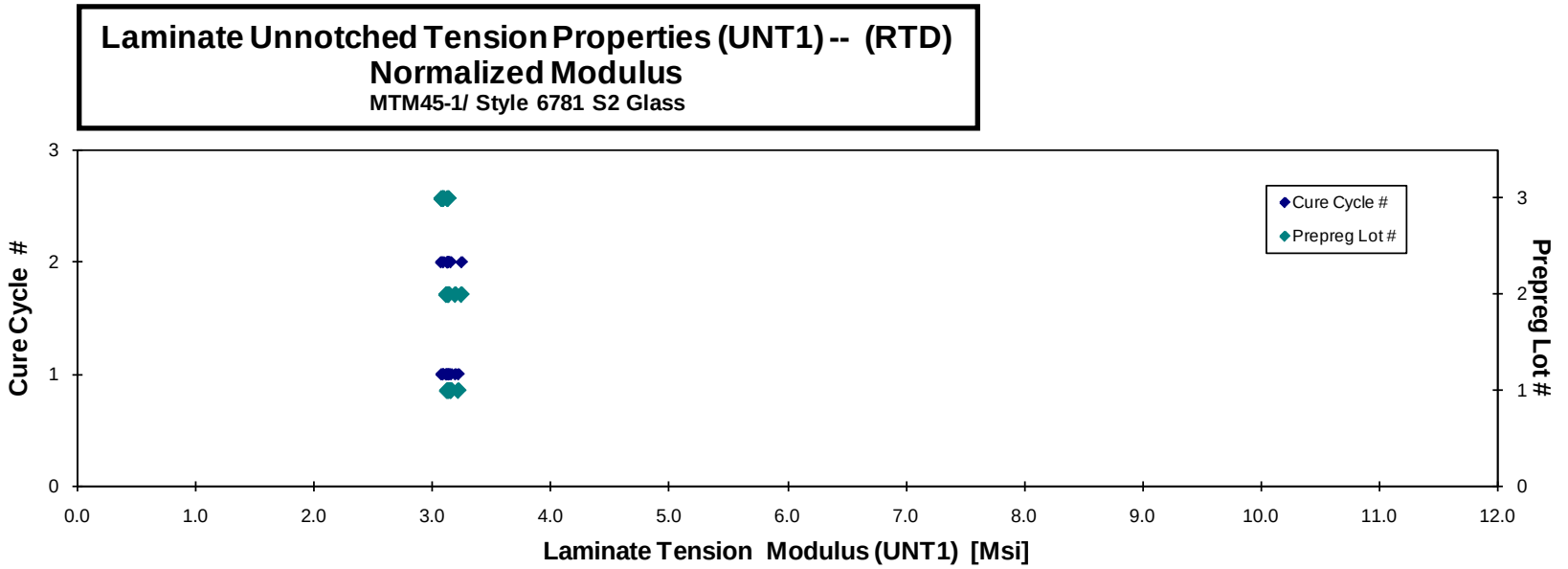
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJAA111A	A	MH1	1	1	63.949	3.148	0.121	12	LGM	0.0101	64.046	3.153
ABJAA112A	A	MH1	1	1	64.739	3.114	0.121	12	LWT	0.0101	64.784	3.116
ABJAA113A	A	MH1	1	1	64.428	3.123	0.122	12	LGM	0.0101	64.712	3.137
ABJAA114A	A	MH1	1	1	63.486	3.174	0.123	12	LGM	0.0102	64.263	3.213
ABJAA211A	A	MH2	1	2	65.095	3.128	0.121	12	LGM	0.0101	65.095	3.128
ABJAA212A	A	MH2	1	2	63.976	3.123	0.122	12	LGM	0.0102	64.495	3.148
ABJAA213A	A	MH2	1	2	64.173	3.113	0.122	12	LWT	0.0101	64.473	3.128
ABJAB111A	B	MH1	2	1	59.720	2.964	0.128	12	LWB	0.0107	63.112	3.132
ABJAB112A	B	MH1	2	1	60.138	2.932	0.129	12	LGM	0.0107	63.777	3.110
ABJAB113A	B	MH1	2	1	59.424	3.000	0.129	12	LGM	0.0107	63.134	3.187
ABJAB211A	B	MH2	2	2	62.785	3.112	0.126	12	LWT	0.0105	65.367	3.240
ABJAB212A	B	MH2	2	2	61.633	2.992	0.127	12	LGM	0.0106	64.447	3.128
ABJAB213A	B	MH2	2	2	61.680	2.984	0.127	12	LWB	0.0106	64.495	3.121
ABJAC116A	C	MH1	3	1	58.606	2.962	0.126	12	LWB	0.0105	61.008	3.084
ABJAC117A	C	MH1	3	1	58.530	2.960	0.126	12	LWT	0.0105	60.977	3.084
ABJAC118A	C	MH1	3	1	57.467	2.990	0.127	12	LGM	0.0105	59.995	3.121
ABJAC119A	C	MH1	3	1	57.206	2.957	0.126	12	LGM	0.0105	59.425	3.071
ABJAC212A	C	MH2	3	2	62.296	3.016	0.126	12	LWB	0.0105	64.618	3.128
ABJAC213A	C	MH2	3	2	62.648	2.998	0.126	12	LWT	0.0105	65.207	3.120
ABJAC214A	C	MH2	3	2	62.728	2.956	0.126	12	LGM	0.0105	65.109	3.068
ABJAC215A	C	MH2	3	2	62.887	2.975	0.126	12	LGM	0.0105	65.257	3.088

	Strength [ksi]	Modulus [Msi]
Average	**61.790**	**3.034**
Standard Dev.	**2.467**	**0.080**
Coeff. of Var. [%]	**3.993**	**2.621**
Min.	**57.206**	**2.932**
Max.	**65.095**	**3.174**
Number of Spec.	**21**	**21**

	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
$Average_{norm}$	**0.0104**	**63.704**	**3.129**
Standard $Dev._{norm}$		**1.798**	**0.043**
Coeff. of Var. $[\%]_{norm}$		**2.822**	**1.381**
Min.	**0.0101**	**59.425**	**3.068**
Max.	**0.0107**	**65.367**	**3.240**
Number of Spec.		**21**	**21**


Laminate Unnotched Tension Properties (UNT1) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Tension Strength (UNT1) [ksi]
0
20
40
60
80
100
120
140
160
180
200

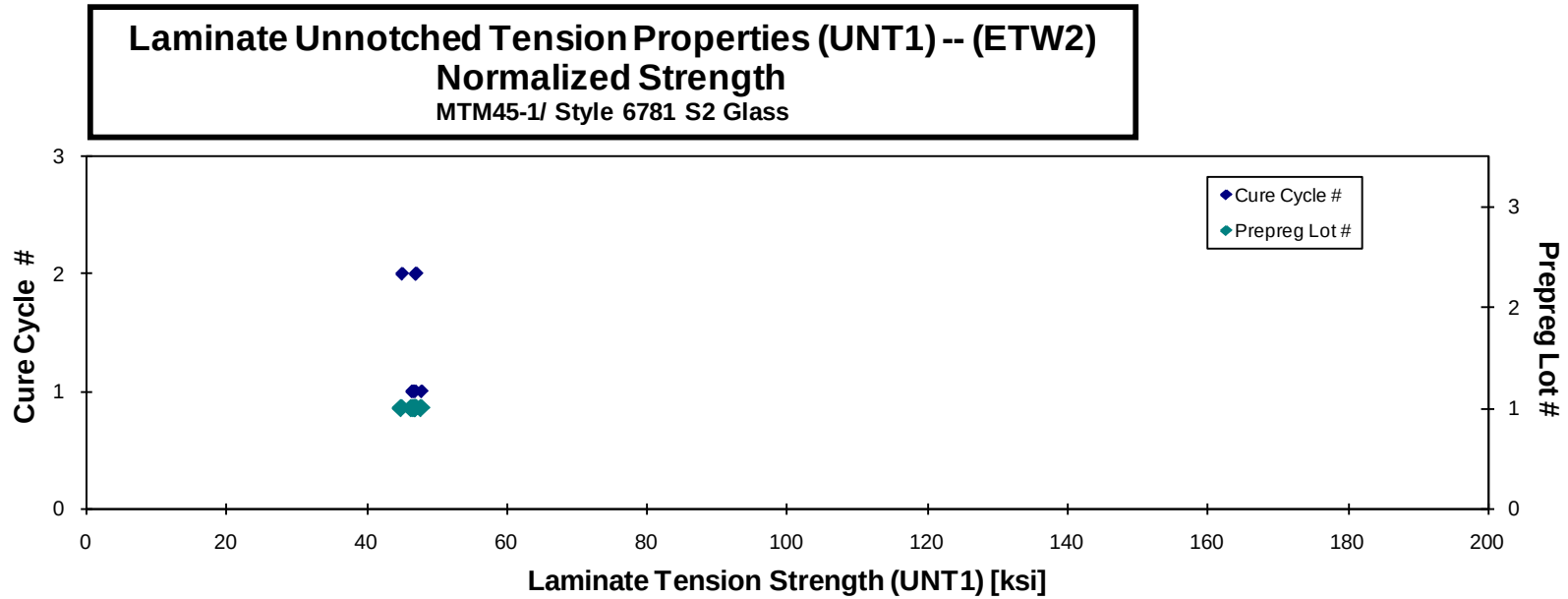

Laminate Unnotched Tension Properties (UNT1) -- (RTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Tension Modulus (UNT1) [Msi]
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0

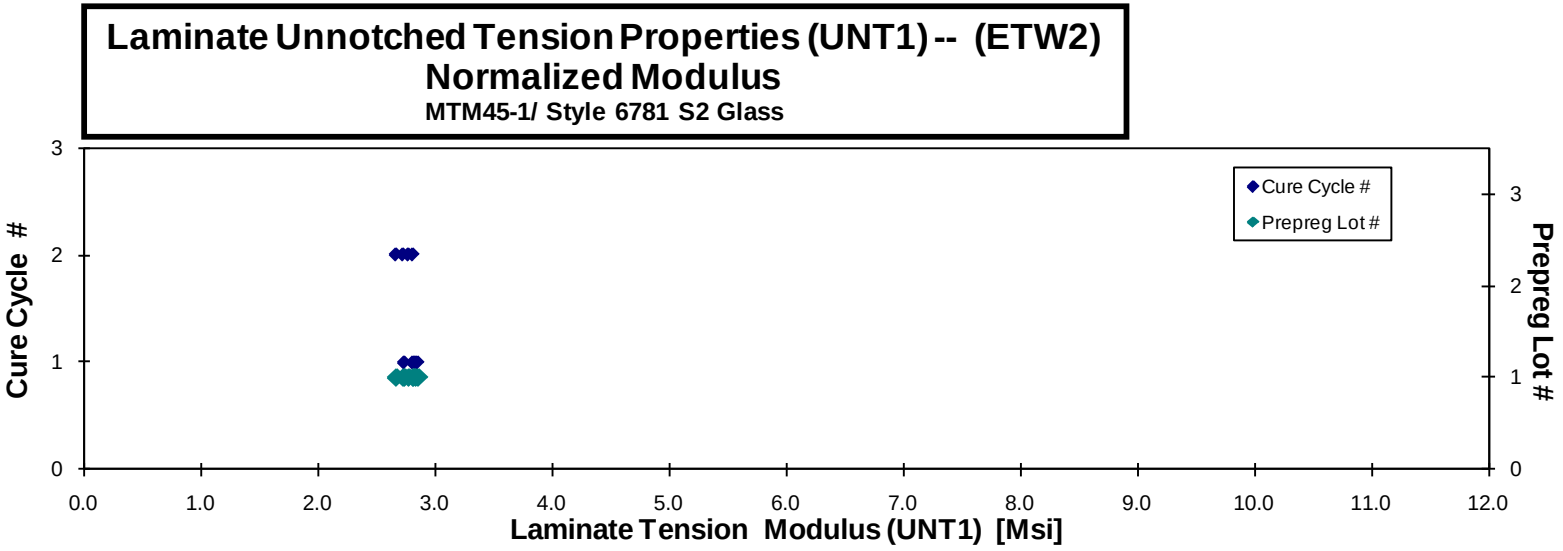
Laminate Unnotched Tension Properties (UNT1) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJAA11AD	A	MH1	1	1	46.524	2.720	0.122	12	LGM	0.0102	46.858	2.739
ABJAA11BD	A	MH1	1	1	47.639	2.806	0.122	12	LGM	0.0101	47.757	2.813
ABJAA11CD	A	MH1	1	1	46.648	2.836	0.121	12	LGM	0.0101	46.610	2.834
ABJAA11DD	A	MH1	1	1	46.220	2.843	0.122	12	LWB	0.0101	46.398	2.854
ABJAA219D	A	MH2	1	2	46.159	2.683	0.123	12	LGM	0.0103	46.939	2.729
ABJAA21AD	A	MH2	1	2	46.388	2.737	0.123	12	LWB	0.0102	47.013	2.774
ABJAA21BD	A	MH2	1	2	46.069	2.760	0.123	12	LWB	0.0103	46.937	2.812
ABJAA21CD	A	MH2	1	2	44.142	2.619	0.124	12	LWB	0.0103	44.979	2.669

	Strength [ksi]	Modulus [Msi]			$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	**46.224**	**2.751**	**$Average_{norm}$**	**0.0102**	**46.686**	**2.778**
Standard Dev.	**0.976**	**0.077**	**Standard $Dev._{norm}$**		**0.794**	**0.062**
Coeff. of Var. [%]	**2.111**	**2.813**	**Coeff. of Var. $[\%]_{norm}$**		**1.701**	**2.240**
Min.	**44.142**	**2.619**	**Min.**	**0.0101**	**44.979**	**2.669**
Max.	**47.639**	**2.843**	**Max.**	**0.0103**	**47.757**	**2.854**
Number of Spec.	**8**	**8**	**Number of Spec.**		**8**	**8**


Laminate Unnotched Tension Properties (UNT1) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
20
40
60
80
100
120
140
160
180
200
Laminate Tension Strength (UNT1) [ksi]


Laminate Unnotched Tension Properties (UNT1) -- (ETW2)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
Laminate Tension Modulus (UNT1) [Msi]

4.7 Unnotched Compression 1 Properties

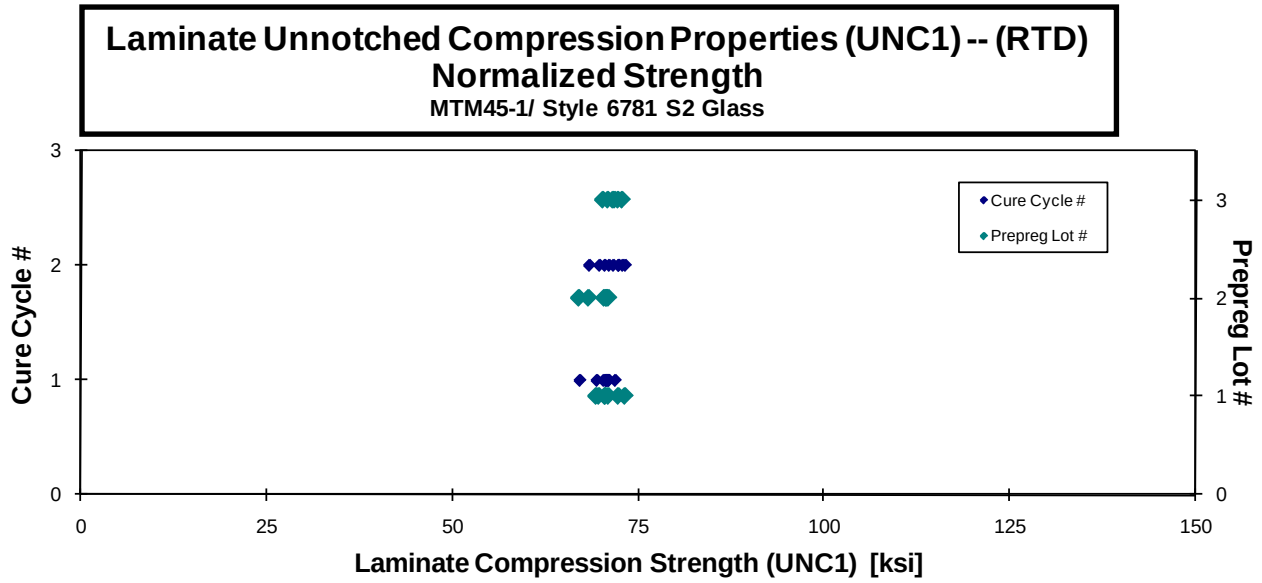
Laminate Unnotched Compression Properties (UNC1) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

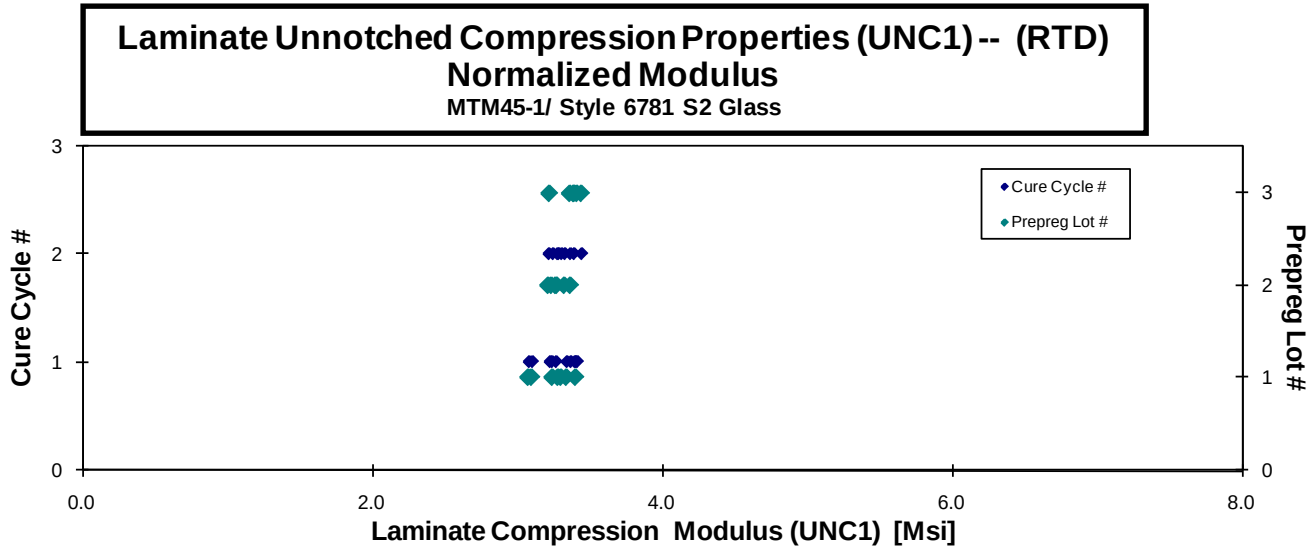
normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJWA112A	A	MH1	1	1	69.009	3.388	0.312	0.122	12	BGM	0.0101	69.332	3.404
ABJWA113A	A	MH1	1	1	70.049	3.078	0.284	0.122	12	BGM	0.0102	70.588	3.102
ABJWA114A	A	MH1	1	1	69.999	3.057	0.267	0.122	12	BGM	0.0102	70.519	3.079
ABJWA115A	A	MH1	1	1	70.123	3.301	0.305	0.123	12	BGM	0.0102	70.981	3.341
ABJWA212A	A	MH2	1	2	72.259	3.242	0.291	0.121	12	BGM	0.0101	72.318	3.245
ABJWA213A	A	MH2	1	2	69.523	3.275	0.282	0.122	12	BGM	0.0101	69.695	3.283
ABJWA214A	A	MH2	1	2	73.017	3.295	0.290	0.122	12	BGM	0.0101	73.207	3.304
ABJWB112A	B	MH1	2	1	68.817	3.176	0.307	0.125	12	BGM	0.0104	70.786	3.266
ABJWB113A	B	MH1	2	1	64.884	3.136	0.286	0.125	12	BGM	0.0104	67.016	3.239
ABJWB114A	B	MH1	2	1	68.197	3.250	0.315	0.126	12	BGM	0.0105	70.682	3.368
ABJWB212A	B	MH2	2	2	69.244	3.221	0.302	0.123	12	BGM	0.0103	70.415	3.275
ABJWB213A	B	MH2	2	2	67.058	3.266	0.309	0.123	12	BGM	0.0103	68.313	3.327
ABJWB214A	B	MH2	2	2	69.463	3.147	0.293	0.124	12	BGM	0.0103	71.001	3.216
ABJWC112A	C	MH1	3	1	71.523	3.381	0.307	0.122	12	BGM	0.0101	71.828	3.395
ABJWC113A	C	MH1	3	1	70.544	3.396	0.309	0.122	12	BGM	0.0102	70.913	3.414
ABJWC114A	C	MH1	3	1	69.417	3.186	0.288	0.123	12	BGM	0.0102	70.248	3.224
ABJWC212A	C	MH2	3	2	70.940	3.360	0.309	0.122	12	BGM	0.0102	71.584	3.390
ABJWC213A	C	MH2	3	2	71.608	3.411	0.305	0.122	12	BGM	0.0102	72.278	3.443
ABJWC214A	C	MH2	3	2	72.086	3.331	0.311	0.122	12	BGM	0.0102	72.829	3.365

Average	**69.882**	**3.258**	**0.298**
Standard Dev.	**1.919**	**0.107**	**0.013**
Coeff. of Var. [%]	**2.746**	**3.297**	**4.399**
Min.	**64.884**	**3.057**	**0.267**
Max.	**73.017**	**3.411**	**0.315**
Number of Spec.	**19**	**19**	**19**

$Average_{norm}$	**0.0102**	**70.765**	**3.299**
$Standard\ Dev._{norm}$		**1.502**	**0.101**
Coeff. of Var. [%]$_{norm}$		**2.122**	**3.049**
Min.	**0.0101**	**67.016**	**3.079**
Max.	**0.0105**	**73.207**	**3.443**
Number of Spec.		**19**	**19**


Laminate Unnotched Compression Properties (UNC1) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Compression Strength (UNC1) [ksi]
0
25
50
75
100
125
150
0
1
2
3

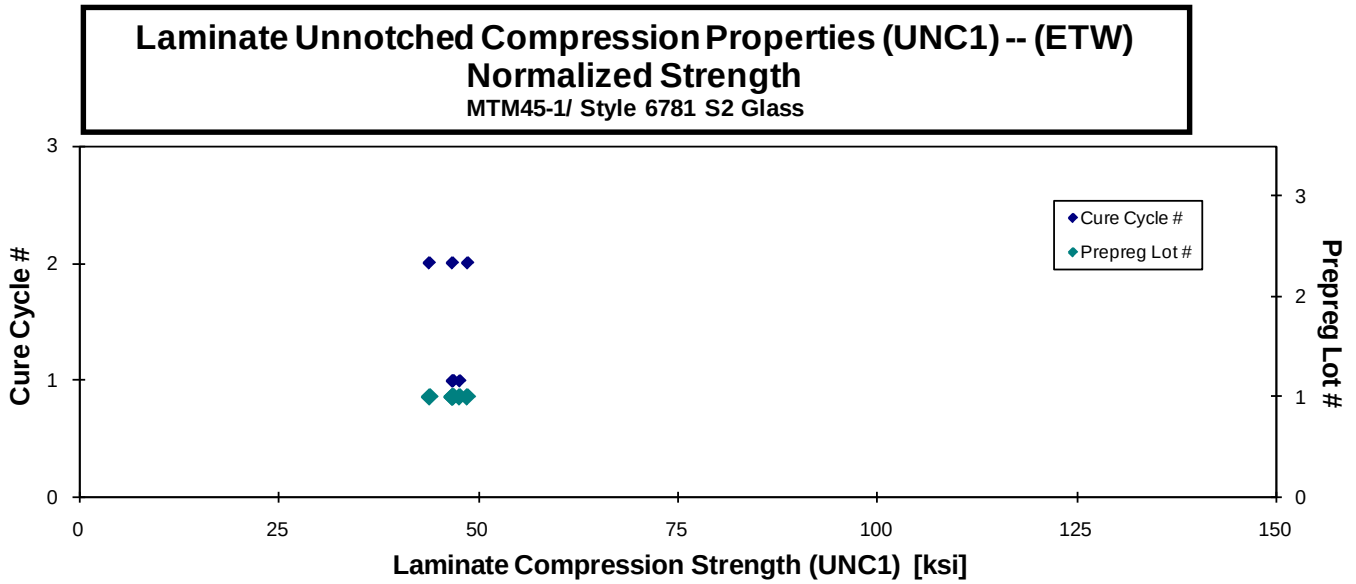

Laminate Unnotched Compression Properties (UNC1) -- (RTD)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Compression Modulus (UNC1) [Msi]
0.0
2.0
4.0
6.0
8.0
0
1
2
3

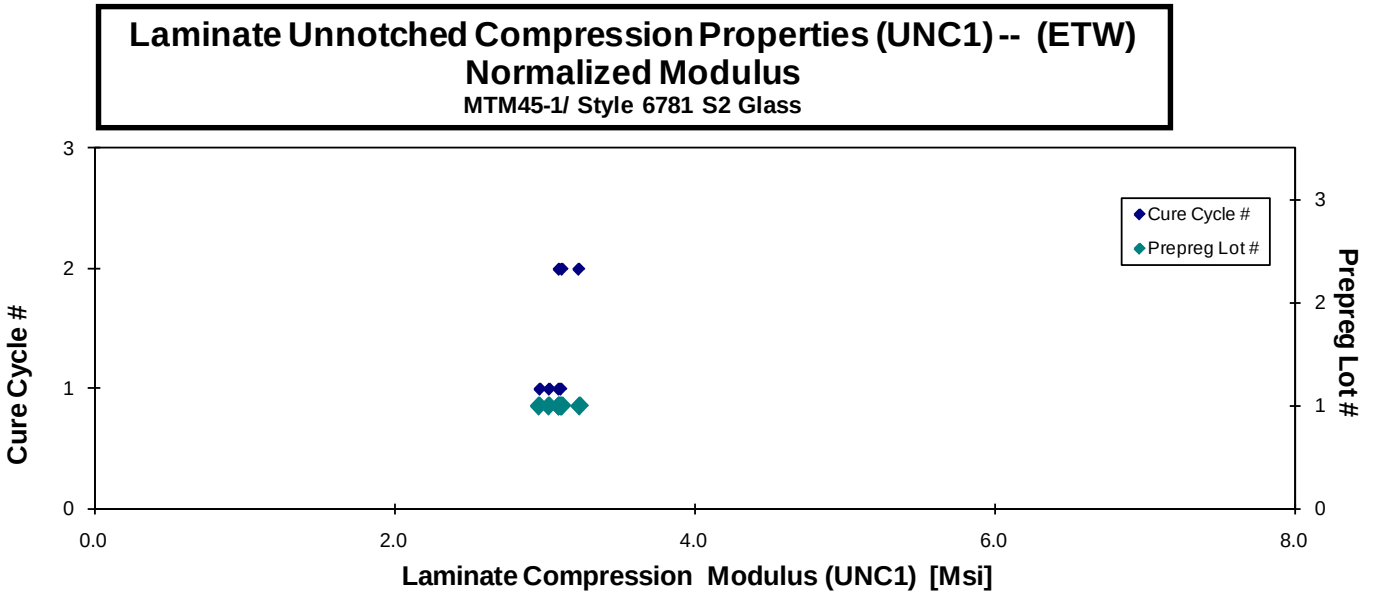
Laminate Unnotched Compression Properties (UNC1) -- (ETW)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJWA215N	A	MH2	1	2	48.366	3.212	0.362	0.122	12	BGM	0.0102	48.652	3.231
ABJWA216N	A	MH2	1	2	43.547	3.091	0.374	0.122	12	BGM	0.0102	43.912	3.117
ABJWA217N	A	MH2	1	2	46.608	3.086	0.370	0.122	12	BGM	0.0101	46.768	3.097
ABJWA117N	A	MH1	1	1	46.312	2.992	0.330	0.123	12	BGM	0.0102	46.904	3.030
ABJWA118N	A	MH1	1	1	46.364	2.934	0.323	0.123	12	BGM	0.0102	46.874	2.966
ABJWA11AN	A	MH1	1	1	47.223	3.065	0.345	0.122	12	BGM	0.0102	47.684	3.095
ABJWA11BN	A	MH1	1	1	46.287	3.077	0.363	0.122	12	BGM	0.0102	46.764	3.109

	Strength [ksi]	Modulus [Msi]	Poisson's Ratio			$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
Average	**46.387**	**3.065**	**0.353**	**$Average_{norm}$**	**0.0102**	**46.794**	**3.092**
Standard Dev.	**1.458**	**0.087**	**0.020**	**Standard $Dev._{norm}$**		**1.447**	**0.082**
Coeff. of Var. [%]	**3.142**	**2.837**	**5.695**	**Coeff. of Var. $[\%]_{norm}$**		**3.093**	**2.636**
Min.	**43.547**	**2.934**	**0.323**	**Min.**	**0.0101**	**43.912**	**2.966**
Max.	**48.366**	**3.212**	**0.374**	**Max.**	**0.0102**	**48.652**	**3.231**
Number of Spec.	**7**	**7**	**7**	**Number of Spec.**		**7**	**7**


Laminate Unnotched Compression Properties (UNC1) -- (ETW)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Compression Strength (UNC1) [ksi]
0
25
50
75
100
125
150
0
1
2
3

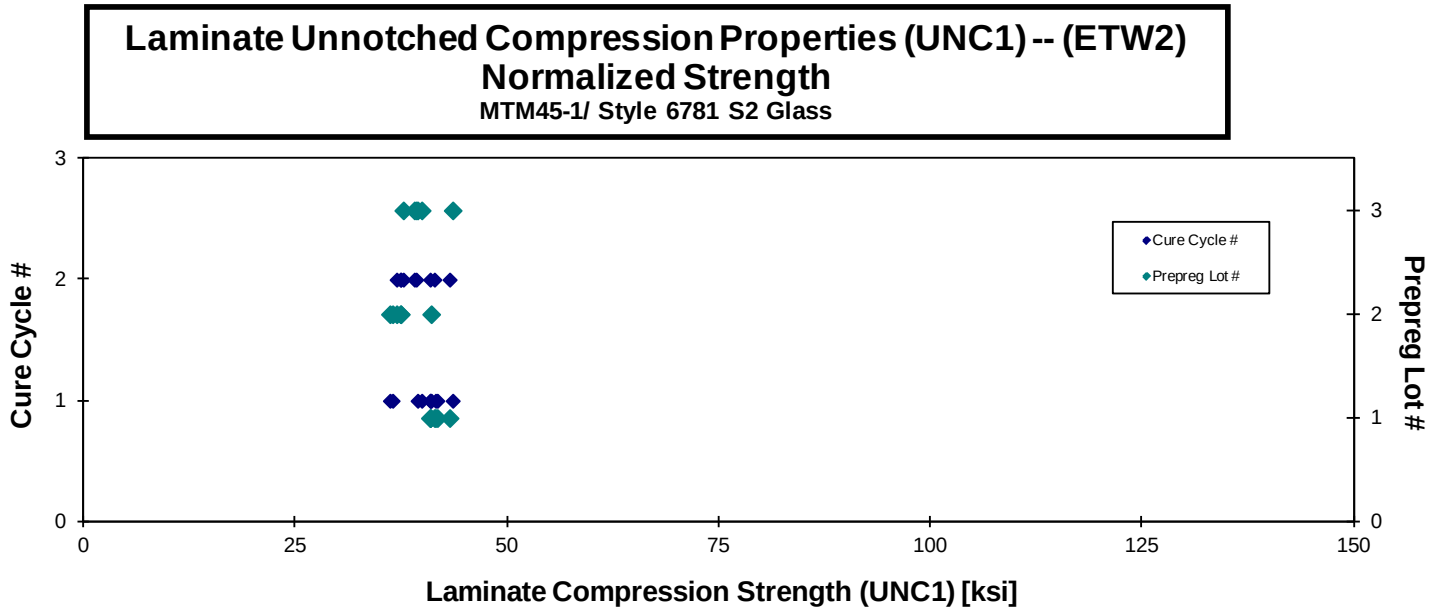

Laminate Unnotched Compression Properties (UNC1) -- (ETW)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Compression Modulus (UNC1) [Msi]
0.0
2.0
4.0
6.0
8.0
0
1
2
3

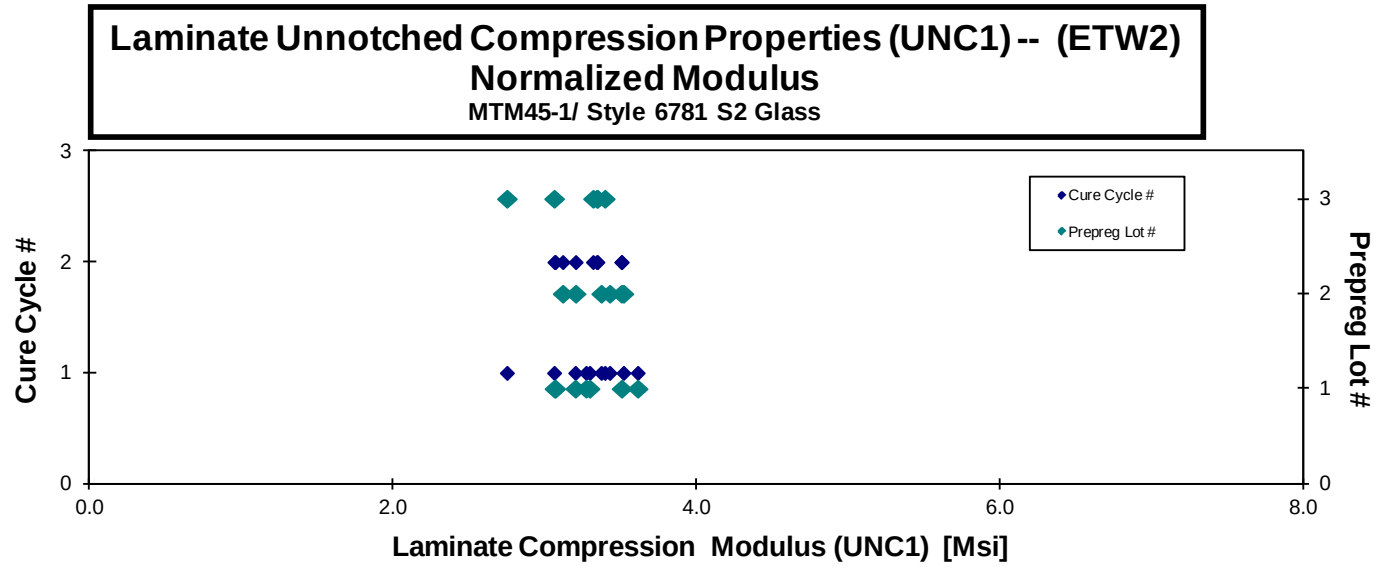
Laminate Unnotched Compression Properties (UNC1) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]	$Modulus_{norm}$ [Msi]
ABJWA11FD	A	MH1	1	1	40.504	3.578	0.387	0.122	12	HGM	0.0102	40.911	3.614
ABJWA11GD	A	MH1	1	1	40.433	3.166	0.352	0.123	12	HGM / BGM	0.0102	40.906	3.203
ABJWA11HD	A	MH1	1	1	41.317	3.263	0.364	0.122	12	HGM	0.0102	41.749	3.297
ABJWA11lD	A	MH1	1	1	41.184	3.245	0.353	0.122	12	HGM	0.0102	41.540	3.273
ABJWA21DD	A	MH2	1	2	41.220	3.052	0.358	0.122	12	BGM	0.0101	41.402	3.066
ABJWA21ED	A	MH2	1	2	40.671	3.488	0.397	0.122	12	HGM	0.0102	40.900	3.508
ABJWA21HD	A	MH2	1	2	43.162	3.068	0.365	0.121	12	HAT	0.0101	43.198	3.071
ABJWB11AD	B	MH1	2	1	34.795	3.301	0.381	0.126	12	HGM	0.0105	36.149	3.429
ABJWB11BD	B	MH1	2	1	39.532	3.251	0.355	0.126	12	HGM	0.0105	41.021	3.373
ABJWB11CD	B	MH1	2	1	35.064	3.385	0.385	0.126	12	BGM	0.0105	36.467	3.520
ABJWB216D	B	MH2	2	2	36.438	3.040	0.352	0.124	12	HGM	0.0104	37.395	3.120
ABJWB217D	B	MH2	2	2	36.557	3.130	0.348	0.124	12	HGM	0.0103	37.431	3.205
ABJWB218D	B	MH2	2	2	35.973	3.415	0.365	0.124	12	HGM	0.0104	36.943	3.507
ABJWC116D	C	MH1	3	1	42.831	3.012	0.335	0.123	12	BGM	0.0103	43.562	3.063
ABJWC117D	C	MH1	3	1	39.168	2.702	0.299	0.123	12	HGM	0.0103	39.901	2.752
ABJWC118D	C	MH1	3	1	38.905	3.353	0.379	0.123	12	BGM	0.0102	39.419	3.397
ABJWC215D	C	MH2	3	2	38.644	3.311	0.384	0.122	12	HGM	0.0102	39.037	3.344
ABJWC216D	C	MH2	3	2	38.681	3.299	0.366	0.123	12	BGM	0.0103	39.255	3.348
ABJWC217D	C	MH2	3	2	37.213	3.274	0.357	0.123	12	HGM	0.0102	37.730	3.320

Average	**39.068**	**3.228**	**0.362**	**$Average_{norm}$**	**0.0103**	**39.732**	**3.285**
Standard Dev.	**2.502**	**0.199**	**0.022**	**$Standard\ Dev._{norm}$**		**2.229**	**0.208**
Coeff. of Var. [%]	**6.405**	**6.179**	**6.104**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.611**	**6.340**
Min.	**34.795**	**2.702**	**0.299**	**Min.**	**0.0101**	**36.149**	**2.752**
Max.	**43.162**	**3.578**	**0.397**	**Max.**	**0.0105**	**43.562**	**3.614**
Number of Spec.	**19**	**19**	**19**	**Number of Spec.**		**19**	**19**


Laminate Unnotched Compression Properties (UNC1) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
25
50
75
100
125
150
Laminate Compression Strength (UNC1) [ksi]

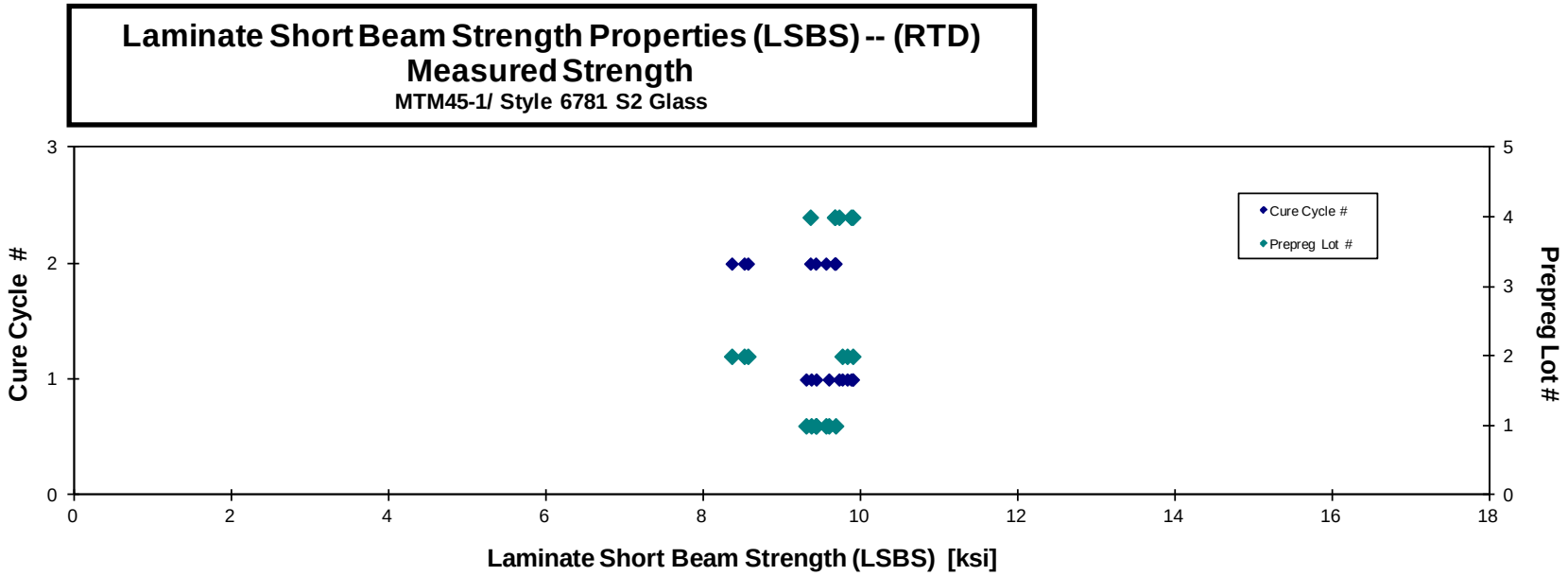

Laminate Unnotched Compression Properties (UNC1) -- (ETW2)
Normalized Modulus
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0.0
2.0
4.0
6.0
8.0
Laminate Compression Modulus (UNC1) [Msi]

4.8 Laminate Short Beam Strength Properties

Laminate Shear Beam Strength Properties (LSBS) -- (RTD) Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJqA143A	A	MH1	1	1	9.603	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA144A	A	MH1	1	1	9.442	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA146A	A	MH1	1	1	9.313	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA147A	A	MH1	1	1	9.378	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA241A	A	MH2	1	2	9.566	0.121	12	0.0100	INTERLAMINAR SHEAR
ABJqA242A	A	MH2	1	2	9.689	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJqA243A	A	MH2	1	2	9.436	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqB141A	B	MH1	2	1	9.836	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJqB142A	B	MH1	2	1	9.773	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJqB143A	B	MH1	2	1	9.908	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJqB241A	B	MH2	2	2	8.573	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJqB242A	B	MH2	2	2	8.526	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJqB243A	B	MH2	2	2	8.368	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJqD141A	D	MH1	4	1	9.732	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJqD142A	D	MH1	4	1	9.906	0.124	12	0.0104	INTERLAMINAR SHEAR
ABJqD143A	D	MH1	4	1	9.885	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJqD241A	D	MH2	4	2	9.677	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJqD242A	D	MH2	4	2	9.367	0.123	12	0.0102	INTERLAMINAR SHEAR
ABJqD243A	D	MH2	4	2	9.679	0.124	12	0.0103	INTERLAMINAR SHEAR

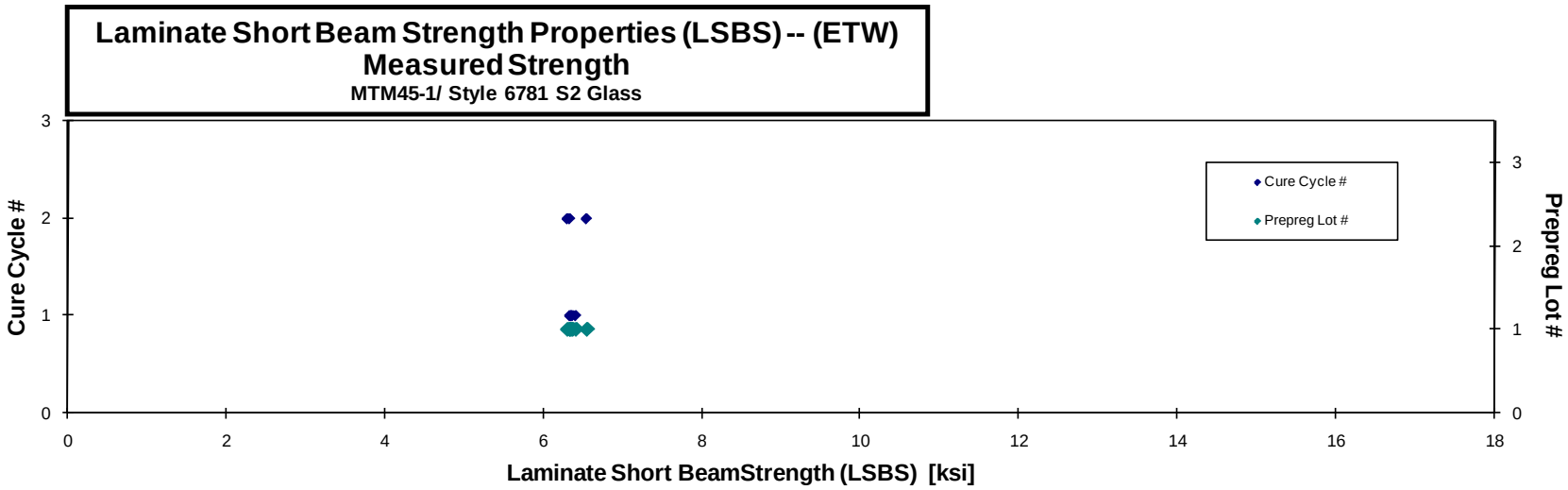
Average	**9.456**	**Average**	**0.0102**
Standard Dev.	**0.469**	**Standard Dev.**	
Coeff. of Var. [%]	**4.960**	**Coeff. of Var. [%]**	
Min.	**8.368**	**Min.**	**0.0100**
Max.	**9.908**	**Max.**	**0.0104**
Number of Spec.	**19**	**Number of Spec.**	**19**


Laminate Short Beam Strength Properties (LSBS) -- (RTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Short Beam Strength (LSBS) [ksi]
0
1
2
3
0
2
4
6
8
10
12
14
16
18
0
1
2
3
4
5

Laminate Short Beam Strength Properties (LSBS) -- (ETW)
Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJqA148N	A	MH1	1	1	6.337	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJqA149N	A	MH1	1	1	6.410	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJqA14AN	A	MH1	1	1	6.352	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJqA14BN	A	MH1	1	1	6.371	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA245N	A	MH2	1	2	6.335	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA246N	A	MH2	1	2	6.305	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA247N	A	MH2	1	2	6.545	0.121	12	0.0101	INTERLAMINAR SHEAR

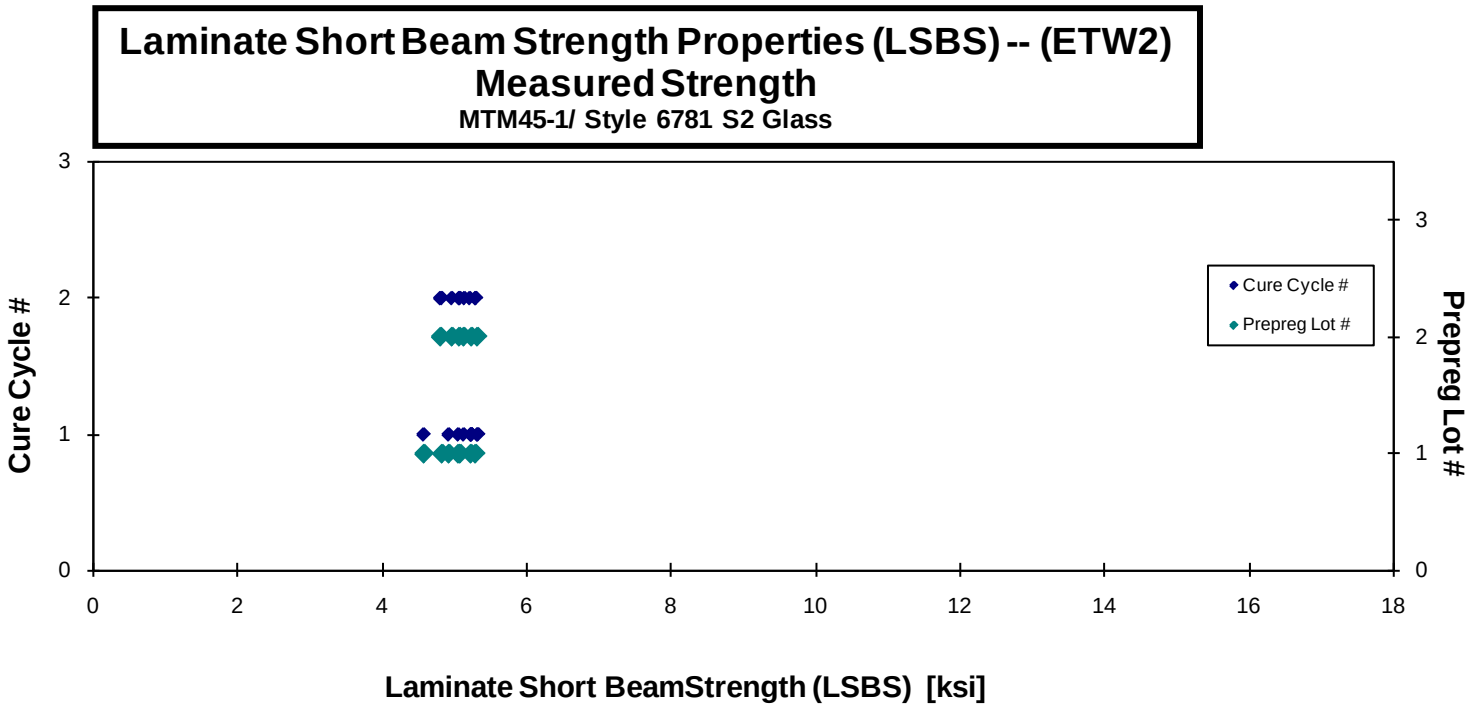
Average	**6.380**	**Average**	**0.0100**
Standard Dev.	**0.080**	**Standard Dev.**	
Coeff. of Var. [%]	**1.257**	**Coeff. of Var. [%]**	
Min.	**6.305**	**Min.**	**0.0100**
Max.	**6.545**	**Max.**	**0.0101**
Number of Spec.	**7**	**Number of Spec.**	**7**


Laminate Short Beam Strength Properties (LSBS) -- (ETW)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Short BeamStrength (LSBS) [ksi]
0
1
2
3
0
2
4
6
8
10
12
14
16
18

Laminate Short Beam Strength (LSBS) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJqA14ED	A	MH1	1	1	5.231	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA14FD	A	MH1	1	1	4.578	0.121	12	0.0100	INTERLAMINAR SHEAR
ABJqA14GD	A	MH1	1	1	4.925	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJqA14HD	A	MH1	1	1	5.058	0.119	12	0.0099	INTERLAMINAR SHEAR
ABJqA24AD	A	MH2	1	2	5.296	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJqA24BD	A	MH2	1	2	5.082	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJqA24CD	A	MH2	1	2	4.830	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJqB145D	B	MH1	2	1	5.133	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJqB146D	B	MH1	2	1	5.322	0.125	12	0.0104	INETRLAMINAR SHEAR
ABJqB147D	B	MH1	2	1	5.241	0.125	12	0.0104	INETRLAMINAR SHEAR
ABJqB245D	B	MH2	2	2	4.809	0.123	12	0.0102	INTERLAMINAR SHEAR
ABJqB246D	B	MH2	2	2	4.968	0.123	12	0.0102	INTERLAMINAR SHEAR
ABJqB247D	B	MH2	2	2	5.070	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJqD145D	D	MH1	4	1	5.241	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJqD146D	D	MH1	4	1	5.244	0.124	12	0.0104	INTERLAMINAR SHEAR
ABJqD147D	D	MH1	4	1	5.334	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJqD245D	D	MH2	4	2	5.217	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJqD246D	D	MH2	4	2	5.304	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJqD247D	D	MH2	4	2	5.142	0.125	12	0.0104	INTERLAMINAR SHEAR

Average	**5.107**	**Average**	**0.0102**
Standard Dev.	**0.205**	**Standard Dev.**	
Coeff. of Var. [%]	**4.018**	**Coeff. of Var. [%]**	
Min.	**4.578**	**Min.**	**0.0099**
Max.	**5.334**	**Max.**	**0.0104**
Number of Spec.	**19**	**Number of Spec.**	**19**

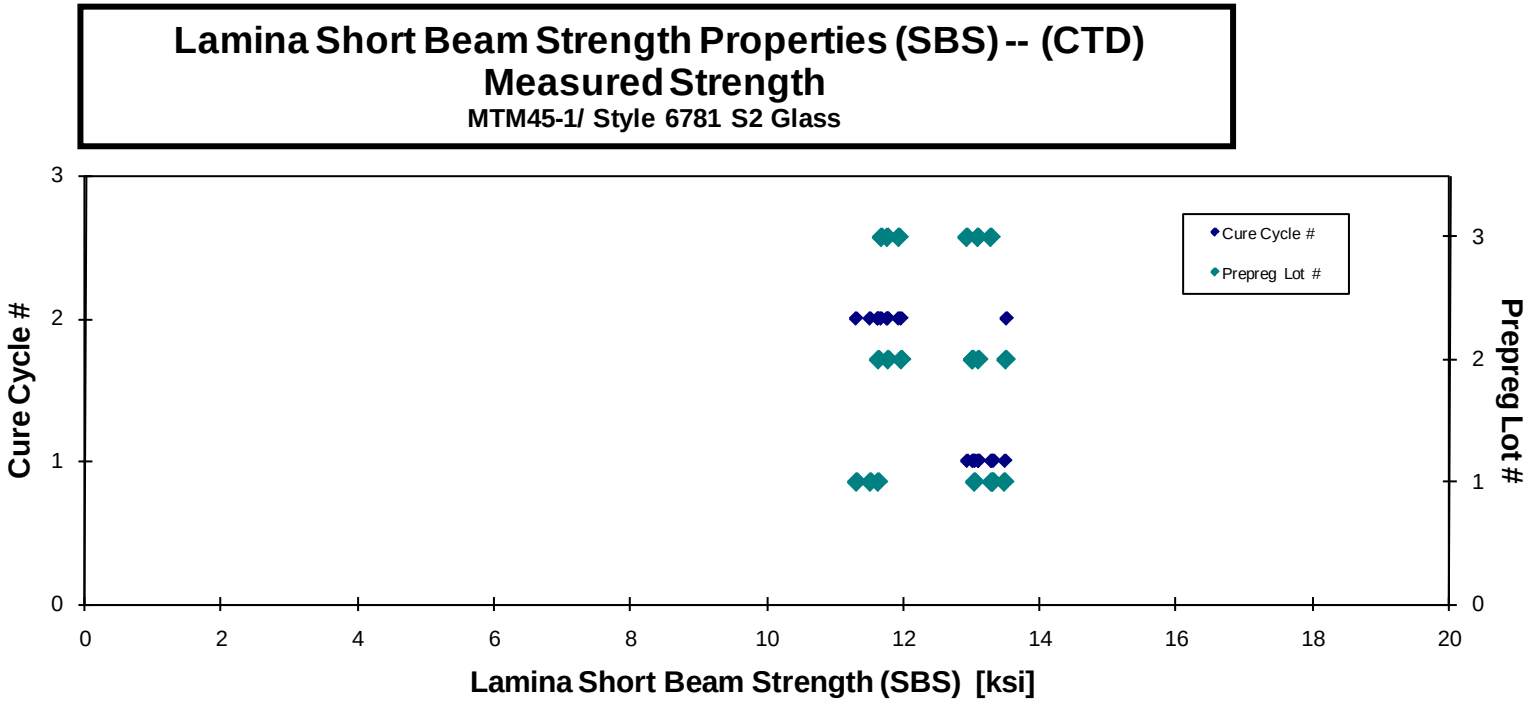

Laminate Short Beam Strength Properties (LSBS) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
2
4
6
8
10
12
14
16
18
Laminate Short BeamStrength (LSBS) [ksi]

4.9 Lamina Short Beam Strength Properties

Lamina Short Beam Strength Properties (SBS) -- (CTD) Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJQA127B	A	MH1	1	1	13.043	0.122	12	0.0102	Interlaminar shear
ABJQA128B	A	MH1	1	1	13.292	0.121	12	0.0101	Interlaminar shear
ABJQA129B	A	MH1	1	1	13.314	0.122	12	0.0101	Interlaminar shear
ABJQA12AB	A	MH1	1	1	13.483	0.122	12	0.0101	Interlaminar shear
ABJQA226B	A	MH2	1	2	11.303	0.123	12	0.0103	Interlaminar shear
ABJQA227B	A	MH2	1	2	11.506	0.123	12	0.0102	Interlaminar shear
ABJQA228B	A	MH2	1	2	11.622	0.123	12	0.0102	Interlaminar shear
ABJQB126B	B	MH1	2	1	13.100	0.127	12	0.0106	Interlaminar shear
ABJQB127B	B	MH1	2	1	13.015	0.127	12	0.0106	Interlaminar shear
ABJQB128B	B	MH1	2	1	13.011	0.128	12	0.0106	Interlaminar shear
ABJQB226B	B	MH2	2	2	11.767	0.127	12	0.0105	Interlaminar shear
ABJQB227B	B	MH2	2	2	11.963	0.126	12	0.0105	Interlaminar shear
ABJQB228B	B	MH2	2	2	13.504	0.127	12	0.0105	Interlaminar shear
ABJQB229B	B	MH2	2	2	11.626	0.126	12	0.0105	Interlaminar shear
ABJQC126B	C	MH1	3	1	13.282	0.126	12	0.0105	Interlaminar shear
ABJQC127B	C	MH1	3	1	13.091	0.126	12	0.0105	Interlaminar shear
ABJQC128B	C	MH1	3	1	12.929	0.126	12	0.0105	Interlaminar shear
ABJQC226B	C	MH2	3	2	11.756	0.125	12	0.0104	Interlaminar shear
ABJQC227B	C	MH2	3	2	11.926	0.126	12	0.0105	Interlaminar shear
ABJQC228B	C	MH2	3	2	11.668	0.126	12	0.0105	Interlaminar shear

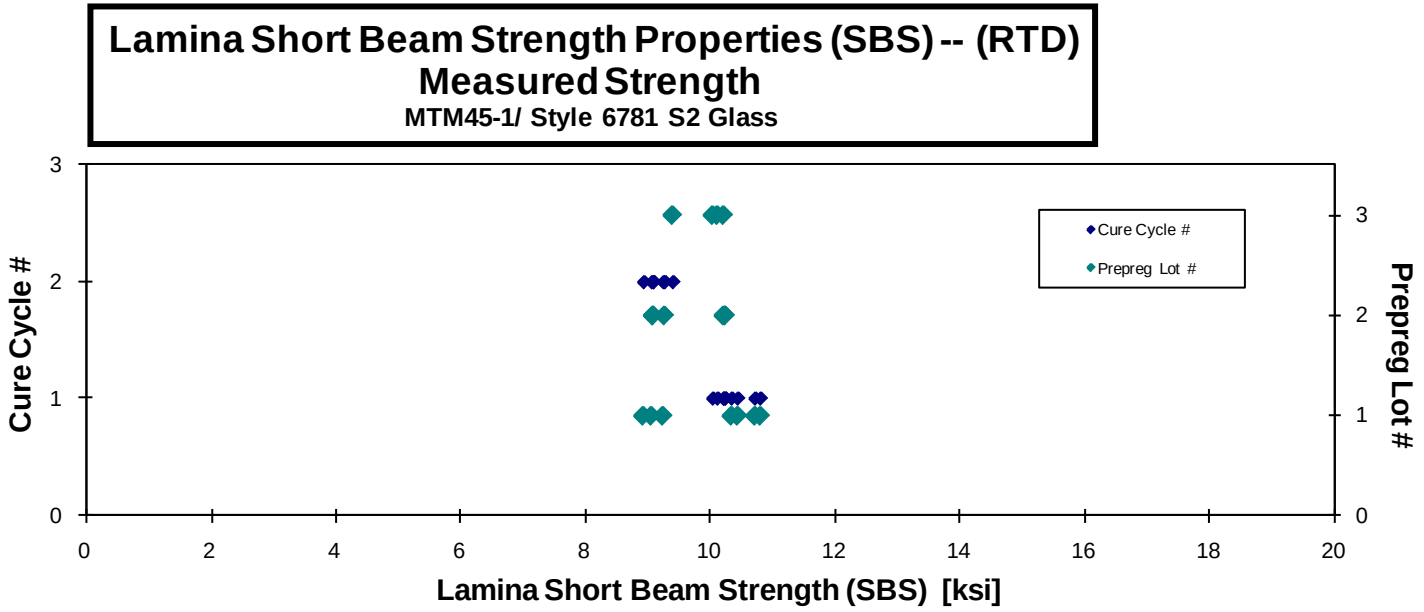
Average	**12.510**	**Average**	**0.0104**
Standard Dev.	**0.793**	**Standard Dev.**	
Coeff. of Var. [%]	**6.339**	**Coeff. of Var. [%]**	
Min.	**11.303**	**Min.**	**0.0101**
Max.	**13.504**	**Max.**	**0.0106**
Number of Spec.	**20**	**Number of Spec.**	**20**


Lamina Short Beam Strength Properties (SBS) -- (CTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Lamina Short Beam Strength (SBS) [ksi]
0
1
2
3
0
2
4
6
8
10
12
14
16
18
20

Lamina Short Beam Strength Properties (SBS) -- (RTD)
Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJQA121A	A	MH1	1	1	10.352	0.120	12	0.0100	Interlaminar shear
ABJQA122A	A	MH1	1	1	10.729	0.121	12	0.0101	Interlaminar shear
ABJQA123A	A	MH1	1	1	10.815	0.121	12	0.0100	Interlaminar shear
ABJQA124A	A	MH1	1	1	10.450	0.122	12	0.0102	Interlaminar shear
ABJQA221A	A	MH2	1	2	9.249	0.122	12	0.0102	Interlaminar shear
ABJQA222A	A	MH2	1	2	9.063	0.122	12	0.0102	Interlaminar shear
ABJQA223A	A	MH2	1	2	8.932	0.123	12	0.0102	Interlaminar shear
ABJQB121A	B	MH1	2	1	10.223	0.128	12	0.0106	Interlaminar shear
ABJQB122A	B	MH1	2	1	10.249	0.126	12	0.0105	Interlaminar shear
ABJQB123A	B	MH1	2	1	10.247	0.128	12	0.0107	Interlaminar shear
ABJQB221A	B	MH2	2	2	9.088	0.127	12	0.0106	Interlaminar shear
ABJQB222A	B	MH2	2	2	9.092	0.126	12	0.0105	Interlaminar shear
ABJQB223A	B	MH2	2	2	9.274	0.125	12	0.0104	Interlaminar shear
ABJQC121A	C	MH1	3	1	10.122	0.126	12	0.0105	Interlaminar shear
ABJQC122A	C	MH1	3	1	10.047	0.124	12	0.0103	Interlaminar shear
ABJQC123A	C	MH1	3	1	10.221	0.126	12	0.0105	Interlaminar shear
ABJQC221A	C	MH2	3	2	9.403	0.125	12	0.0104	Interlaminar shear
ABJQC222A	C	MH2	3	2	9.251	0.126	12	0.0105	Interlaminar shear
ABJQC223A	C	MH2	3	2	9.183	0.126	12	0.0105	Interlaminar shear

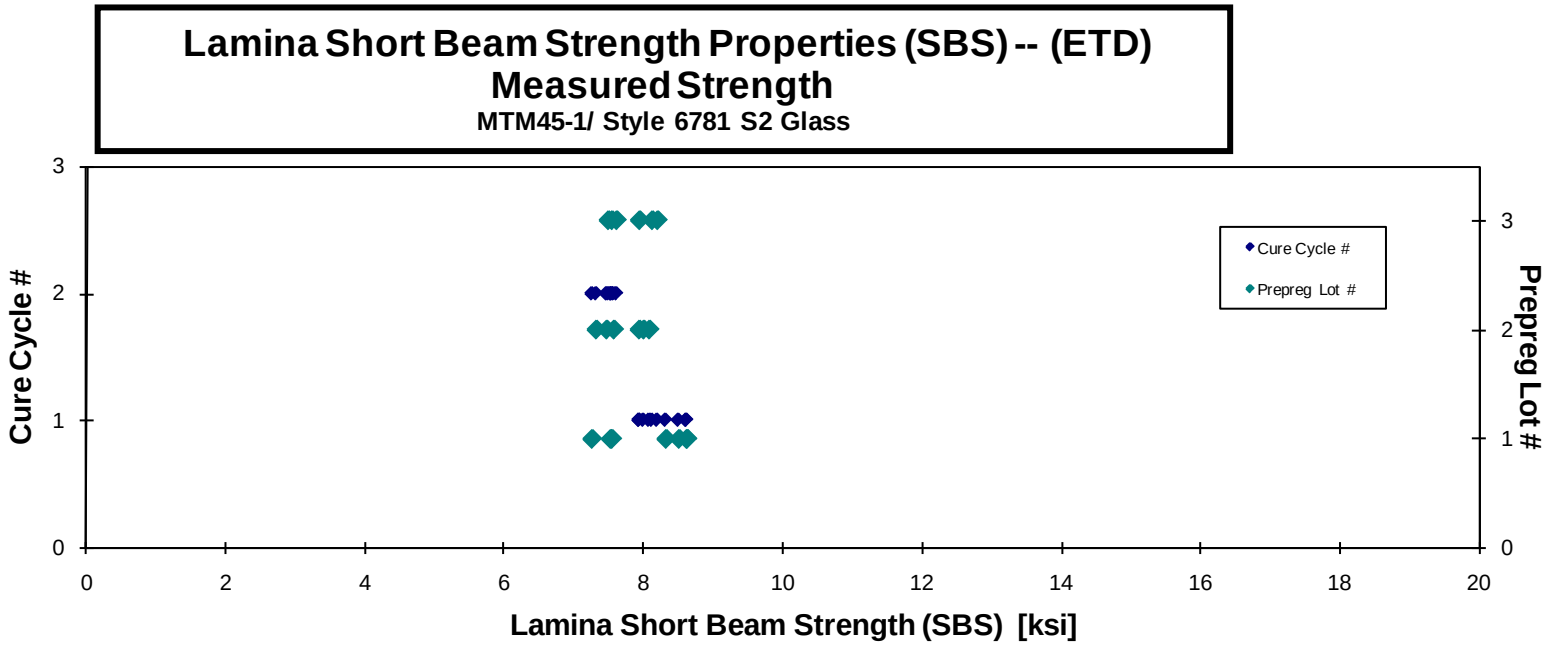
Average	**9.789**	**Average**	**0.0104**
Standard Dev.	**0.635**	**Standard Dev.**	
Coeff. of Var. [%]	**6.490**	**Coeff. of Var. [%]**	
Min.	**8.932**	**Min.**	**0.0100**
Max.	**10.815**	**Max.**	**0.0107**
Number of Spec.	**19**	**Number of Spec.**	**19**


Lamina Short Beam Strength Properties (SBS) -- (RTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Lamina Short Beam Strength (SBS) [ksi]
0
1
2
3
0
2
4
6
8
10
12
14
16
18
20

Lamina Short Beam Strength Properties (SBS) -- (ETD)
Strength
MTM45-1/Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJQA12DC	A	MH1	1	1	8.623	0.122	12	0.0101	INTERLAMINAR SHEAR
ABJQA12EC	A	MH1	1	1	8.615	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJQA12FC	A	MH1	1	1	8.506	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJQA12GC	A	MH1	1	1	8.319	0.123	12	0.0102	INTERLAMINAR SHEAR
ABJQA22BC	A	MH2	1	2	7.523	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJQA22CC	A	MH2	1	2	7.543	0.122	12	0.0101	INTERLAMINAR SHEAR
ABJQA22DC	A	MH2	1	2	7.256	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJQB12BC	B	MH1	2	1	8.079	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQB12CC	B	MH1	2	1	7.998	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQB12DC	B	MH1	2	1	7.935	0.127	12	0.0105	INTERLAMINAR SHEAR
ABJQB22BC	B	MH2	2	2	7.571	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQB22CC	B	MH2	2	2	7.466	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQB22DC	B	MH2	2	2	7.317	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQC12BC	C	MH1	3	1	7.939	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQC12CC	C	MH1	3	1	8.197	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJQC12DC	C	MH1	3	1	8.121	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQC22BC	C	MH2	3	2	7.543	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQC22CC	C	MH2	3	2	7.610	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQC22DC	C	MH2	3	2	7.490	0.126	12	0.0105	INTERLAMINAR SHEAR

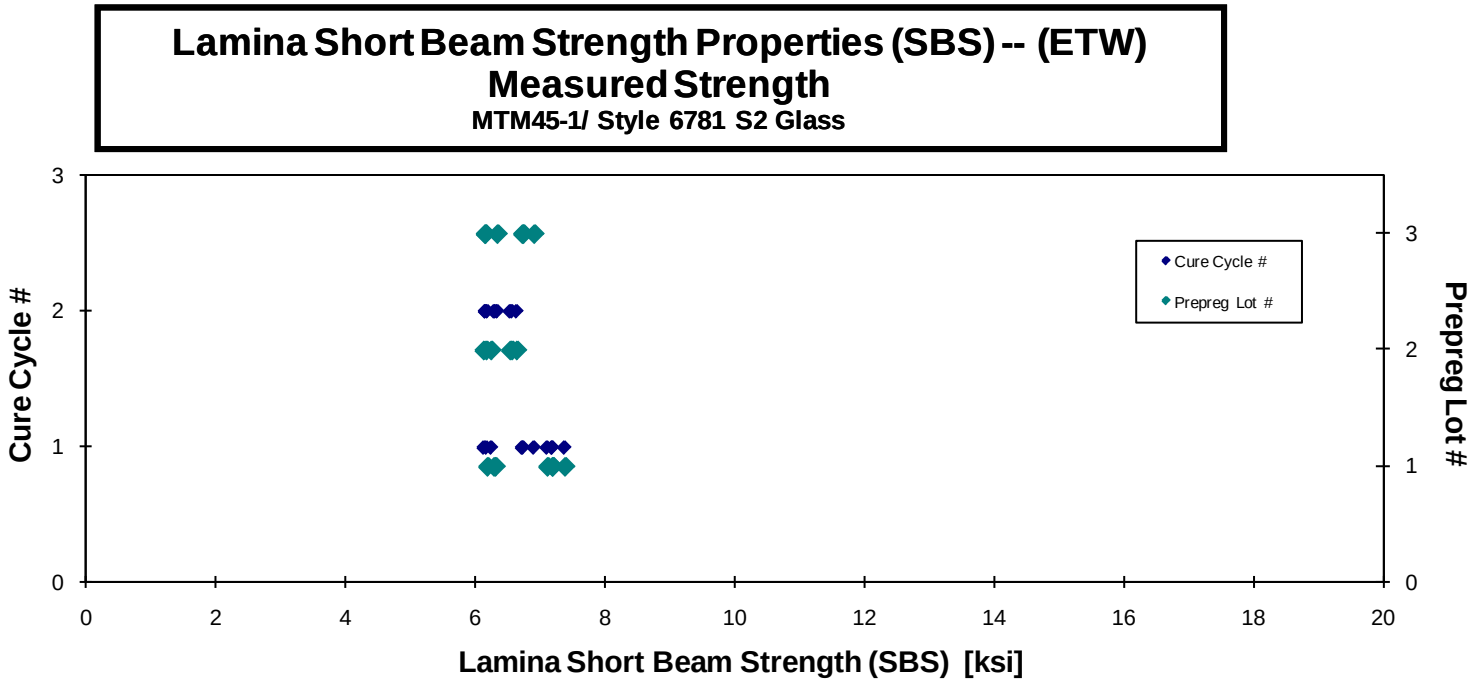
Average	**7.876**	**Average**	**0.0104**
Standard Dev.	**0.438**	**Standard Dev.**	
Coeff. of Var. [%]	**5.557**	**Coeff. of Var. [%]**	
Min.	**7.256**	**Min.**	**0.0101**
Max.	**8.623**	**Max.**	**0.0106**
Number of Spec.	**19**	**Number of Spec.**	**19**


Lamina Short Beam Strength Properties (SBS) -- (ETD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Lamina Short Beam Strength (SBS) [ksi]
0
1
2
3
0
2
4
6
8
10
12
14
16
18
20

Lamina Short Beam Strength Properties (SBS) -- (ETW)
Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJQA118N	A	MH1	1	1	7.114	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJQA119N	A	MH1	1	1	7.190	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJQA11AN	A	MH1	1	1	7.385	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJQA11BN	A	MH1	1	1	7.197	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJQA216N	A	MH2	1	2	6.310	0.123	12	0.0103	INTERLAMINAR SHEAR
ABJQA217N	A	MH2	1	2	6.288	0.123	12	0.0102	INTERLAMINAR SHEAR
ABJQA218N	A	MH2	1	2	6.185	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJQB116N	B	MH1	2	1	6.128	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQB117N	B	MH1	2	1	6.244	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQB118N	B	MH1	2	1	6.170	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQB217N	B	MH2	2	2	6.639	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQB218N	B	MH2	2	2	6.567	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJQB219N	B	MH2	2	2	6.538	0.128	12	0.0107	INTERLAMINAR SHEAR
ABJQC116N	C	MH1	3	1	6.725	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJQC117N	C	MH1	3	1	6.909	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJQC118N	C	MH1	3	1	6.741	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJQC216N	C	MH2	3	2	6.147	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQC217N	C	MH2	3	2	6.155	0.128	12	0.0107	INTERLAMINAR SHEAR
ABJQC218N	C	MH2	3	2	6.339	0.126	12	0.0105	INTERLAMINAR SHEAR

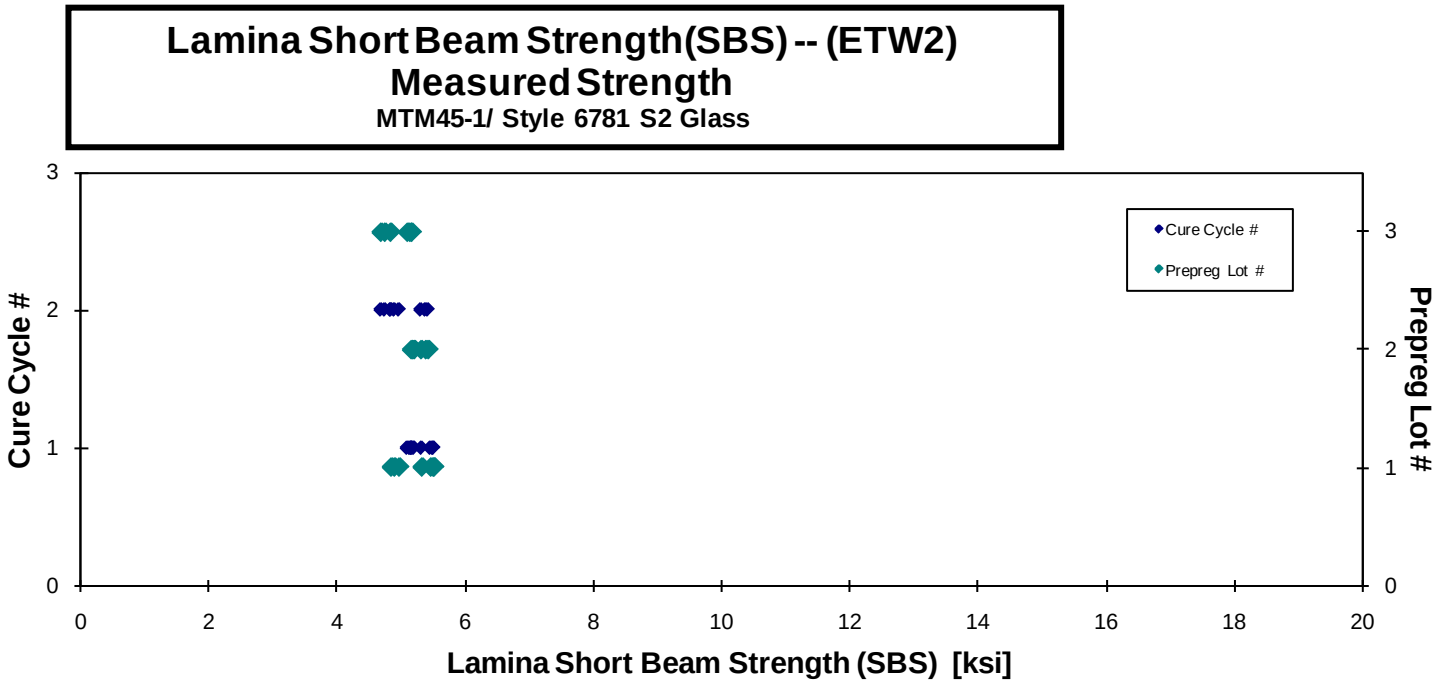
Average	**6.577**	**Average**	**0.0104**
Standard Dev.	**0.413**	**Standard Dev.**	
Coeff. of Var. [%]	**6.280**	**Coeff. of Var. [%]**	
Min.	**6.128**	**Min.**	**0.0101**
Max.	**7.385**	**Max.**	**0.0107**
Number of Spec.	**19**	**Number of Spec.**	**19**


Lamina Short Beam Strength Properties (SBS) -- (ETW)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Lamina Short Beam Strength (SBS) [ksi]
0
1
2
3
0
2
4
6
8
10
12
14
16
18
20

Lamina Short Beam Shear Strength (SBS) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
ABJQA111D	A	MH1	1	1	5.453	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJQA112D	A	MH1	1	1	5.504	0.121	12	0.0101	INTERLAMINAR SHEAR
ABJQA113D	A	MH1	1	1	5.313	0.122	12	0.0102	INTERLAMINAR SHEAR
ABJQA114D	A	MH1	1	1	5.491	0.120	12	0.0100	INTERLAMINAR SHEAR
ABJQA211D	A	MH2	1	2	4.886	0.123	12	0.0102	INTERLAMINAR SHEAR
ABJQA212D	A	MH2	1	2	4.835	0.123	12	0.0102	INTERLAMINAR SHEAR
ABJQA213D	A	MH2	1	2	4.959	0.123	12	0.0103	INTERLAMINAR SHEAR
ABJQB112D	B	MH1	2	1	5.148	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQB113D	B	MH1	2	1	5.196	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQB114D	B	MH1	2	1	5.174	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQB211D	B	MH2	2	2	5.414	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQB212D	B	MH2	2	2	5.302	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQB213D	B	MH2	2	2	5.374	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQC112D	C	MH1	3	1	5.154	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJQC113D	C	MH1	3	1	5.128	0.124	12	0.0103	INTERLAMINAR SHEAR
ABJQC114D	C	MH1	3	1	5.088	0.125	12	0.0104	INTERLAMINAR SHEAR
ABJQC213D	C	MH2	3	2	4.737	0.127	12	0.0106	INTERLAMINAR SHEAR
ABJQC214D	C	MH2	3	2	4.825	0.126	12	0.0105	INTERLAMINAR SHEAR
ABJQC215D	C	MH2	3	2	4.675	0.127	12	0.0105	INTERLAMINAR SHEAR

Average	**5.140**	**Average**	**0.0104**
Standard Dev.	**0.260**	**Standard Dev.**	
Coeff. of Var. [%]	**5.055**	**Coeff. of Var. [%]**	
Min.	**4.675**	**Min.**	**0.0100**
Max.	**5.504**	**Max.**	**0.0106**
Number of Spec.	**19**	**Number of Spec.**	**19**


Lamina Short Beam Strength(SBS) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Lamina Short Beam Strength (SBS) [ksi]
0
1
2
3
0
2
4
6
8
10
12
14
16
18
20

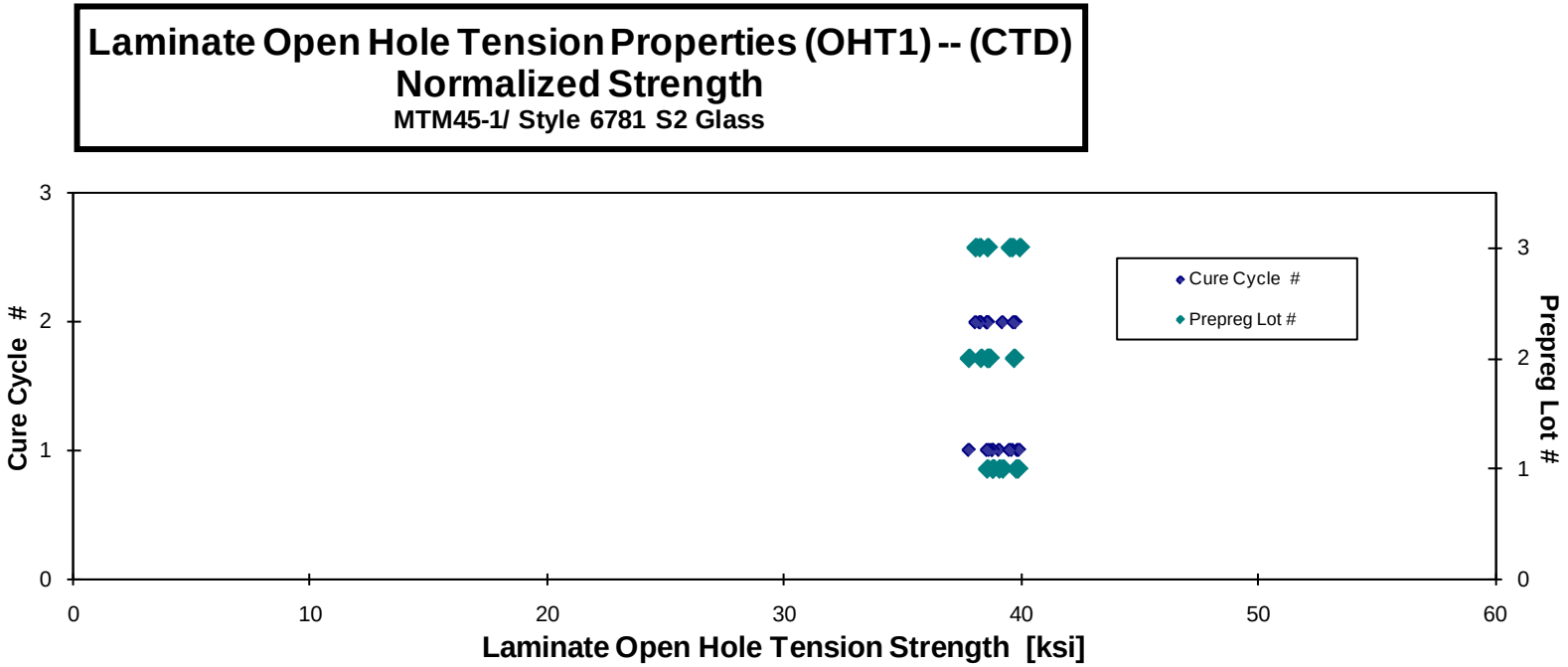
4.10 Open Hole Tension 1 Properties

Laminate Open Hole Tension Properties (OHT1) -- (CTD)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJDA115B	A	MH1	1	1	38.320	0.124	12	0.0103	LGM	0.0103	39.074
ABJDA116B	A	MH1	1	1	38.254	0.123	12	0.0102	LGM	0.0102	38.790
ABJDA117B	A	MH1	1	1	38.584	0.122	12	0.0102	LGM	0.0102	38.812
ABJDA118B	A	MH1	1	1	39.819	0.121	12	0.0101	LGM	0.0101	39.862
ABJDA215B	A	MH2	1	2	37.850	0.123	12	0.0103	LGM	0.0103	38.558
ABJDA216B	A	MH2	1	2	38.362	0.124	12	0.0103	LGM	0.0103	39.221
ABJDA217B	A	MH2	1	2	38.993	0.124	12	0.0103	LGM	0.0103	39.782
ABJDB114B	B	MH1	2	1	37.186	0.126	12	0.0105	LGM	0.0105	38.659
ABJDB115B	B	MH1	2	1	36.494	0.126	12	0.0105	LGM	0.0105	37.789
ABJDB116B	B	MH1	2	1	37.297	0.125	12	0.0104	LGM	0.0104	38.563
ABJDB214B	B	MH2	2	2	37.402	0.125	12	0.0104	LGM	0.0104	38.610
ABJDB215B	B	MH2	2	2	38.434	0.125	12	0.0104	LGM	0.0104	39.692
ABJDB216B	B	MH2	2	2	37.084	0.125	12	0.0104	LGM	0.0104	38.298
ABJDC114B	C	MH1	3	1	37.929	0.127	12	0.0106	LGM	0.0106	39.630
ABJDC115B	C	MH1	3	1	38.156	0.127	12	0.0106	LGM	0.0106	39.935
ABJDC116B	C	MH1	3	1	37.566	0.128	12	0.0106	LGM	0.0106	39.519
ABJDC215B	C	MH2	3	2	37.109	0.126	12	0.0105	LGM	0.0105	38.579
ABJDC216B	C	MH2	3	2	36.871	0.126	12	0.0105	LGM	0.0105	38.250
ABJDC217B	C	MH2	3	2	36.710	0.126	12	0.0105	LGM	0.0105	38.073

Average	**37.812**	**Average**	**0.0104**	**$Average_{norm}$**	**38.931**
Standard Dev.	**0.851**			**$Standard\ Dev._{norm}$**	**0.651**
Coeff. of Var. [%]	**2.251**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**	**1.673**
Min.	**36.494**	**Min.**	**0.0101**	**Min.**	**37.789**
Max.	**39.819**	**Max.**	**0.0106**	**Max.**	**39.935**
Number of Spec.	**19**			**Number of Spec.**	**19**

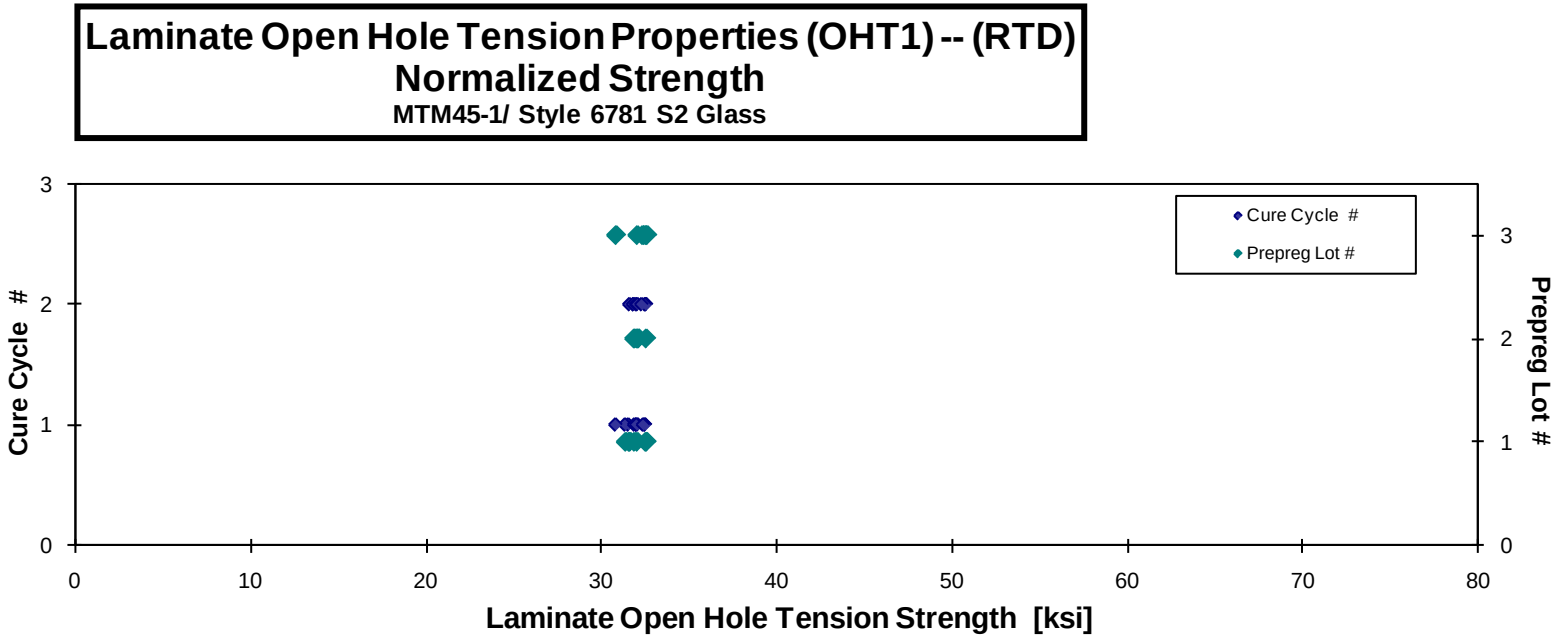

Laminate Open Hole Tension Properties (OHT1) -- (CTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
10
20
30
40
50
60
1
2
3

Laminate Open Hole Tension Properties (OHT1) -- (RTD)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJDA111A	A	MH1	1	1	32.029	0.123	12	0.0103	LGM	0.0103	32.531
ABJDA112A	A	MH1	1	1	31.259	0.124	12	0.0104	LGM	0.0104	32.050
ABJDA113A	A	MH1	1	1	30.798	0.124	12	0.0104	LGM	0.0104	31.590
ABJDA114A	A	MH1	1	1	30.882	0.123	12	0.0103	LGM	0.0103	31.400
ABJDA211A	A	MH2	1	2	31.359	0.123	12	0.0103	LGM	0.0103	31.894
ABJDA212A	A	MH2	1	2	31.971	0.124	12	0.0103	LGM	0.0103	32.586
ABJDA213A	A	MH2	1	2	31.117	0.123	12	0.0103	LGM	0.0103	31.652
ABJDB111A	B	MH1	2	1	30.823	0.126	12	0.0105	LGM	0.0105	32.128
ABJDB112A	B	MH1	2	1	31.222	0.126	12	0.0105	LGM	0.0105	32.557
ABJDB113A	B	MH1	2	1	30.240	0.128	12	0.0107	LGM	0.0107	31.933
ABJDB211A	B	MH2	2	2	31.086	0.124	12	0.0104	LGM	0.0104	31.873
ABJDB212A	B	MH2	2	2	31.124	0.125	12	0.0104	LGM	0.0104	32.045
ABJDB213A	B	MH2	2	2	31.064	0.125	12	0.0104	LGM	0.0104	32.115
ABJDC111A	C	MH1	3	1	30.783	0.126	12	0.0105	LGM	0.0105	32.053
ABJDC112A	C	MH1	3	1	29.692	0.126	12	0.0105	LGM	0.0105	30.851
ABJDC113A	C	MH1	3	1	31.166	0.126	12	0.0105	LGM	0.0105	32.439
ABJDC212A	C	MH2	3	2	31.451	0.126	12	0.0105	LGM	0.0105	32.618
ABJDC213A	C	MH2	3	2	31.295	0.126	12	0.0105	LGM	0.0105	32.547
ABJDC214A	C	MH2	3	2	31.130	0.126	12	0.0105	LGM	0.0105	32.350

Average	**31.078**	**Average**	**0.0104**	**$Average_{norm}$**	**0.01042**	**32.064**
Standard Dev.	**0.523**			**$Standard\ Dev._{norm}$**		**0.465**
Coeff. of Var. [%]	**1.684**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.451**
Min.	**29.692**	**Min.**	**0.0103**	**Min.**	**0.0103**	**30.851**
Max.	**32.029**	**Max.**	**0.0107**	**Max.**	**0.0107**	**32.618**
Number of Spec.	**19**			**Number of Spec.**		**19**

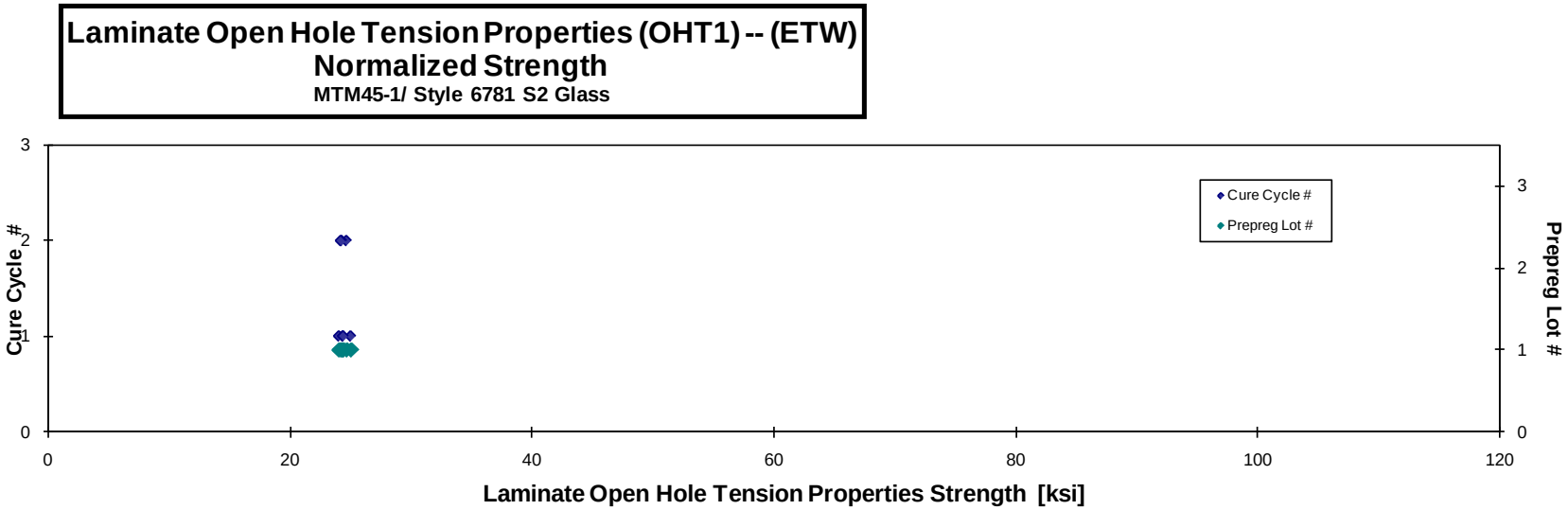

Laminate Open Hole Tension Properties (OHT1) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
10
20
30
40
50
60
70
80
Laminate Open Hole Tension Strength [ksi]

Laminate Open Hole Tension Properties (OHT1) -- (ETW)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_p [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJDA11EN	A	MH1	1	1	23.809	0.122	12	0.0102	LGM	0.0102	24.045
ABJDA11FN	A	MH1	1	1	24.826	0.122	12	0.0102	LGM	0.0102	25.034
ABJDA11GN	A	MH1	1	1	24.152	0.122	12	0.0102	LGM	0.0102	24.374
ABJDA11HN	A	MH1	1	1	24.393	0.121	12	0.0101	LGM	0.0101	24.406
ABJDA21DN	A	MH2	1	2	24.366	0.123	12	0.0102	LGM	0.0102	24.675
ABJDA21EN	A	MH2	1	2	24.062	0.122	12	0.0102	LGM	0.0102	24.277
ABJDA21FN	A	MH2	1	2	24.195	0.121	12	0.0101	LGM	0.0101	24.199

Average	**24.258**	**Average**	**0.0102**	**$Average_{norm}$**	**0.0102**	**24.430**
Standard Dev.	**0.318**			**$Standard\ Dev._{norm}$**		**0.330**
Coeff. of Var. [%]	**1.312**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.351**
Min.	**23.809**	**Min.**	**0.0101**	**Min.**	**0.0101**	**24.045**
Max.	**24.826**	**Max.**	**0.0102**	**Max.**	**0.0102**	**25.034**
Number of Spec.	**7**			**Number of Spec.**		**7**

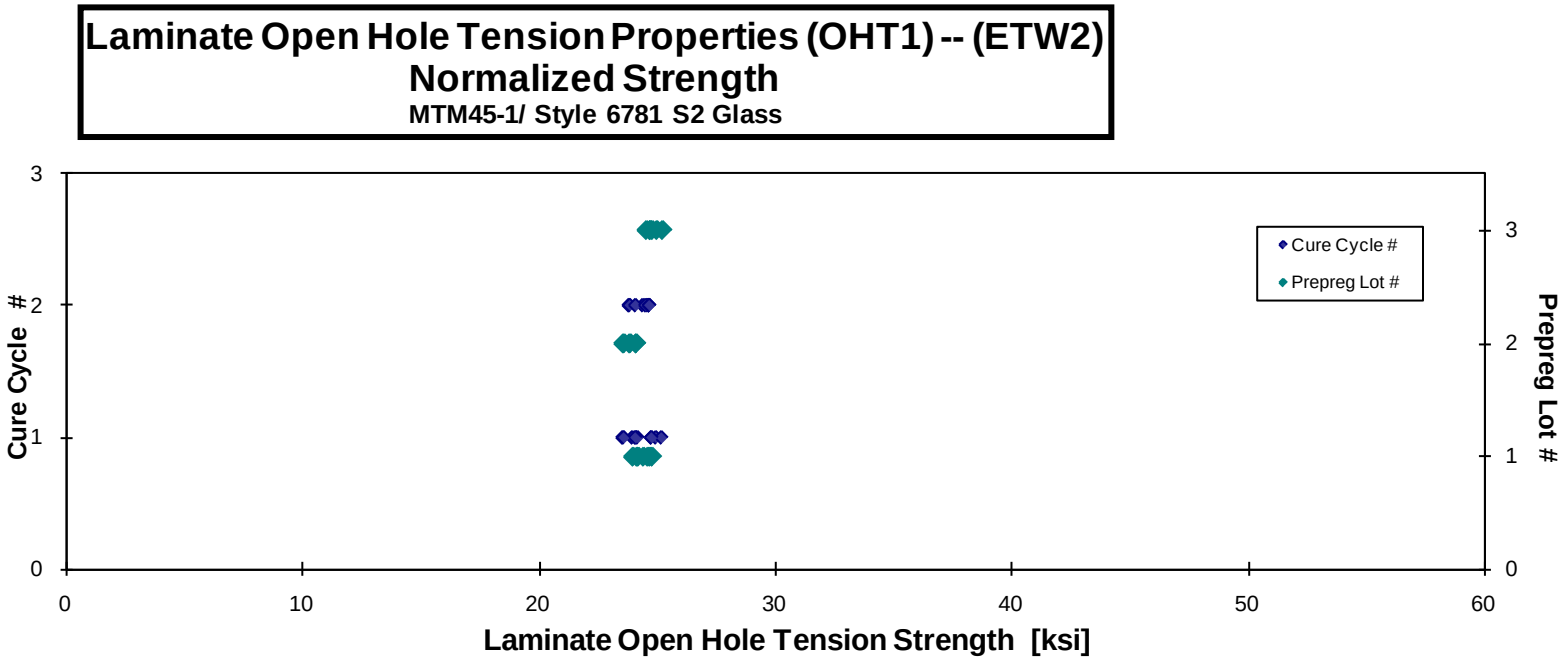

Laminate Open Hole Tension Properties (OHT1) -- (ETW)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Properties Strength [ksi]
0
20
40
60
80
100
120
0
1
2
3

Laminate Open Hole Tension Properties (OHT1) -- (ETW2)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJDA119D	A	MH1	1	1	24.658	0.122	12	0.0101	LGM	0.0101	24.763
ABJDA11AD	A	MH1	1	1	23.780	0.123	12	0.0102	LGM	0.0102	24.116
ABJDA11BD	A	MH1	1	1	23.780	0.123	12	0.0103	LGM	0.0103	24.178
ABJDA11CD	A	MH1	1	1	23.594	0.123	12	0.0103	LGM	0.0103	23.951
ABJDA219D	A	MH2	1	2	24.298	0.123	12	0.0103	LGM	0.0103	24.663
ABJDA21AD	A	MH2	1	2	23.971	0.123	12	0.0103	LGM	0.0103	24.396
ABJDA21BD	A	MH2	1	2	24.315	0.123	12	0.0102	LGM	0.0102	24.575
ABJDB117D	B	MH1	2	1	22.555	0.126	12	0.0105	LGM	0.0105	23.538
ABJDB118D	B	MH1	2	1	23.137	0.126	12	0.0105	LGM	0.0105	24.081
ABJDB119D	B	MH1	2	1	22.660	0.126	12	0.0105	LGM	0.0105	23.583
ABJDB217D	B	MH2	2	2	23.218	0.124	12	0.0104	LGM	0.0104	23.805
ABJDB218D	B	MH2	2	2	23.249	0.124	12	0.0104	LGM	0.0104	23.843
ABJDB219D	B	MH2	2	2	23.622	0.124	12	0.0103	LGM	0.0103	24.089
ABJDC117D	C	MH1	3	1	23.518	0.129	12	0.0107	LGM	0.0107	24.961
ABJDC118D	C	MH1	3	1	23.819	0.128	12	0.0107	LGM	0.0107	25.198
ABJDC119D	C	MH1	3	1	23.395	0.128	12	0.0107	LGM	0.0107	24.772
ABJDC218D	C	MH2	3	2	23.676	0.126	12	0.0105	LGM	0.0105	24.520
ABJDC219D	C	MH2	3	2	23.906	0.125	12	0.0104	LGM	0.0104	24.675
ABJDC21AD	C	MH2	3	2	23.978	0.125	12	0.0104	LGM	0.0104	24.680

Average	**23.638**	**Average**	**0.0104**	**$Average_{norm}$**	**0.0104**	**24.336**
Standard Dev.	**0.532**			**$Standard\ Dev._{norm}$**		**0.472**
Coeff. of Var. [%]	**2.250**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.941**
Min.	**22.555**	**Min.**	**0.0101**	**Min.**	**0.0101**	**23.538**
Max.	**24.658**	**Max.**	**0.0107**	**Max.**	**0.0107**	**25.198**
Number of Spec.	**19**			**Number of Spec.**		**19**


Laminate Open Hole Tension Properties (OHT1) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
10
20
30
40
50
60
1
2
3

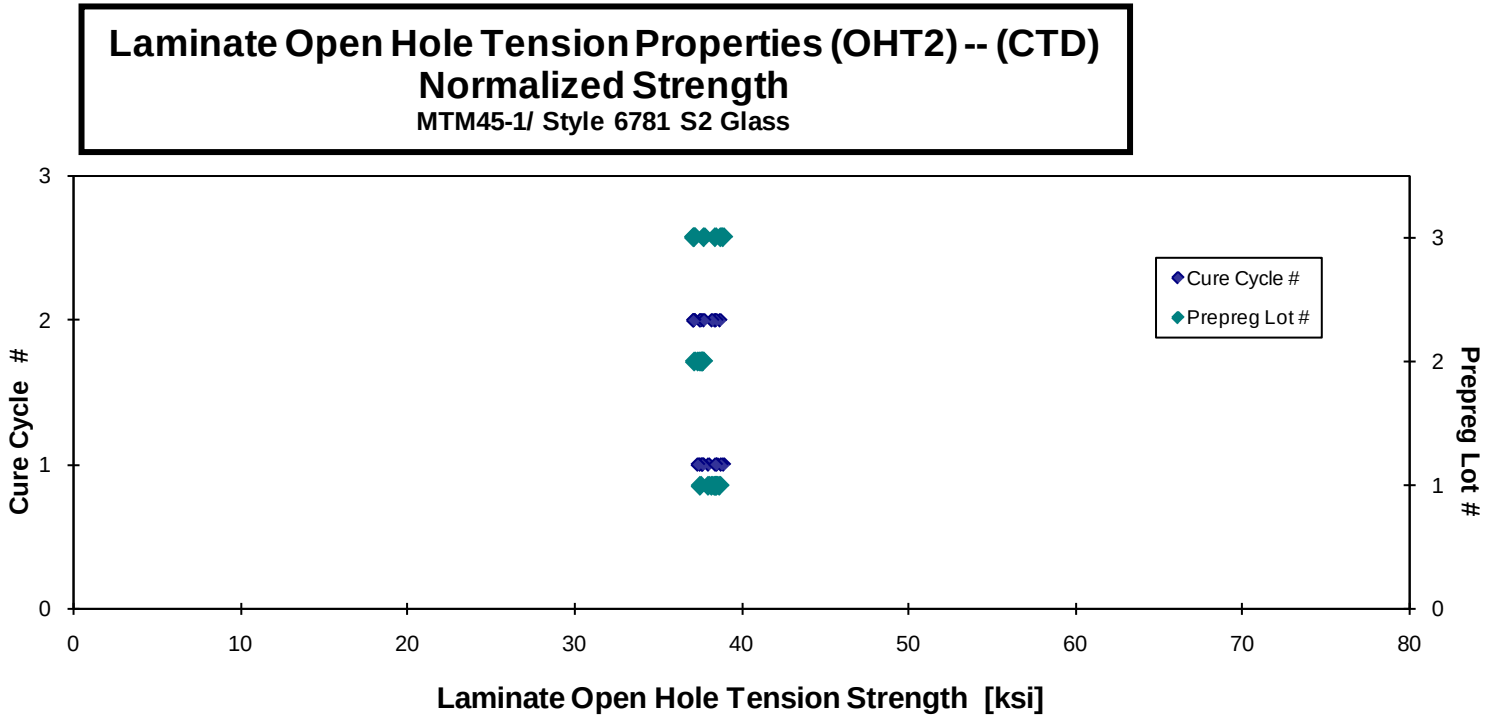
4.11 Open Hole Tension 2 Properties

Laminate Open Hole Tension Properties (OHT2) -- (CTD) Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJEA116B	A	MH1	1	1	37.798	0.154	15	0.0103	AGM	0.0103	38.538
ABJEA117B	A	MH1	1	1	36.887	0.154	15	0.0103	AGM	0.0103	37.546
ABJEA118B	A	MH1	1	1	37.370	0.154	15	0.0103	AGM	0.0103	38.036
ABJEA215B	A	MH2	1	2	38.006	0.154	15	0.0103	AGM	0.0103	38.713
ABJEA217B	A	MH2	1	2	37.363	0.156	15	0.0104	AGM	0.0104	38.415
ABJEA218B	A	MH2	1	2	37.544	0.155	15	0.0104	AGM	0.0104	38.481
ABJEA219B	A	MH2	1	2	37.356	0.155	15	0.0103	AGM	0.0103	38.240
ABJEB112B	B	MH1	2	1	36.727	0.156	15	0.0104	AGM	0.0104	37.712
ABJEB113B	B	MH1	2	1	36.507	0.156	15	0.0104	AGM	0.0104	37.672
ABJEB114B	B	MH1	2	1	36.313	0.156	15	0.0104	AGM	0.0104	37.408
ABJEB211B	B	MH2	2	2	36.260	0.155	15	0.0104	AGM	0.0104	37.198
ABJEB212B	B	MH2	2	2	36.380	0.157	15	0.0104	AGM	0.0104	37.617
ABJEB213B	B	MH2	2	2	36.413	0.156	15	0.0104	AGM	0.0104	37.547
ABJEC112B	C	MH1	3	1	37.584	0.157	15	0.0105	AGM	0.0105	38.927
ABJEC113B	C	MH1	3	1	37.374	0.157	15	0.0105	AGM	0.0105	38.780
ABJEC115B	C	MH1	3	1	37.078	0.157	15	0.0105	AGM	0.0105	38.453
ABJEC211B	C	MH2	3	2	36.255	0.158	15	0.0105	AGM	0.0105	37.767
ABJEC212B	C	MH2	3	2	35.681	0.158	15	0.0105	AGM	0.0105	37.185
ABJEC214B	C	MH2	3	2	35.657	0.158	15	0.0105	AGM	0.0105	37.144

Average	**36.871**	**Average**	**0.0104**	**$Average_{norm}$**	**37.967**
Standard Dev.	**0.695**			**$Standard\ Dev._{norm}$**	**0.583**
Coeff. of Var. [%]	**1.884**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**	**1.534**
Min.	**35.657**	**Min.**	**0.0103**	**Min.**	**37.144**
Max.	**38.006**	**Max.**	**0.0105**	**Max.**	**38.927**
Number of Spec.	**19**			**Number of Spec.**	**19**

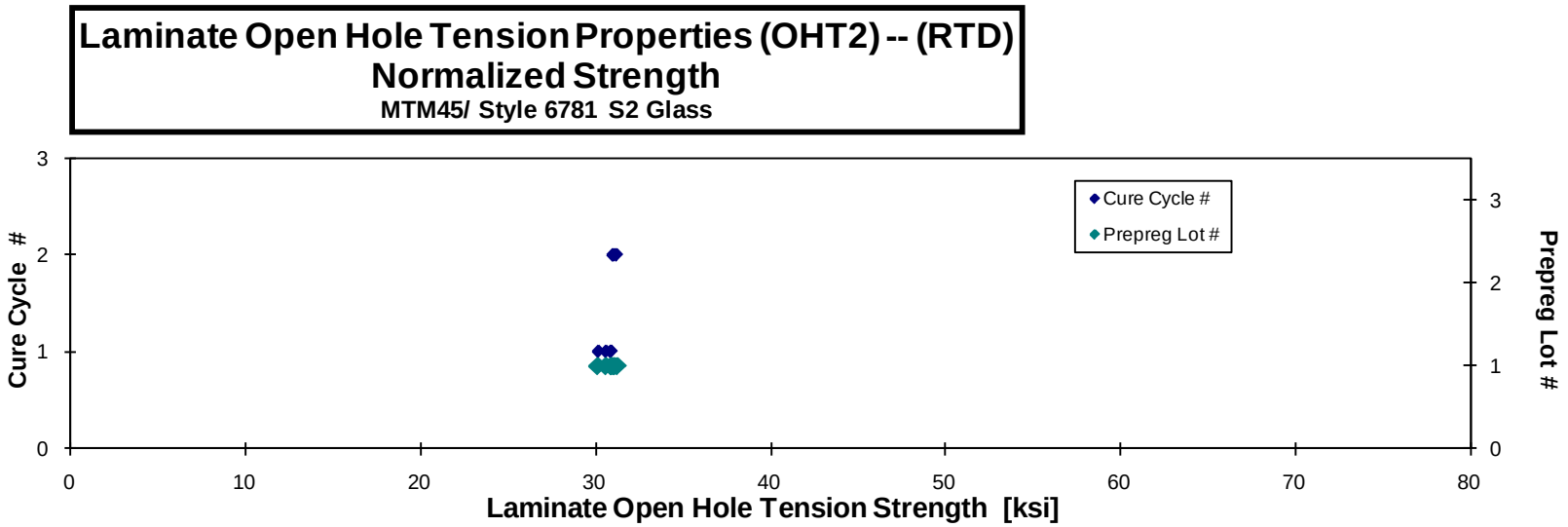

Laminate Open Hole Tension Properties (OHT2) -- (CTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
1
2
3
0
10
20
30
40
50
60
70
80

Laminate Open Hole Tension Properties (OHT2) -- (RTD) Strength
MTM45/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJEA111A	A	MH1	1	1	29.946	0.153	15	0.0102	AGM	0.0102	30.150
ABJEA112A	A	MH1	1	1	30.249	0.153	15	0.0102	AGM	0.0102	30.605
ABJEA113A	A	MH1	1	1	30.452	0.154	15	0.0102	AGM	0.0102	30.887
ABJEA114A	A	MH1	1	1	30.415	0.154	15	0.0103	AGM	0.0103	30.917
ABJEA211A	A	MH2	1	2	30.801	0.154	15	0.0102	AGM	0.0102	31.238
ABJEA212A	A	MH2	1	2	30.463	0.154	15	0.0103	AGM	0.0103	31.016
ABJEA213A	A	MH2	1	2	30.450	0.155	15	0.0103	AGM	0.0103	31.094

Average	**30.397**	**Average**	**0.0102**	**$Average_{norm}$**	**0.0102**	**30.844**
Standard Dev.	**0.258**			**$Standard\ Dev._{norm}$**		**0.364**
Coeff. of Var. [%]	**0.849**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.179**
Min.	**29.946**	**Min.**	**0.0102**	**Min.**	**0.0102**	**30.150**
Max.	**30.801**	**Max.**	**0.0103**	**Max.**	**0.0103**	**31.238**
Number of Spec.	**7**			**Number of Spec.**		**7**

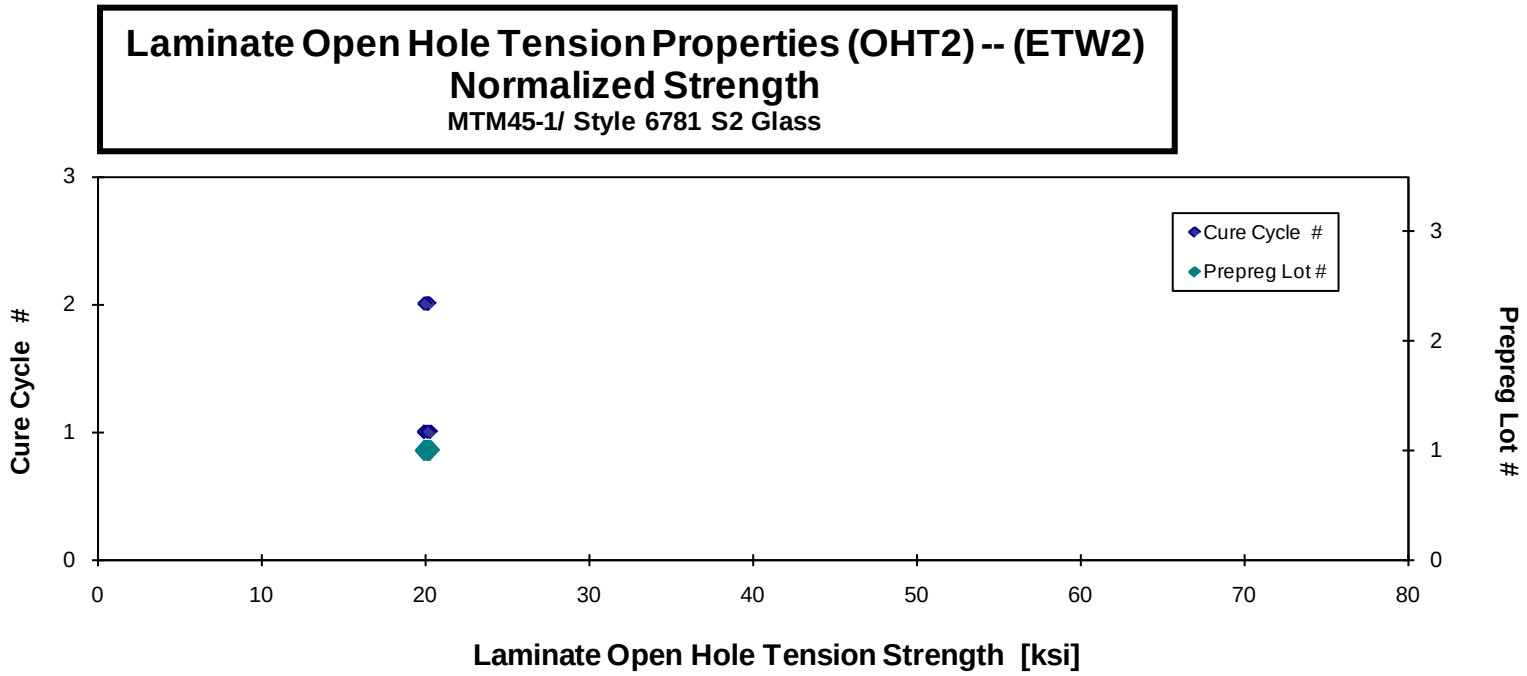

Laminate Open Hole Tension Properties (OHT2) -- (RTD)
Normalized Strength
MTM45/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
1
2
3
0
10
20
30
40
50
60
70
80

Laminate Open Hole Tension Properties (OHT2) -- (ETW2)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJEA119D	A	MH1	1	1	19.911	0.154	15	0.0103	AGM	0.0103	20.283
ABJEA11AD	A	MH1	1	1	19.567	0.154	15	0.0103	AGM	0.0103	19.920
ABJEA11BD	A	MH1	1	1	19.594	0.154	15	0.0103	AGM	0.0103	19.924
ABJEA11CD	A	MH1	1	1	19.850	0.154	15	0.0102	AGM	0.0102	20.132
ABJEA216D	A	MH2	1	2	19.451	0.156	15	0.0104	AGM	0.0104	20.084
ABJEA21AD	A	MH2	1	2	19.497	0.156	15	0.0104	AGM	0.0104	20.134
ABJEA21BD	A	MH2	1	2	19.664	0.156	15	0.0104	AGM	0.0104	20.194
ABJEA21CD	A	MH2	1	2	19.284	0.157	15	0.0104	AGM	0.0104	19.939

Average	**19.602**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**20.076**
Standard Dev.	**0.206**			**$Standard\ Dev._{norm}$**		**0.136**
Coeff. of Var. [%]	**1.051**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**0.678**
Min.	**19.284**	**Min.**	**0.0102**	**Min.**	**0.0102**	**19.920**
Max.	**19.911**	**Max.**	**0.0104**	**Max.**	**0.0104**	**20.283**
Number of Spec.	**8**			**Number of Spec.**		**8**


Laminate Open Hole Tension Properties (OHT2) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
10
20
30
40
50
60
70
80
Laminate Open Hole Tension Strength [ksi]

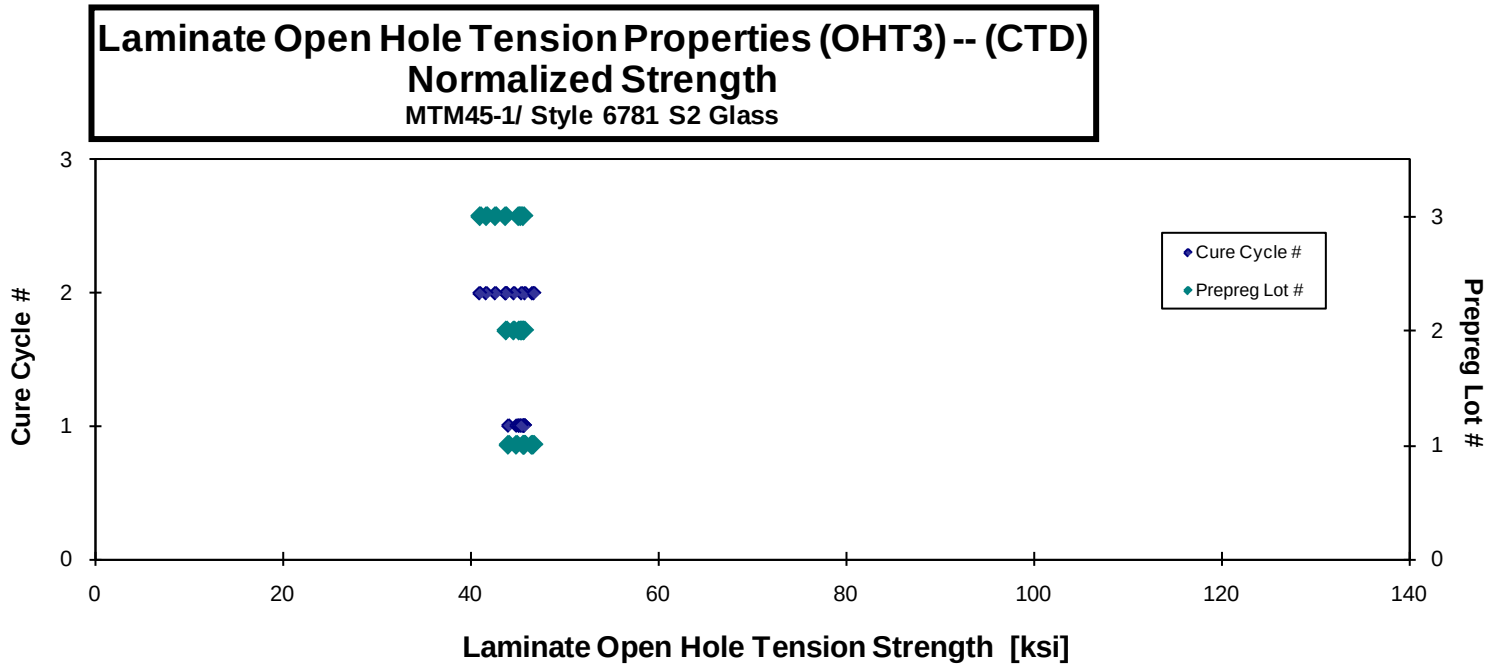
4.12 Open Hole Tension 3 Properties

Laminate Open Hole Tension Properties (OHT3) -- (CTD)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJFA116B	A	MH1	1	1	43.127	0.155	15	0.0103	LGM	0.0103	43.996
ABJFA118B	A	MH1	1	1	44.525	0.155	15	0.0103	LGM	0.0103	45.592
ABJFA119B	A	MH1	1	1	43.911	0.155	15	0.0103	LGM	0.0103	44.853
ABJFA11AB	A	MH1	1	1	44.681	0.155	15	0.0103	LGM	0.0103	45.669
ABJFA215B	A	MH2	1	2	45.769	0.154	15	0.0103	LGM	0.0103	46.490
ABJFA216B	A	MH2	1	2	44.830	0.154	15	0.0103	LGM	0.0103	45.713
ABJFA21AB	A	MH2	1	2	46.197	0.153	15	0.0102	LGM	0.0102	46.649
ABJFB212B	B	MH2	2	2	44.501	0.154	15	0.0103	LGM	0.0103	45.363
ABJFB213B	B	MH2	2	2	43.679	0.155	15	0.0103	LGM	0.0103	44.568
ABJFB214B	B	MH2	2	2	42.845	0.155	15	0.0103	LGM	0.0103	43.769
ABJFB111B	B	MH1	2	1	44.843	0.154	15	0.0102	LGM	0.0102	45.465
ABJFB112B	B	MH1	2	1	44.952	0.154	15	0.0103	LGM	0.0103	45.659
ABJFB113B	B	MH1	2	1	44.040	0.155	15	0.0104	LGM	0.0104	45.135
ABJFC112B	C	MH1	3	1	43.133	0.160	15	0.0107	LGM	0.0107	45.582
ABJFC113B	C	MH1	3	1	42.630	0.160	15	0.0107	LGM	0.0107	45.088
ABJFC114B	C	MH1	3	1	42.880	0.160	15	0.0107	LGM	0.0107	45.309
ABJFC211B	C	MH2	3	2	42.407	0.156	15	0.0104	LGM	0.0104	43.699
ABJFC212B	C	MH2	3	2	41.231	0.157	15	0.0104	LGM	0.0104	42.623
ABJFC213B	C	MH2	3	2	40.133	0.157	15	0.0105	LGM	0.0105	41.670
ABJFC214B	C	MH2	3	2	39.576	0.157	15	0.0105	LGM	0.0105	40.991

Average	**43.495**	**Average**	**0.0104**	**$Average_{norm}$**	**0.0104**	**44.694**
Standard Dev.	**1.731**			**$Standard\ Dev._{norm}$**		**1.502**
Coeff. of Var. [%]	**3.981**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**3.360**
Min.	**39.576**	**Min.**	**0.0102**	**Min.**	**0.0102**	**40.991**
Max.	**46.197**	**Max.**	**0.0107**	**Max.**	**0.0107**	**46.649**
Number of Spec.	**20**			**Number of Spec.**		**20**

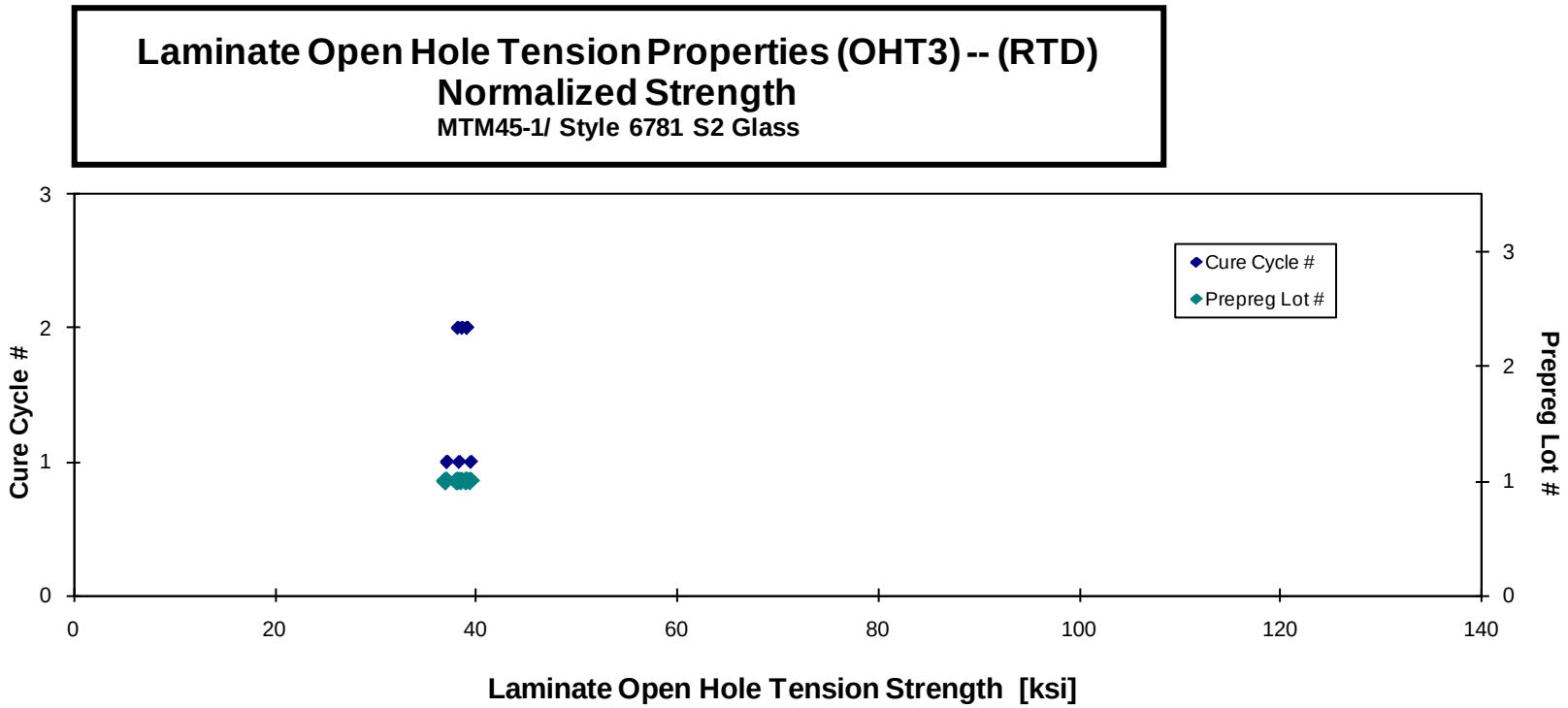

Laminate Open Hole Tension Properties (OHT3) -- (CTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Tension Strength [ksi]
0
1
2
3
0
20
40
60
80
100
120
140

Laminate Open Hole Tension Properties (OHT3) -- (RTD)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJFA211A	A	MH1	1	1	37.897	0.153	15	0.0102	LGM	0.0102	38.281
ABJFA212A	A	MH1	1	1	38.804	0.154	15	0.0103	LGM	0.0103	39.461
ABJFA213A	A	MH1	1	1	36.375	0.154	15	0.0103	LGM	0.0103	37.039
ABJFA214A	A	MH1	1	1	36.230	0.155	15	0.0103	LGM	0.0103	37.051
ABJFA112A	A	MH2	1	2	38.567	0.153	15	0.0102	LGM	0.0102	39.072
ABJFA113A	A	MH2	1	2	37.431	0.154	15	0.0103	LGM	0.0103	38.135
ABJFA114A	A	MH2	1	2	38.012	0.154	15	0.0102	LGM	0.0102	38.572
ABJFA115A	A	MH2	1	2	38.409	0.154	15	0.0103	LGM	0.0103	39.060

Average	**37.715**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**38.334**
Standard Dev.	**0.971**			**$Standard\ Dev._{norm}$**		**0.908**
Coeff. of Var. [%]	**2.574**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.367**
Min.	**36.230**	**Min.**	**0.0102**	**Min.**	**0.0102**	**37.039**
Max.	**38.804**	**Max.**	**0.0103**	**Max.**	**0.0103**	**39.461**
Number of Spec.	**8**			**Number of Spec.**		**8**

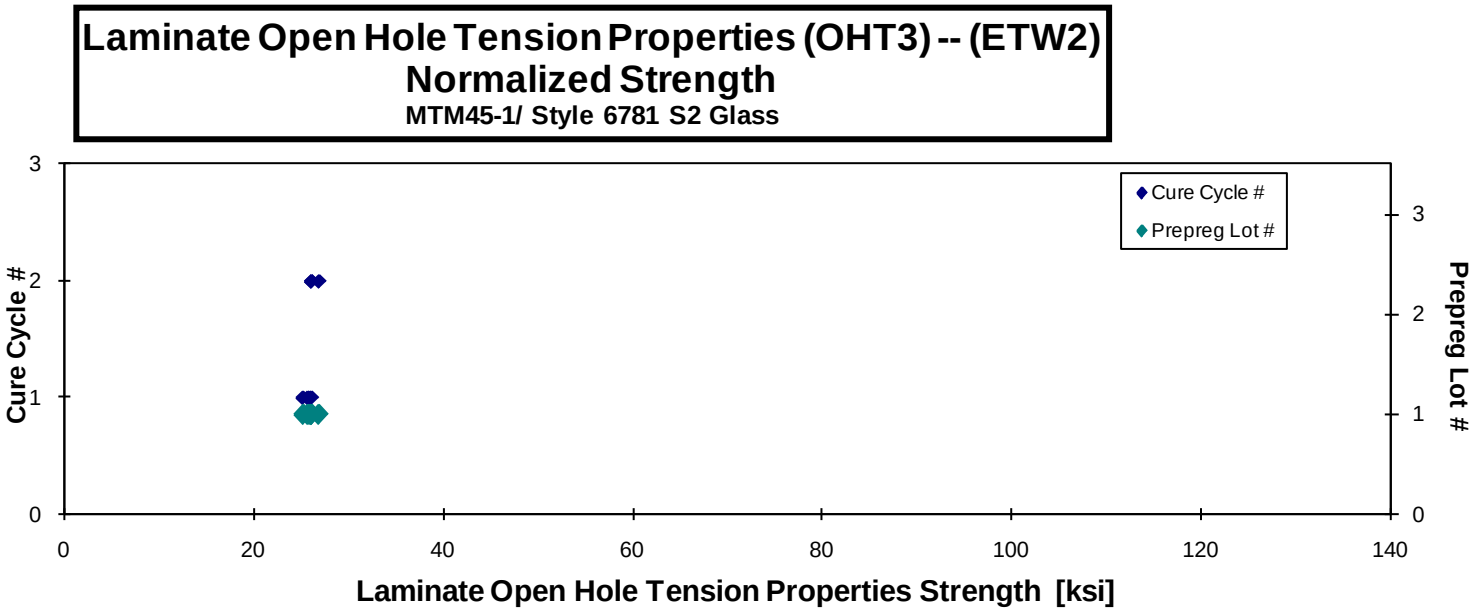

Laminate Open Hole Tension Properties (OHT3) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
20
40
60
80
100
120
140
Laminate Open Hole Tension Strength [ksi]

Laminate Open Hole Tension Properties (OHT3) -- (ETW2)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJFA11BD	A	MH1	1	1	25.367	0.155	15	0.0103	LGM	0.0103	25.900
ABJFA11CD	A	MH1	1	1	25.294	0.154	15	0.0103	LGM	0.0103	25.698
ABJFA11DD	A	MH1	1	1	24.741	0.154	15	0.0103	LGM	0.0103	25.220
ABJFA11ED	A	MH1	1	1	25.788	0.153	15	0.0102	LGM	0.0102	26.114
ABJFA21CD	A	MH2	1	2	26.757	0.152	15	0.0101	LGM	0.0101	26.871
ABJFA21DD	A	MH2	1	2	26.148	0.151	15	0.0101	LGM	0.0101	26.108
ABJFA21ED	A	MH2	1	2	26.334	0.150	15	0.0100	LGM	0.0100	26.085

Average	**25.776**	**Average**	**0.0102**	**$Average_{norm}$**	**0.0102**	**25.999**
Standard Dev.	**0.693**			**$Standard\ Dev._{norm}$**		**0.500**
Coeff. of Var. [%]	**2.689**			**Coeff. of Var. [%]$_{norm}$**		**1.923**
Min.	**24.741**	**Min.**	**0.0100**	**Min.**	**0.0100**	**25.220**
Max.	**26.757**	**Max.**	**0.0103**	**Max.**	**0.0103**	**26.871**
Number of Spec.	**7**			**Number of Spec.**		**7**


Laminate Open Hole Tension Properties (OHT3) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
20
40
60
80
100
120
140
Laminate Open Hole Tension Properties Strength [ksi]

4.13 Filled Hole Tension 1 Properties

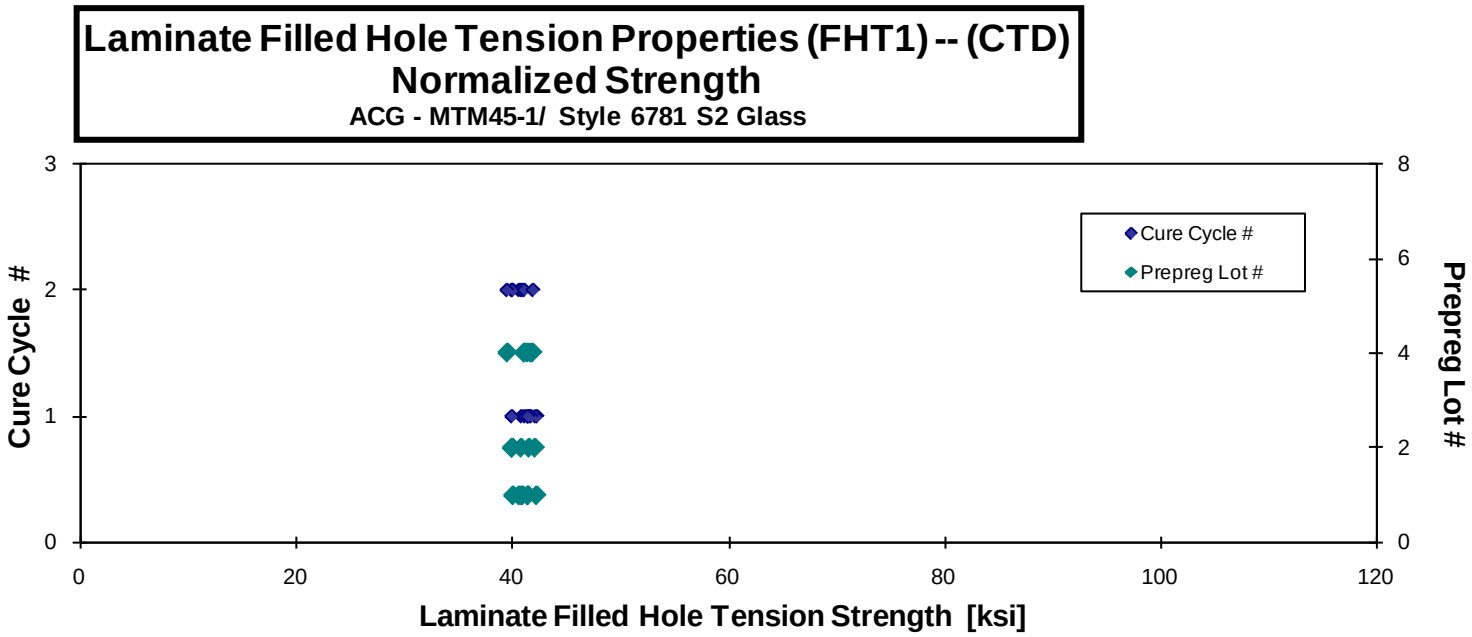
Laminate Filled Hole Tension Properties 1 (FHT1) -- (CTD) Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJ4A111B	A	MH1	1	1	41.244	0.122	12	0.0102	LGM	0.0102	41.499
ABJ4A113B	A	MH1	1	1	41.638	0.123	12	0.0103	LGM	0.0103	42.296
ABJ4A114B	A	MH1	1	1	41.030	0.123	12	0.0102	LGM	0.0102	41.498
ABJ4A17AB*	A	MH1	1	1	40.818	0.121	12	0.0101	LGM	0.0101	40.902
ABJ4A215B	A	MH2	1	2	39.654	0.123	12	0.0102	LGM	0.0102	40.133
ABJ4A216B	A	MH2	1	2	40.630	0.122	12	0.0102	LGM	0.0102	41.021
ABJ4A217B	A	MH2	1	2	40.238	0.123	12	0.0102	LGM	0.0102	40.680
ABJ4B114B	B	MH1	2	1	39.146	0.124	12	0.0103	LGM	0.0103	40.039
ABJ4B115B	B	MH1	2	1	41.036	0.124	12	0.0104	LGM	0.0104	42.148
ABJ4B116B	B	MH1	2	1	40.483	0.125	12	0.0104	LGM	0.0104	41.602
ABJ4B213B	B	MH2	2	2	38.970	0.125	12	0.0104	LGM	0.0104	40.042
ABJ4B214B	B	MH2	2	2	39.984	0.124	12	0.0103	LGM	0.0103	40.875
ABJ4B215B	B	MH2	2	2	39.209	0.124	12	0.0103	LGM	0.0103	40.061
ABJ4D112B	D	MH1	4	1	40.086	0.125	12	0.0104	LGM	0.0104	41.194
ABJ4D113B	D	MH1	4	1	40.879	0.124	12	0.0103	LGM	0.0103	41.756
ABJ4D116B	D	MH1	4	1	40.953	0.123	12	0.0102	LGM	0.0102	41.466
ABJ4D212B	D	MH2	4	2	40.322	0.125	12	0.0104	LGM	0.0104	41.431
ABJ4D213B	D	MH2	4	2	40.812	0.125	12	0.0104	LGM	0.0104	42.108
ABJ4D216B	D	MH2	4	2	38.654	0.124	12	0.0103	LGM	0.0103	39.606

* ABJ4A17AB renamed from ABJ7A11A.

Average	**40.304**	**Average**	**0.0103**	**$Average_{norm}$**	**41.071**
Standard Dev.	**0.842**			**$Standard\ Dev._{norm}$**	**0.801**
Coeff. of Var. [%]	**2.089**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**	**1.950**
Min.	**38.654**	**Min.**	**0.0101**	**Min.**	**39.606**
Max.	**41.638**	**Max.**	**0.0104**	**Max.**	**42.296**
Number of Spec.	**19**			**Number of Spec.**	**19**

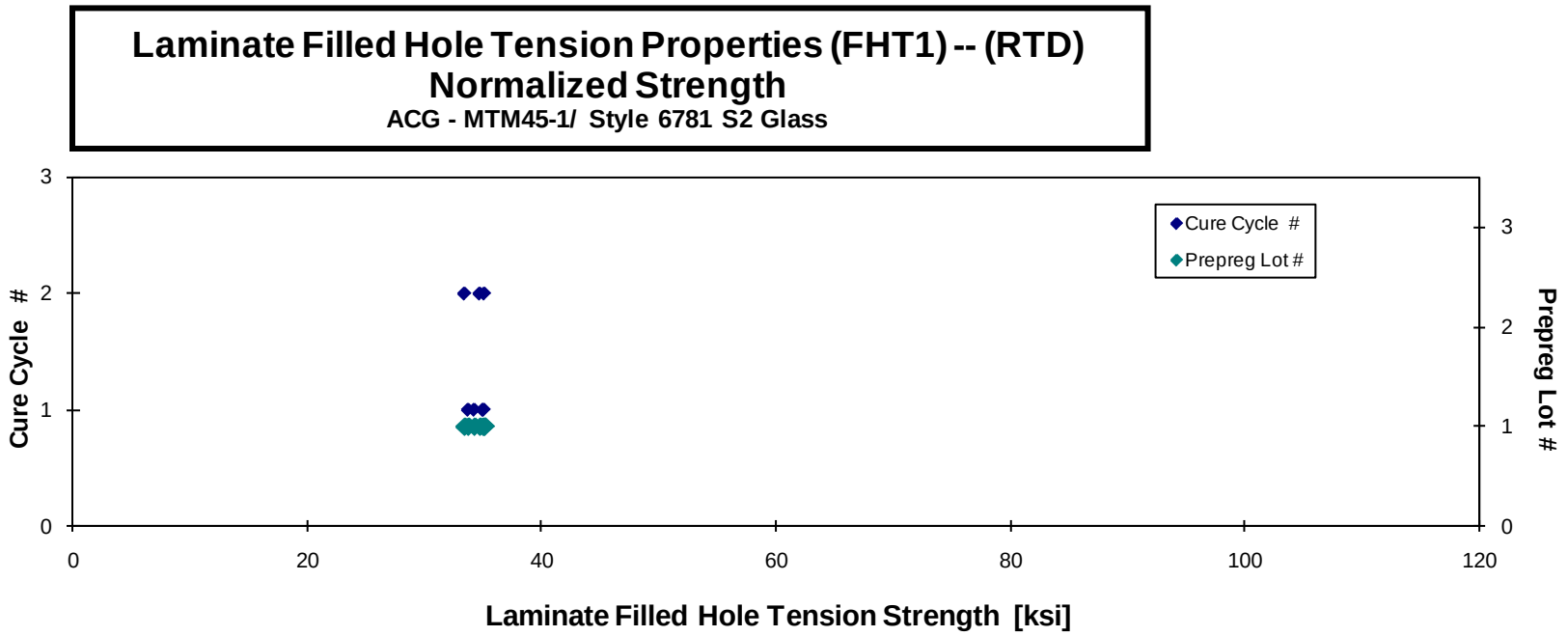

Laminate Filled Hole Tension Properties (FHT1) -- (CTD)
Normalized Strength
ACG - MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
2
4
6
8
0
20
40
60
80
100
120
Laminate Filled Hole Tension Strength [ksi]

Laminate Filled Hole Tension Properties 1 (FHT1) -- (RTD)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJ4A211A	A	MH2	1	2	34.560	0.122	12	0.0101	LGM	0.0101	34.712
ABJ4A212A	A	MH2	1	2	34.756	0.122	12	0.0102	LGM	0.0102	35.100
ABJ4A213A	A	MH2	1	2	33.031	0.123	12	0.0102	LGM	0.0102	33.422
ABJ4A115A	A	MH1	1	1	33.868	0.123	12	0.0102	LGM	0.0102	34.250
ABJ4A116A	A	MH1	1	1	34.387	0.123	12	0.0103	LGM	0.0103	34.983
ABJ4A117A	A	MH1	1	1	34.897	0.122	12	0.0102	LGM	0.0102	35.070
ABJ4A118A	A	MH1	1	1	33.391	0.122	12	0.0102	LGM	0.0102	33.735

Average	**34.127**	**Average**	**0.0102**	**$Average_{norm}$**	**0.0102**	**34.467**
Standard Dev.	**0.713**			**$Standard\ Dev._{norm}$**		**0.679**
Coeff. of Var. [%]	**2.090**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.969**
Min.	**33.031**	**Min.**	**0.0101**	**Min.**	**0.0101**	**33.422**
Max.	**34.897**	**Max.**	**0.0103**	**Max.**	**0.0103**	**35.100**
Number of Spec.	**7**			**Number of Spec.**		**7**


Laminate Filled Hole Tension Properties (FHT1) -- (RTD)
Normalized Strength
ACG - MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
20
40
60
80
100
120
Laminate Filled Hole Tension Strength [ksi]

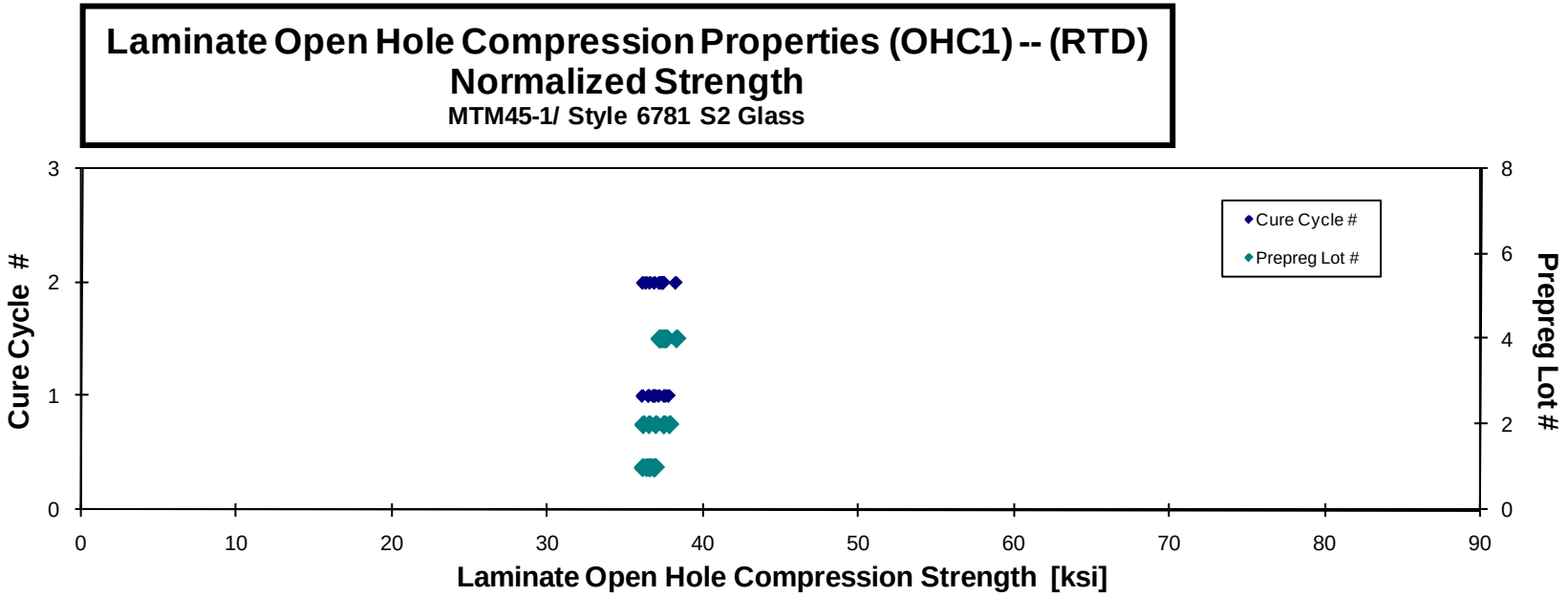
4.14 Open Hole Compression 1 Properties

Laminate Open Hole Compression Properties (OHC1) -- (RTD)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJGA111A	A	MH1	1	1	37.323	0.120	12	0.0100	LGM	0.0100	36.831
ABJGA112A	A	MH1	1	1	36.560	0.120	12	0.0100	LGM	0.0100	36.062
ABJGA113A	A	MH1	1	1	36.943	0.120	12	0.0100	LGM	0.0100	36.481
ABJGA114A	A	MH1	1	1	37.097	0.120	12	0.0100	LGM	0.0100	36.786
ABJGA211A	A	MH2	1	2	36.607	0.120	12	0.0100	LGM	0.0100	36.310
ABJGA212A	A	MH2	1	2	36.479	0.121	12	0.0101	LGM	0.0101	36.560
ABJGA213A	A	MH2	1	2	36.621	0.122	12	0.0102	LGM	0.0102	36.863
ABJGB111A	B	MH1	2	1	35.225	0.126	12	0.0105	LGM	0.0105	36.475
ABJGB112A	B	MH1	2	1	35.621	0.126	12	0.0105	LGM	0.0105	36.914
ABJGB113A	B	MH1	2	1	36.604	0.125	12	0.0104	LGM	0.0104	37.797
ABJGB211A	B	MH2	2	2	35.159	0.124	12	0.0104	LGM	0.0104	36.096
ABJGB212A	B	MH2	2	2	36.408	0.125	12	0.0104	LGM	0.0104	37.430
ABJGB213A	B	MH2	2	2	36.465	0.125	12	0.0104	LGM	0.0104	37.458
ABJGD111A	D	MH1	4	1	35.867	0.127	12	0.0106	LGM	0.0106	37.504
ABJGD112A	D	MH1	4	1	35.646	0.126	12	0.0105	LGM	0.0105	37.151
ABJGD113A	D	MH1	4	1	36.069	0.126	12	0.0105	LGM	0.0105	37.607
ABJGD211A	D	MH2	4	2	36.385	0.124	12	0.0103	LGM	0.0103	37.175
ABJGD212A	D	MH2	4	2	37.433	0.124	12	0.0103	LGM	0.0103	38.257
ABJGD213A	D	MH2	4	2	36.466	0.124	12	0.0104	LGM	0.0104	37.384
ABJGD214A	D	MH2	4	2	36.511	0.124	12	0.0103	LGM	0.0103	37.264

Average	**36.374**	**Average**	**0.0103**	**$Average_{norm}$** **0.0103** **37.020**
Standard Dev.	**0.623**			**$Standard\ Dev._{norm}$** **0.585**
Coeff. of Var. [%]	**1.712**			**$Coeff.\ of\ Var.\ [\%]_{norm}$** **1.581**
Min.	**35.159**	**Min.**	**0.0100**	**Min.** **0.0100** **36.062**
Max.	**37.433**	**Max.**	**0.0106**	**Max.** **0.0106** **38.257**
Number of Spec.	**20**			**Number of Spec.** **20**

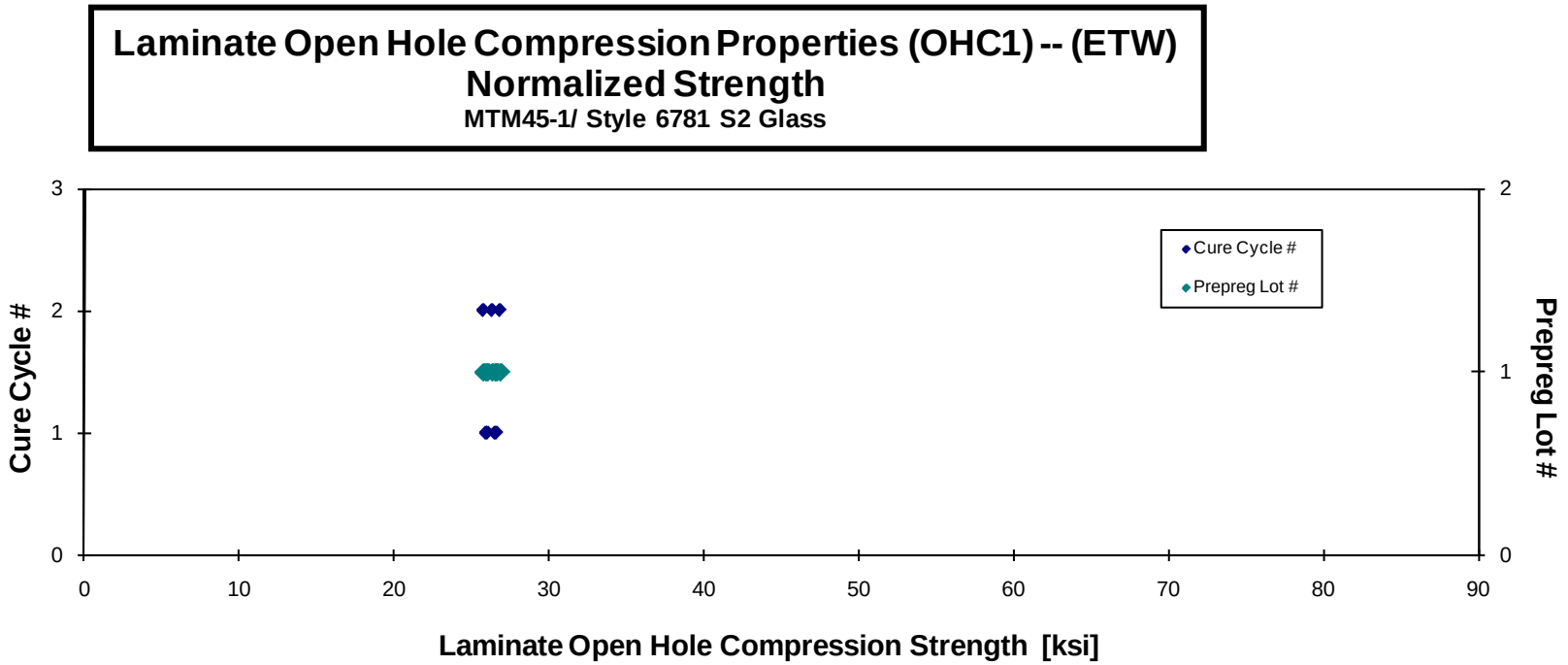

Laminate Open Hole Compression Properties (OHC1) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
1
2
3
0
2
4
6
8
0
10
20
30
40
50
60
70
80
90

Laminate Open Hole Compression Properties (OHC1) -- (ETW)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJGA11AN	A	MH1	1	1	26.315	0.120	12	0.0100	LGM	0.0100	26.040
ABJGA11BN	A	MH1	1	1	26.664	0.121	12	0.0101	LGM	0.0101	26.638
ABJGA11CN	A	MH1	1	1	26.104	0.120	12	0.0100	LGM	0.0100	25.928
ABJGA11DN	A	MH1	1	1	26.809	0.120	12	0.0100	LGM	0.0100	26.537
ABJGA219N	A	MH2	1	2	26.496	0.123	12	0.0102	LGM	0.0102	26.864
ABJGA21BN	A	MH2	1	2	25.950	0.123	12	0.0103	LGM	0.0103	26.339
ABJGA21CN	A	MH2	1	2	25.492	0.122	12	0.0102	LGM	0.0102	25.748

Average	**26.261**	**Average**	**0.0101**	**$Average_{norm}$**	**0.0101**	**26.299**
Standard Dev.	**0.453**			**$Standard\ Dev._{norm}$**		**0.408**
Coeff. of Var. [%]	**1.727**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.552**
Min.	**25.492**	**Min.**	**0.0100**	**Min.**	**0.0100**	**25.748**
Max.	**26.809**	**Max.**	**0.0103**	**Max.**	**0.0103**	**26.864**
Number of Spec.	**7**			**Number of Spec.**		**7**

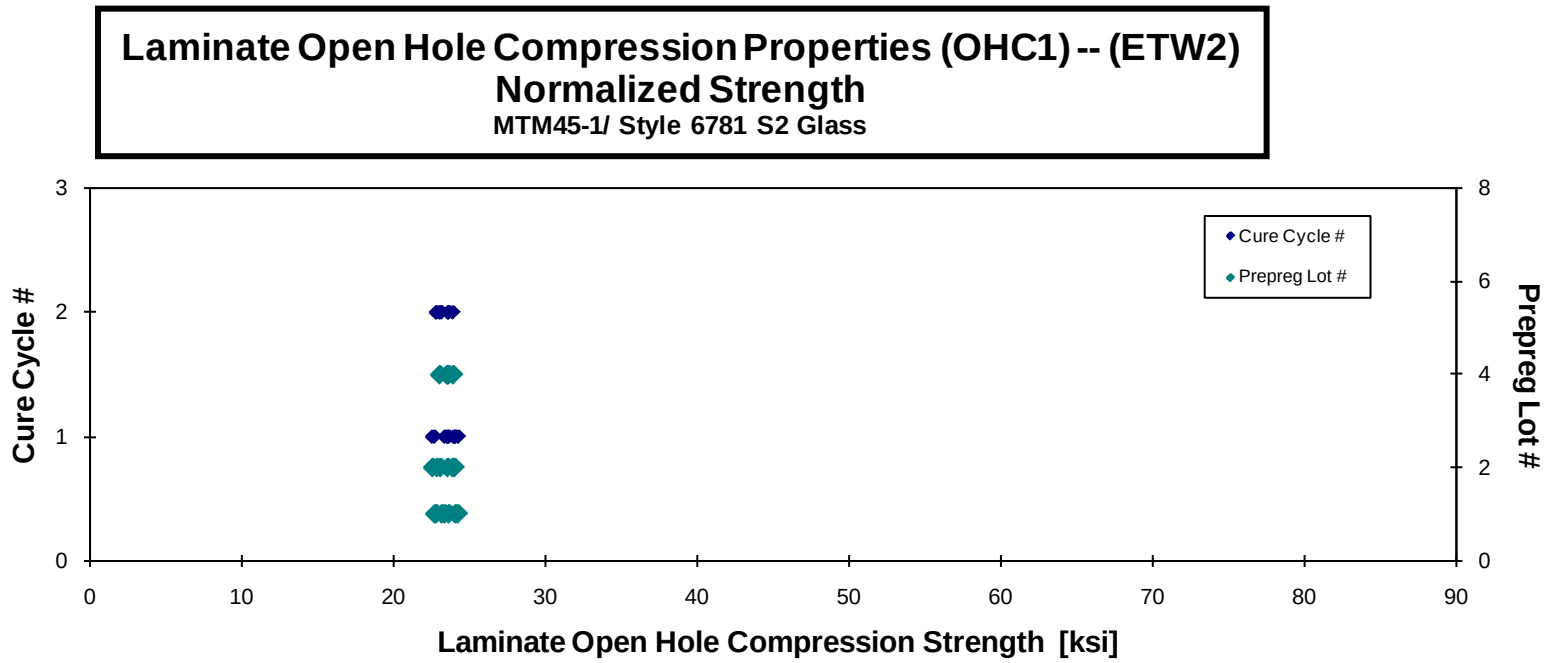

Laminate Open Hole Compression Properties (OHC1) -- (ETW)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
10
20
30
40
50
60
70
80
90
0
1
2
3

Laminate Open Hole Compression Properties (OHC1) -- (ETW2)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJGA115D	A	MH1	1	1	24.278	0.120	12	0.0100	LGM	0.0100	24.111
ABJGA116D	A	MH1	1	1	24.384	0.121	12	0.0101	LGM	0.0101	24.284
ABJGA117D	A	MH1	1	1	23.467	0.121	12	0.0101	LGM	0.0101	23.403
ABJGA118D	A	MH1	1	1	22.809	0.121	12	0.0101	LGM	0.0101	22.753
ABJGA215D	A	MH2	1	2	22.969	0.123	12	0.0102	LGM	0.0102	23.215
ABJGA216D	A	MH2	1	2	23.428	0.123	12	0.0102	LGM	0.0102	23.683
ABJGA217D	A	MH2	1	2	22.465	0.123	12	0.0103	LGM	0.0103	22.851
ABJGB115D	B	MH1	2	1	21.988	0.125	12	0.0104	LGM	0.0104	22.608
ABJGB116D	B	MH1	2	1	23.325	0.125	12	0.0104	LGM	0.0104	24.066
ABJGB117D	B	MH1	2	1	22.611	0.127	12	0.0105	LGM	0.0105	23.600
ABJGB215D	B	MH2	2	2	23.359	0.124	12	0.0103	LGM	0.0103	23.928
ABJGB216D	B	MH2	2	2	22.378	0.124	12	0.0103	LGM	0.0103	22.905
ABJGB217D	B	MH2	2	2	22.679	0.124	12	0.0103	LGM	0.0103	23.128
ABJGD115D	D	MH1	4	1	22.705	0.126	12	0.0105	LGM	0.0105	23.560
ABJGD116D	D	MH1	4	1	22.741	0.126	12	0.0105	LGM	0.0105	23.689
ABJGD117D	D	MH1	4	1	23.380	0.124	12	0.0104	LGM	0.0104	23.968
ABJGD215D	D	MH2	4	2	22.586	0.124	12	0.0103	LGM	0.0103	23.076
ABJGD216D	D	MH2	4	2	23.149	0.124	12	0.0103	LGM	0.0103	23.642
ABJGD217D	D	MH2	4	2	23.174	0.123	12	0.0103	LGM	0.0103	23.607

Average	**23.046**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**23.478**
Standard Dev.	**0.608**			**$Standard\ Dev._{norm}$**		**0.492**
Coeff. of Var. [%]	**2.639**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**2.095**
Min.	**21.988**	**Min.**	**0.0100**	**Min.**	**0.0100**	**22.608**
Max.	**24.384**	**Max.**	**0.0105**	**Max.**	**0.0105**	**24.284**
Number of Spec.	**19**			**Number of Spec.**		**19**


Laminate Open Hole Compression Properties (OHC1) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
2
4
6
8
0
10
20
30
40
50
60
70
80
90
Laminate Open Hole Compression Strength [ksi]

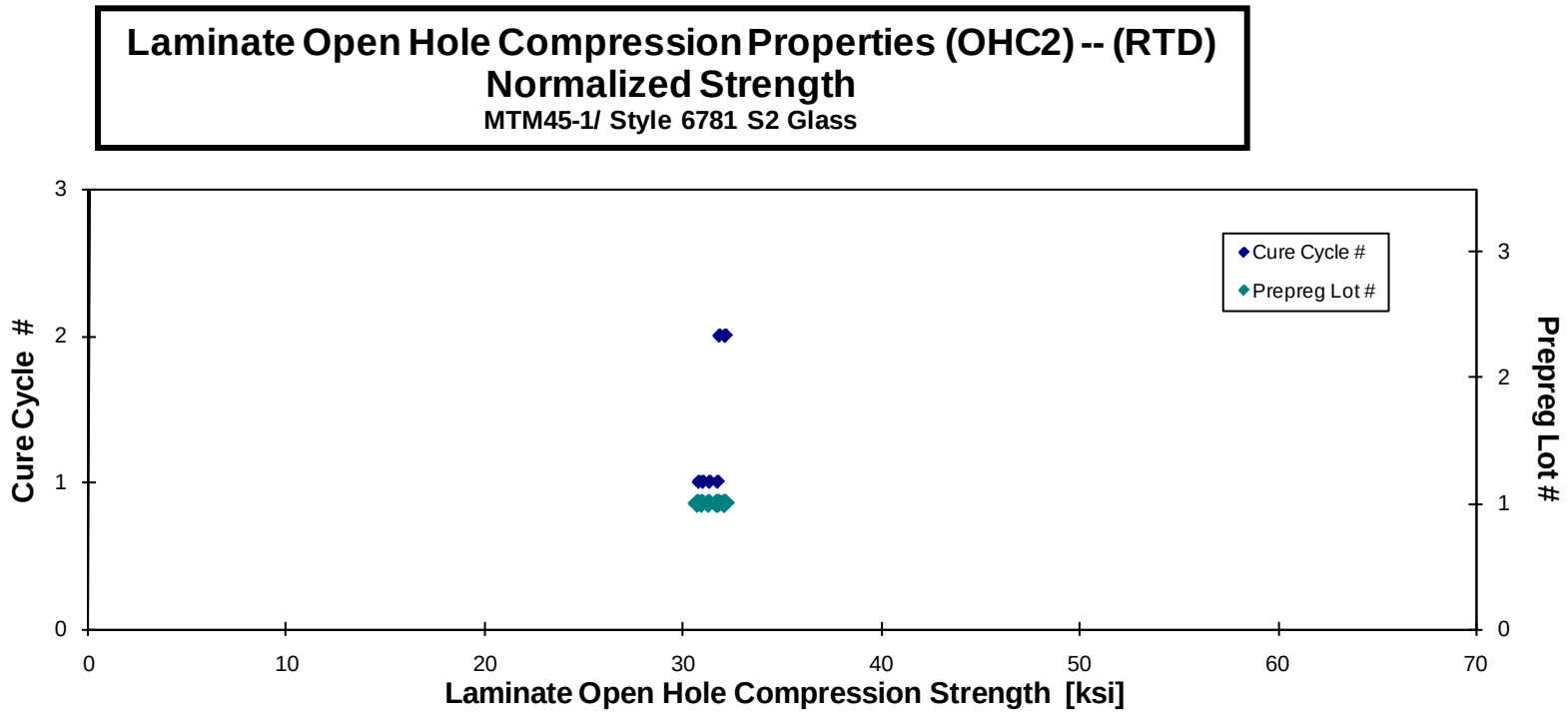
4.15 Open Hole Compression 2 Properties

Laminate Open Hole Compression Properties (OHC2) -- (RTD) Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	Strength$_{norm}$ [ksi]
ABJHA112A	A	MH1	1	1	31.221	0.150	15	0.01002	LGM/AGM	0.0100	30.984
ABJHA113A	A	MH1	1	1	30.889	0.151	15	0.01006	LGM/AGM	0.0101	30.770
ABJHA114A	A	MH1	1	1	31.458	0.151	15	0.01006	LGM	0.0101	31.327
ABJHA115A	A	MH1	1	1	31.845	0.151	15	0.01007	LGM	0.0101	31.737
ABJHA211A	A	MH2	1	2	31.426	0.153	15	0.01023	AGM/LGM	0.0102	31.827
ABJHA212A	A	MH2	1	2	31.653	0.154	15	0.01026	AGM/LGM	0.0103	32.140
ABJHA213A	A	MH2	1	2	31.580	0.154	15	0.01027	AGM/LGM	0.0103	32.112

Average	**31.439**	**Average**	**0.0101**	**Average$_{norm}$**	**0.0101**	**31.557**
Standard Dev.	**0.311**			**Standard Dev.$_{norm}$**		**0.541**
Coeff. of Var. [%]	**0.990**			**Coeff. of Var. [%]$_{norm}$**		**1.713**
Min.	**30.889**	**Min.**	**0.0100**	**Min.**	**0.0100**	**30.770**
Max.	**31.845**	**Max.**	**0.0103**	**Max.**	**0.0103**	**32.140**
Number of Spec.	**7**			**Number of Spec.**		**7**

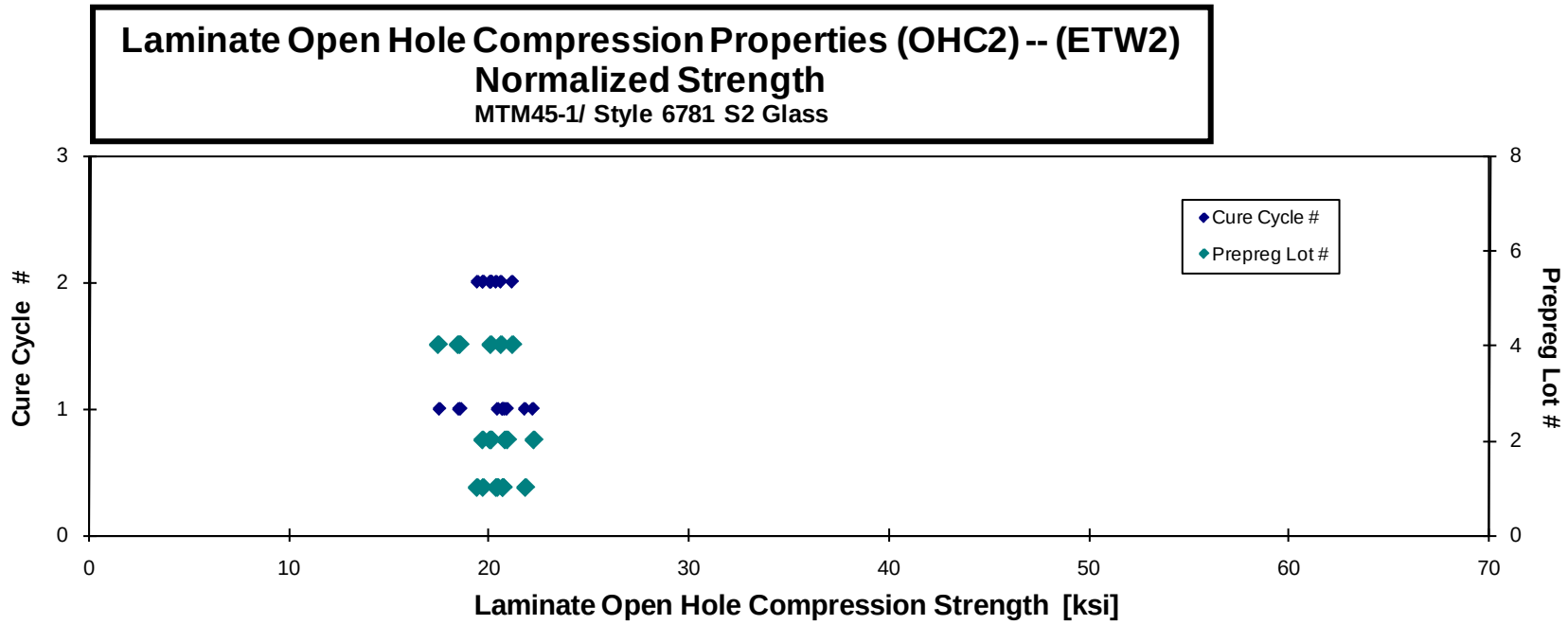

Laminate Open Hole Compression Properties (OHC2) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
10
20
30
40
50
60
70
Laminate Open Hole Compression Strength [ksi]

Laminate Open Hole Compression Properties (OHC2) -- (ETW2)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJHA111D	A	MH1	1	1	20.631	0.150	15	0.0100	LGM	0.0100	20.399
ABJHA116D	A	MH1	1	1	21.827	0.151	15	0.0101	LGM	0.0101	21.774
ABJHA117D	A	MH1	1	1	20.730	0.151	15	0.0101	AGM	0.0101	20.662
ABJHA118D	A	MH1	1	1	20.704	0.151	15	0.0101	AGM	0.0101	20.659
ABJHA215D	A	MH2	1	2	19.490	0.153	15	0.0102	LGM	0.0102	19.679
ABJHA216D	A	MH2	1	2	19.144	0.153	15	0.0102	LGM	0.0102	19.382
ABJHA217D	A	MH2	1	2	20.097	0.153	15	0.0102	LGM	0.0102	20.327
ABJHB111D	B	MH1	2	1	21.714	0.155	15	0.0103	LGM/AGM	0.0103	22.185
ABJHB112D	B	MH1	2	1	20.072	0.157	15	0.0105	LGM	0.0105	20.767
ABJHB113D	B	MH1	2	1	20.360	0.155	15	0.0104	LGM	0.0104	20.880
ABJHB211D	B	MH2	2	2	19.084	0.156	15	0.0104	LGM	0.0104	19.658
ABJHB212D	B	MH2	2	2	19.450	0.156	15	0.0104	LGM/AGM	0.0104	20.087
ABJHB213D	B	MH2	2	2	19.386	0.156	15	0.0104	LGM/AGM	0.0104	20.023
ABJHD111D	D	MH1	4	1	17.895	0.157	15	0.0105	LGM/AGM	0.0105	18.535
ABJHD112D	D	MH1	4	1	16.820	0.157	15	0.0105	AGM	0.0105	17.465
ABJHD113D	D	MH1	4	1	17.830	0.157	15	0.0104	AGM	0.0104	18.446
ABJHD211D	D	MH2	4	2	20.348	0.157	15	0.0105	LGM	0.0105	21.136
ABJHD213D	D	MH2	4	2	19.937	0.156	15	0.0104	LGM	0.0104	20.568
ABJHD214D	D	MH2	4	2	19.275	0.158	15	0.0105	LGM	0.0105	20.058

Average	**19.726**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**20.142**
Standard Dev.	**1.266**			**$Standard\ Dev._{norm}$**		**1.137**
Coeff. of Var. [%]	**6.417**	**Min.**	**0.0100**	**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.643**
Min.	**16.820**	**Max.**	**0.0105**	**Min.**	**0.0100**	**17.465**
Max.	**21.827**			**Max.**	**0.0105**	**22.185**
Number of Spec.	**19**			**Number of Spec.**		**19**


Laminate Open Hole Compression Properties (OHC2) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
1
2
3
0
2
4
6
8
0
10
20
30
40
50
60
70

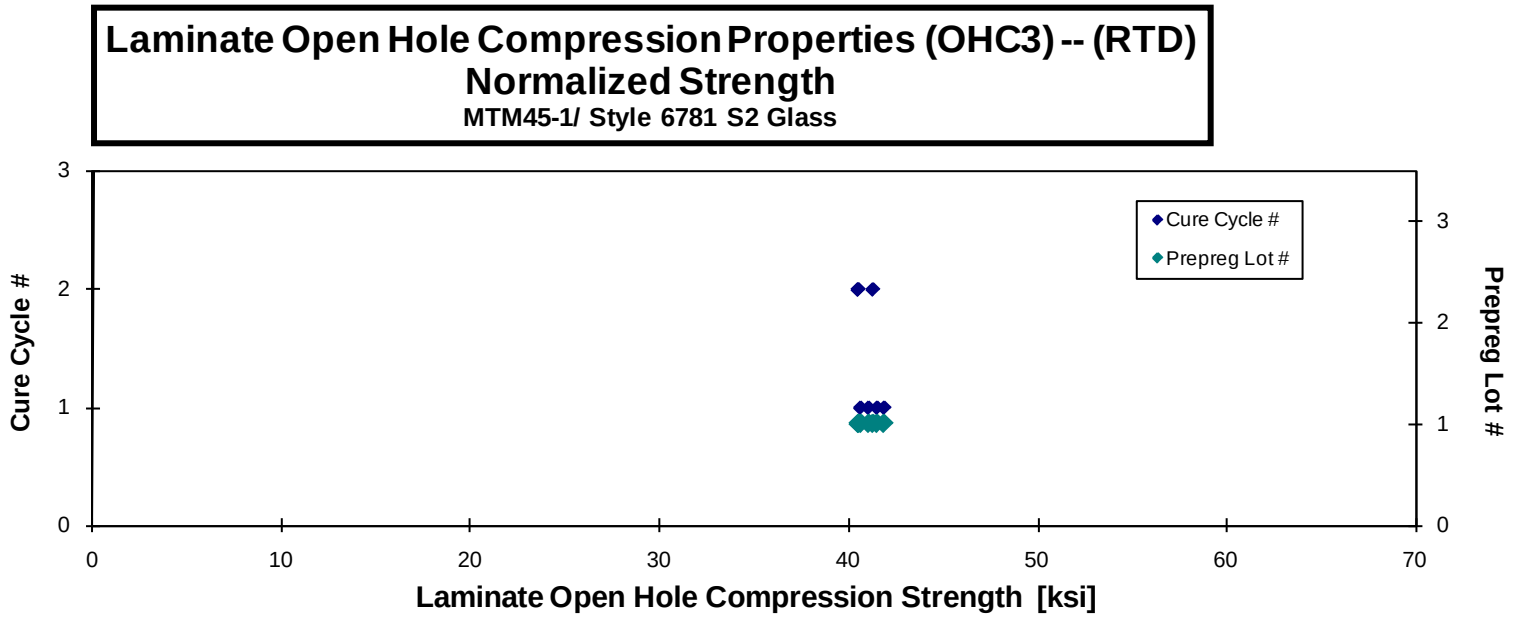
4.16 Open Hole Compression 3 Properties

Laminate Open Hole Compression Properties (OHC3) -- (RTD) Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJIA111A	A	MH1	1	1	40.480	0.152	15	0.0101	LGM	0.0101	40.667
ABJIA112A	A	MH1	1	1	41.633	0.152	15	0.0102	LGM	0.0102	41.890
ABJIA113A	A	MH1	1	1	41.353	0.152	15	0.0101	LGM	0.0101	41.526
ABJIA114A	A	MH1	1	1	40.825	0.152	15	0.0102	LGM	0.0102	41.081
ABJIA211A	A	MH2	1	2	40.813	0.153	15	0.0102	LGM	0.0102	41.307
ABJIA213A	A	MH2	1	2	39.972	0.154	15	0.0102	LGM	0.0102	40.553
ABJIA214A	A	MH2	1	2	40.004	0.154	15	0.0102	LGM	0.0102	40.532

Average	**40.726**	**Average**	**0.0102**	**$Average_{norm}$**	**0.0102**	**41.079**
Standard Dev.	**0.630**			**$Standard\ Dev._{norm}$**		**0.525**
Coeff. of Var. [%]	**1.548**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**1.278**
Min.	**39.972**	**Min.**	**0.0101**	**Min.**	**0.0101**	**40.532**
Max.	**41.633**	**Max.**	**0.0102**	**Max.**	**0.0102**	**41.890**
Number of Spec.	**7**			**Number of Spec.**		**7**

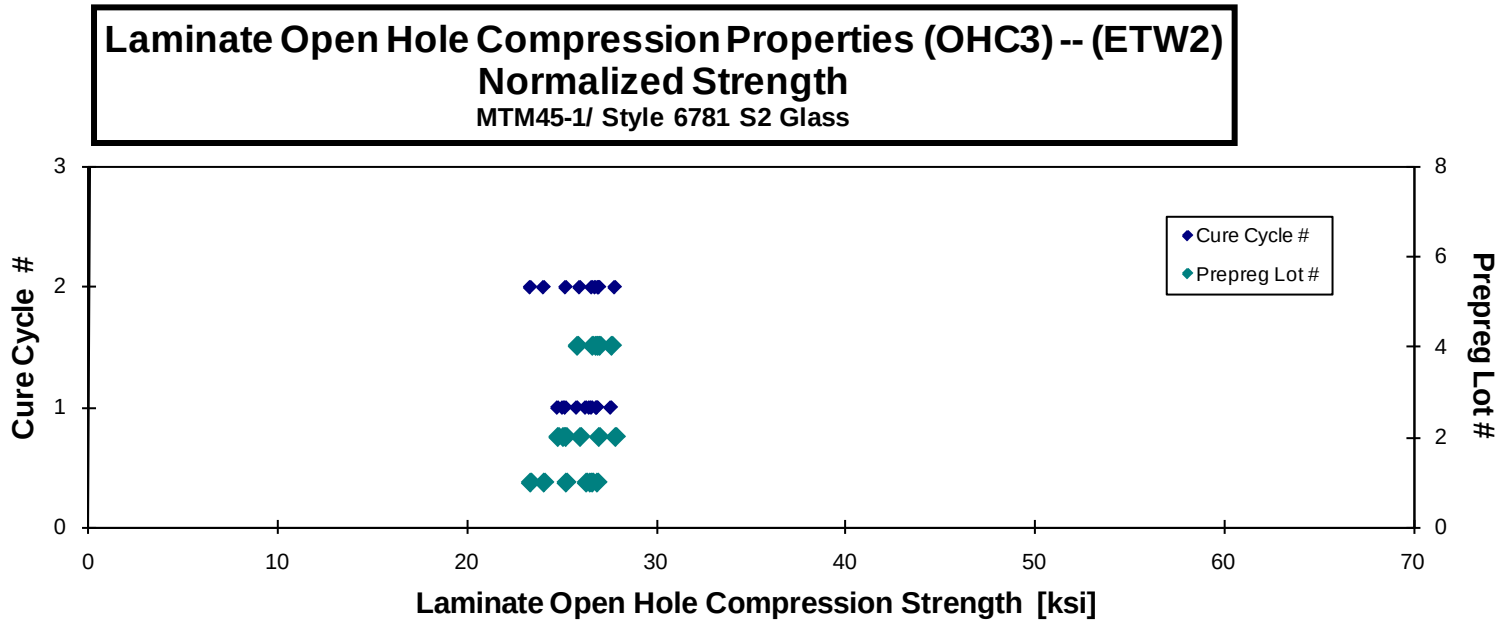

Laminate Open Hole Compression Properties (OHC3) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
10
20
30
40
50
60
70
Laminate Open Hole Compression Strength [ksi]

Laminate Open Hole Compression Properties (OHC3) -- (ETW2)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJIA115D	A	MH1	1	1	26.422	0.152	15	0.0101	LGM	0.0101	26.463
ABJIA116D	A	MH1	1	1	26.287	0.151	15	0.0101	LGM	0.0101	26.267
ABJIA117D	A	MH1	1	1	26.923	0.151	15	0.0101	LGM	0.0101	26.837
ABJIA118D	A	MH1	1	1	26.569	0.152	15	0.0101	LGM	0.0101	26.584
ABJIA215D	A	MH2	1	2	24.984	0.153	15	0.0102	LGM	0.0102	25.204
ABJIA216D	A	MH2	1	2	23.057	0.153	15	0.0102	LGM	0.0102	23.329
ABJIA217D	A	MH2	1	2	23.931	0.152	15	0.0101	LGM	0.0101	24.039
ABJIB113D	B	MH1	2	1	24.307	0.157	15	0.0105	LGM	0.0105	25.190
ABJIB114D	B	MH1	2	1	23.985	0.156	15	0.0104	LGM	0.0104	24.774
ABJIB115D	B	MH1	2	1	24.149	0.157	15	0.0105	LGM	0.0105	25.050
ABJIB211D	B	MH2	2	2	27.352	0.154	15	0.0103	LGM	0.0103	27.804
ABJIB212D	B	MH2	2	2	26.159	0.156	15	0.0104	LGM	0.0104	26.931
ABJIB213D	B	MH2	2	2	25.055	0.157	15	0.0105	LGM	0.0105	25.948
ABJID111D	D	MH1	4	1	25.554	0.153	15	0.0102	LGM	0.0102	25.793
ABJID112D	D	MH1	4	1	26.449	0.154	15	0.0103	LGM	0.0103	26.873
ABJID113D	D	MH1	4	1	27.105	0.154	15	0.0103	LGM	0.0103	27.597
ABJID212D	D	MH2	4	2	25.921	0.155	15	0.0104	LGM	0.0104	26.591
ABJID213D	D	MH2	4	2	26.372	0.155	15	0.0103	LGM	0.0103	26.973
ABJID214D	D	MH2	4	2	26.104	0.155	15	0.0104	LGM	0.0104	26.765

Average	**25.615**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**26.053**
Standard Dev.	**1.235**			**$Standard\ Dev._{norm}$**		**1.186**
Coeff. of Var. [%]	**4.823**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.552**
Min.	**23.057**	**Min.**	**0.0101**	**Min.**	**0.0101**	**23.329**
Max.	**27.352**	**Max.**	**0.0105**	**Max.**	**0.0105**	**27.804**
Number of Spec.	**19**			**Number of Spec.**		**19**


Laminate Open Hole Compression Properties (OHC3) -- (ETW2)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
1
2
3
0
2
4
6
8
0
10
20
30
40
50
60
70

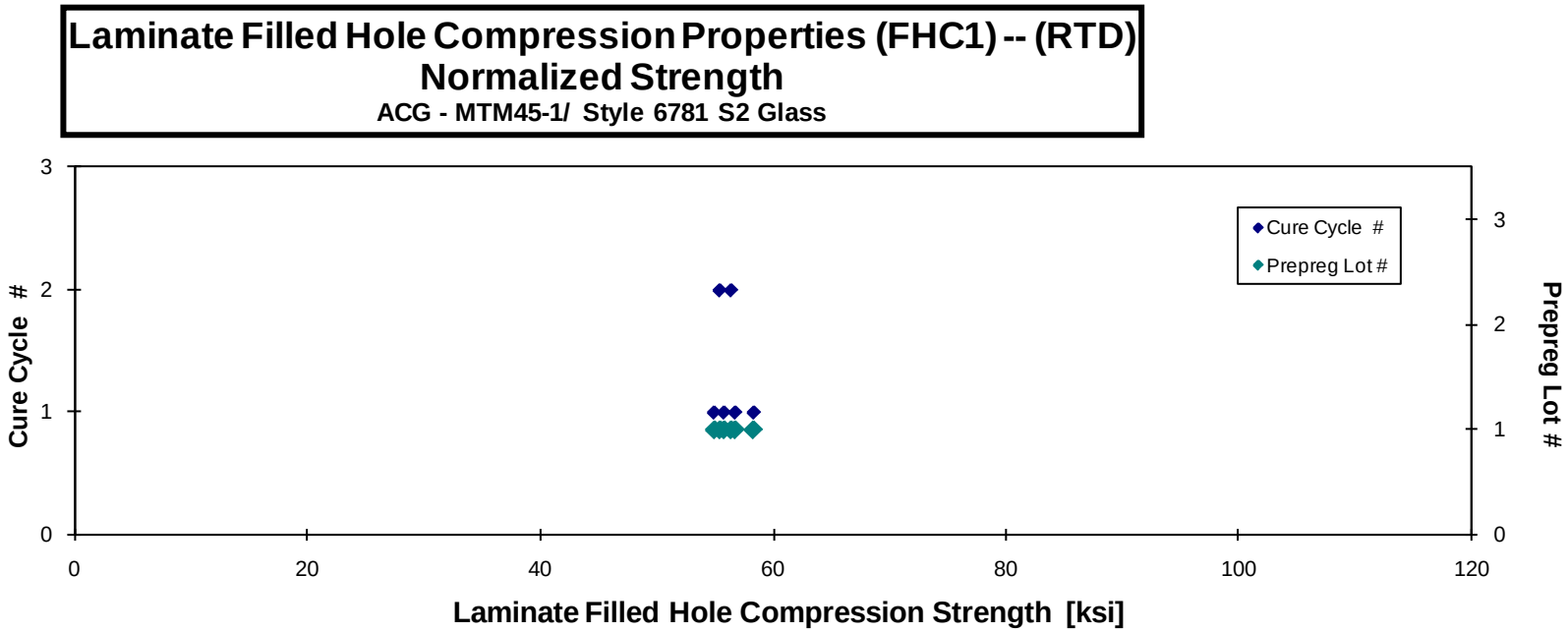
4.17 Filled Hole Compression 1 Properties

Laminate Filled Hole Compression Properties (FHC1) -- (RTD) Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJ7A111A	A	MH1	1	1	56.885	0.121	12	0.0101	LGM	0.0101	56.768
ABJ7A112A	A	MH1	1	1	55.382	0.122	12	0.0102	LGM	0.0102	55.816
ABJ7A113A	A	MH1	1	1	57.859	0.122	12	0.0102	LGM	0.0102	58.345
ABJ7A114A	A	MH1	1	1	54.669	0.122	12	0.0102	LGM	0.0102	54.978
ABJ7A211A	A	MH2	1	2	55.743	0.123	12	0.0102	LGM	0.0102	56.417
ABJ7A212A	A	MH2	1	2	54.577	0.123	12	0.0103	LGM	0.0103	55.455
ABJ7A213A	A	MH2	1	2	53.926	0.123	12	0.0102	LGM	0.0102	54.593

Average	**55.577**	**Average**	**0.0102**	**$Average_{norm}$**	**0.0102**	**56.053**
Standard Dev.	**1.387**			**Standard $Dev._{norm}$**		**1.265**
Coeff. of Var. [%]	**2.495**			**Coeff. of Var. $[\%]_{norm}$**		**2.256**
Min.	**53.926**	**Min.**	**0.0101**	**Min.**	**0.0101**	**54.593**
Max.	**57.859**	**Max.**	**0.0103**	**Max.**	**0.0103**	**58.345**
Number of Spec.	**7**			**Number of Spec.**		**7**

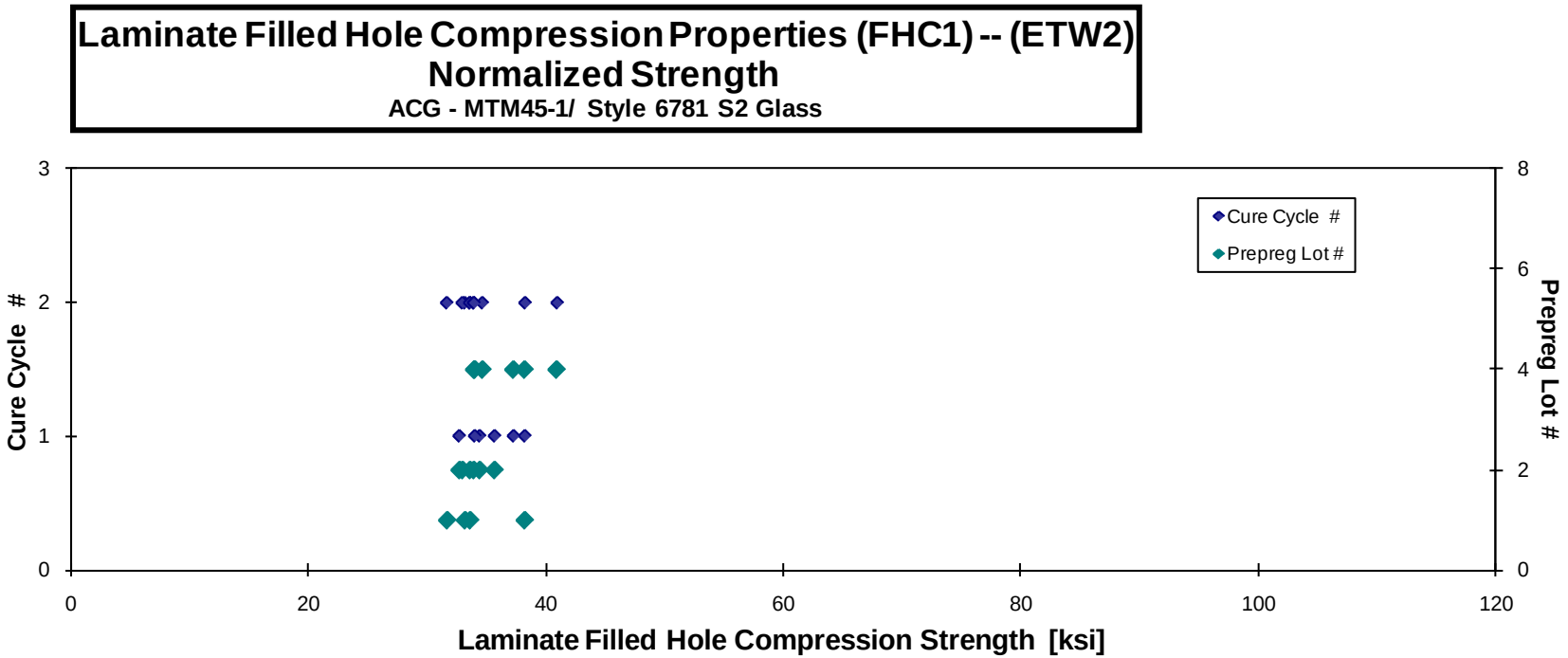

Laminate Filled Hole Compression Properties (FHC1) -- (RTD)
Normalized Strength
ACG - MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Compression Strength [ksi]
0
20
40
60
80
100
120
1
2
3

Laminate Filled Hole Compression Properties (FHC1) -- (ETW2)
Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJ7A115D	A	MH1	1	1	34.003	0.122	12	0.0102	LGM	0.010	34.218
ABJ7A116D	A	MH1	1	1	38.214	0.123	12	0.0102	LGM	0.010	38.776
ABJ7A117D	A	MH1	1	1	35.455	0.123	12	0.0102	LGM	0.010	35.859
ABJ7A118D	A	MH1	1	1	36.829	0.122	12	0.0102	LGM	0.010	37.087
ABJ7A214D	A	MH2	1	2	31.266	0.123	12	0.0102	LGM	0.0102	31.636
ABJ7A215D	A	MH2	1	2	33.132	0.123	12	0.0102	LGM	0.0102	33.583
ABJ7A216D	A	MH2	1	2	37.811	0.123	12	0.0102	LGM	0.0102	38.217
ABJ7A217D	A	MH2	1	2	32.769	0.123	12	0.0102	LGM	0.0102	33.152
ABJ7B111D	B	MH1	2	1	34.441	0.125	12	0.0105	LGM	0.0105	35.654
ABJ7B112D	B	MH1	2	1	33.033	0.126	12	0.0105	LGM	0.0105	34.396
ABJ7B114D	B	MH1	2	1	31.271	0.125	12	0.0104	LGM	0.0104	32.294
ABJ7B211D	B	MH2	2	2	32.119	0.124	12	0.0104	LGM	0.0104	32.940
ABJ7B212D	B	MH2	2	2	32.714	0.124	12	0.0104	LGM	0.0104	33.573
ABJ7B213D	B	MH2	2	2	32.933	0.125	12	0.0104	LGM	0.0104	33.893
ABJ7D112D	D	MH1	4	1	33.016	0.125	12	0.0104	LGM	0.0104	33.988
ABJ7D113D	D	MH1	4	1	37.124	0.125	12	0.0104	LGM	0.0104	38.196
ABJ7D114D	D	MH1	4	1	36.242	0.125	12	0.0104	LGM	0.0104	37.249
ABJ7D213D	D	MH2	4	2	33.495	0.125	12	0.0104	LGM	0.0104	34.623
ABJ7D214D	D	MH2	4	2	39.750	0.125	12	0.0104	LGM	0.0104	40.914
ABJ7D216D	D	MH2	4	2	32.972	0.125	12	0.0104	LGM	0.0104	33.915

Average	**34.429**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**35.208**
Standard Dev.	**2.444**			**$Standard\ Dev._{norm}$**		**2.454**
Coeff. of Var. [%]	**7.099**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**6.969**
Min.	**31.266**	**Min.**	**0.0102**	**Min.**	**0.0102**	**31.636**
Max.	**39.750**	**Max.**	**0.0105**	**Max.**	**0.0105**	**40.914**
Number of Spec.	**20**			**Number of Spec.**		**20**


Laminate Filled Hole Compression Properties (FHC1) -- (ETW2)
Normalized Strength
ACG - MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
2
4
6
8
0
20
40
60
80
100
120
Laminate Filled Hole Compression Strength [ksi]

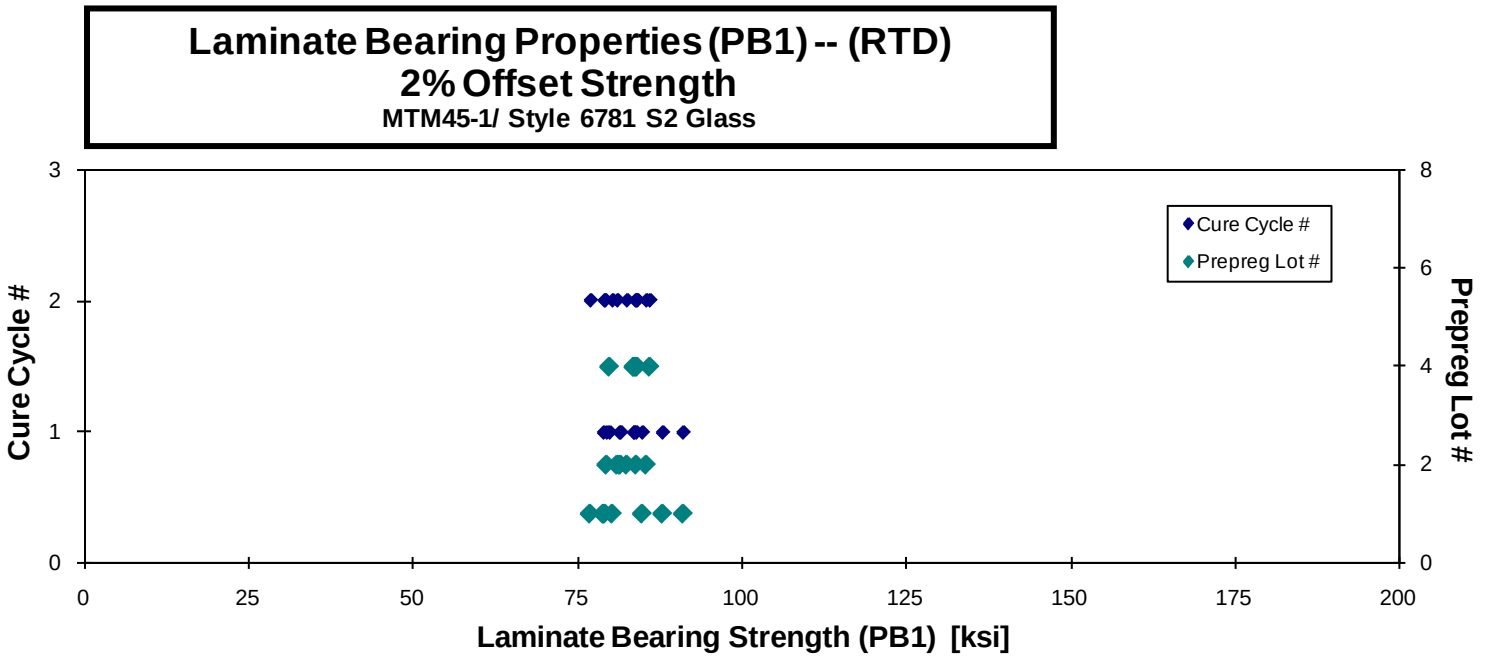
4.18 Pin Bearing 1 Properties

Laminate Bearing Properties (PB1) -- (RTD)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]
ABJ1A111A	A	MH1	1	1	86.851	0.123	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	87.998
ABJ1A112A	A	MH1	1	1	90.010	0.123	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	91.124
ABJ1A113A	A	MH1	1	1	83.652	0.123	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	84.911
ABJ1A114A	A	MH1	1	1	77.768	0.123	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	79.003
ABJ1A115A	A	MH2	1	2	78.122	0.123	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	79.137
ABJ1A211A	A	MH2	1	2	76.406	0.122	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	77.004
ABJ1A212A	A	MH2	1	2	79.193	0.123	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	80.369
ABJ1A213A	A	MH2	1	2	78.153	0.123	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	79.265
ABJ1B112A	B	MH1	2	1	77.125	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	79.511
ABJ1B113A	B	MH1	2	1	79.285	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	81.640
ABJ1B114A	B	MH1	2	1	78.369	0.126	12	0.0105	2% OFFSET FOR UBS* / B1I	0.0105	81.441
ABJ1B115A	B	MH1	2	1	81.201	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	83.998
ABJ1B211A	B	MH2	2	2	80.540	0.124	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	82.567
ABJ1B212A	B	MH2	2	2	83.304	0.124	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	85.520
ABJ1B213A	B	MH2	2	2	79.128	0.124	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	81.103
ABJ1D111A	D	MH1	4	1	82.081	0.123	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	83.621
ABJ1D112A	D	MH1	4	1	78.029	0.124	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	79.944
ABJ1D113A	D	MH1	4	1	79.972	0.127	12	0.0106	2% OFFSET FOR UBS* / B1I	0.0106	83.700
ABJ1D211A	D	MH2	4	2	82.212	0.124	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	84.162
ABJ1D213A	D	MH2	4	2	81.845	0.124	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	83.870
ABJ1D215A	D	MH2	4	2	81.938	0.124	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	84.034
ABJ1D216A	D	MH2	4	2	83.559	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	86.059
									Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)		

Average	**80.852**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**82.726**
Standard Dev.	**3.293**	**Standard Dev.**		**$Standard\ Dev._{norm}$**		**3.317**
Coeff. of Var. [%]	**4.073**	**Coeff. of Var. [%]**		**Coeff. of Var. $[\%]_{norm}$**		**4.009**
Min.	**76.406**	**Min.**	**0.0102**	**Min.**	**0.0102**	**77.004**
Max.	**90.010**	**Max.**	**0.0106**	**Max.**	**0.0106**	**91.124**
Number of Spec.	**22**	**Number of Spec.**	**22**	**Number of Spec.**	**22**	**22**

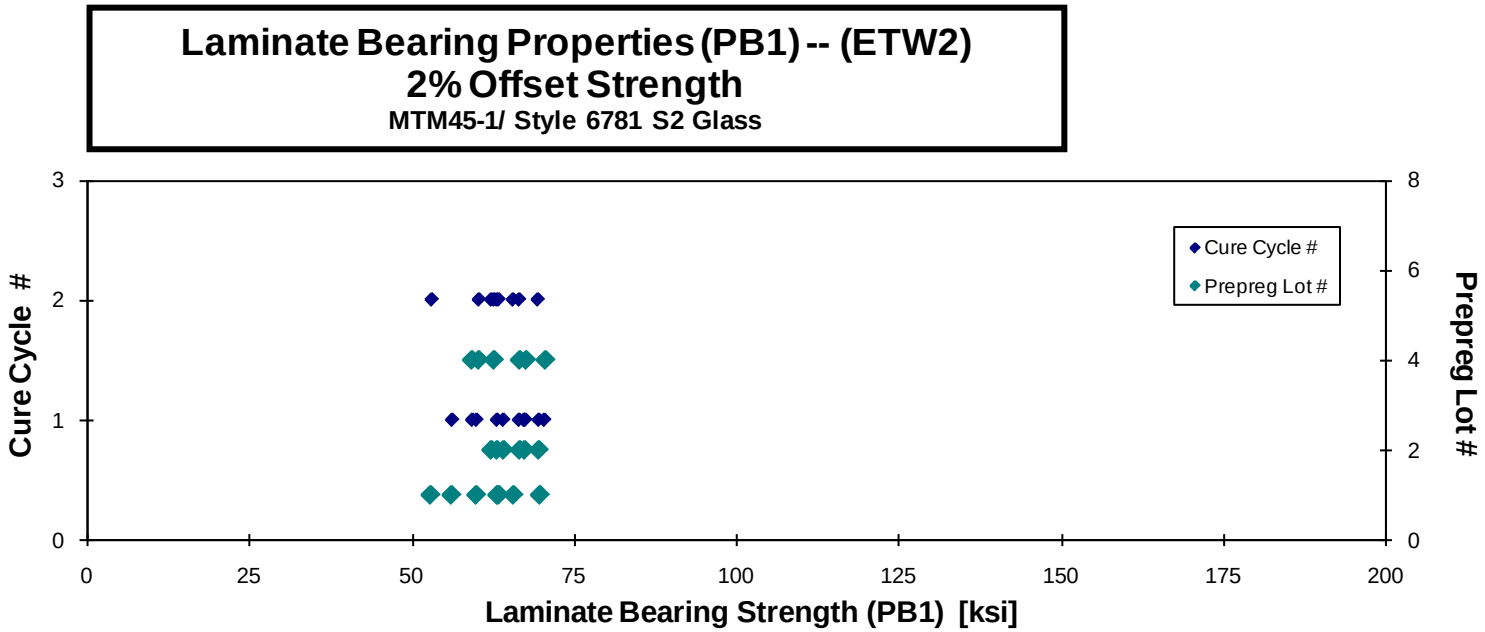

Laminate Bearing Properties (PB1) -- (RTD)
2% Offset Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Bearing Strength (PB1) [ksi]
0
25
50
75
100
125
150
175
200
0
1
2
3
0
2
4
6
8

Laminate Bearing Properties (PB1) -- (ETW2)
Strength & Modulus
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]: 0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Comments	Avg. t_{ply} [in]	2% $Strength_{norm}$ [ksi]
ABJ1A117D	A	MH1	1	1	59.672	0.122	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	60.054
ABJ1A118D	A	MH1	1	1	55.808	0.122	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	56.280
ABJ1A119D	A	MH1	1	1	62.424	0.123	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	63.248
ABJ1A11AD	A	MH1	1	1	68.854	0.123	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	69.734
ABJ1A216D	A	MH2	1	2	52.798	0.122	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	53.103
ABJ1A217D	A	MH2	1	2	65.572	0.121	12	0.0101	2% OFFSET FOR UBS* / B1I	0.0101	65.721
ABJ1A218D	A	MH2	1	2	63.249	0.122	12	0.0101	2% OFFSET FOR UBS* / B1I	0.0101	63.497
ABJ1B116D	B	MH1	2	1	64.573	0.127	12	0.0105	2% OFFSET FOR UBS* / B1I	0.0105	67.423
ABJ1B117D	B	MH1	2	1	64.692	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	66.667
ABJ1B118D	B	MH1	2	1	63.095	0.123	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	64.214
ABJ1B216D	B	MH2	2	2	61.334	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	63.206
ABJ1B217D	B	MH2	2	2	68.029	0.124	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	69.572
ABJ1B218D	B	MH2	2	2	61.466	0.123	12	0.0102	2% OFFSET FOR UBS* / B1I	0.0102	62.341
ABJ1D115D	D	MH1	4	1	57.479	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	59.399
ABJ1D116D	D	MH1	4	1	65.515	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	67.650
ABJ1D117D	D	MH1	4	1	68.549	0.125	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	70.585
ABJ1D217D	D	MH2	4	2	65.053	0.124	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	66.677
ABJ1D218D	D	MH2	4	2	59.305	0.124	12	0.0103	2% OFFSET FOR UBS* / B1I	0.0103	60.430
ABJ1D219D	D	MH2	4	2	61.206	0.124	12	0.0104	2% OFFSET FOR UBS* / B1I	0.0104	62.758
									Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)		

Average	**62.562**	**Average**	**0.0103**	**$Average_{norm}$**	**0.0103**	**63.819**
Standard Dev.	**4.275**	**Standard Dev.**		**$Standard\ Dev._{norm}$**		**4.610**
Coeff. of Var. [%]	**6.833**	**Coeff. of Var. [%]**		**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**7.224**
Min.	**52.798**	**Min.**	**0.0101**	**Min.**	**0.0101**	**53.103**
Max.	**68.854**	**Max.**	**0.0105**	**Max.**	**0.0105**	**70.585**
Number of Spec.	**19**	**Number of Spec.**	**19**	**Number of Spec.**	**19**	**19**


Laminate Bearing Properties (PB1) -- (ETW2)
2% Offset Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Bearing Strength (PB1) [ksi]
0
1
2
3
0
2
4
6
8
0
25
50
75
100
125
150
175
200

4.19 Compression Strength After Impact 1 Properties

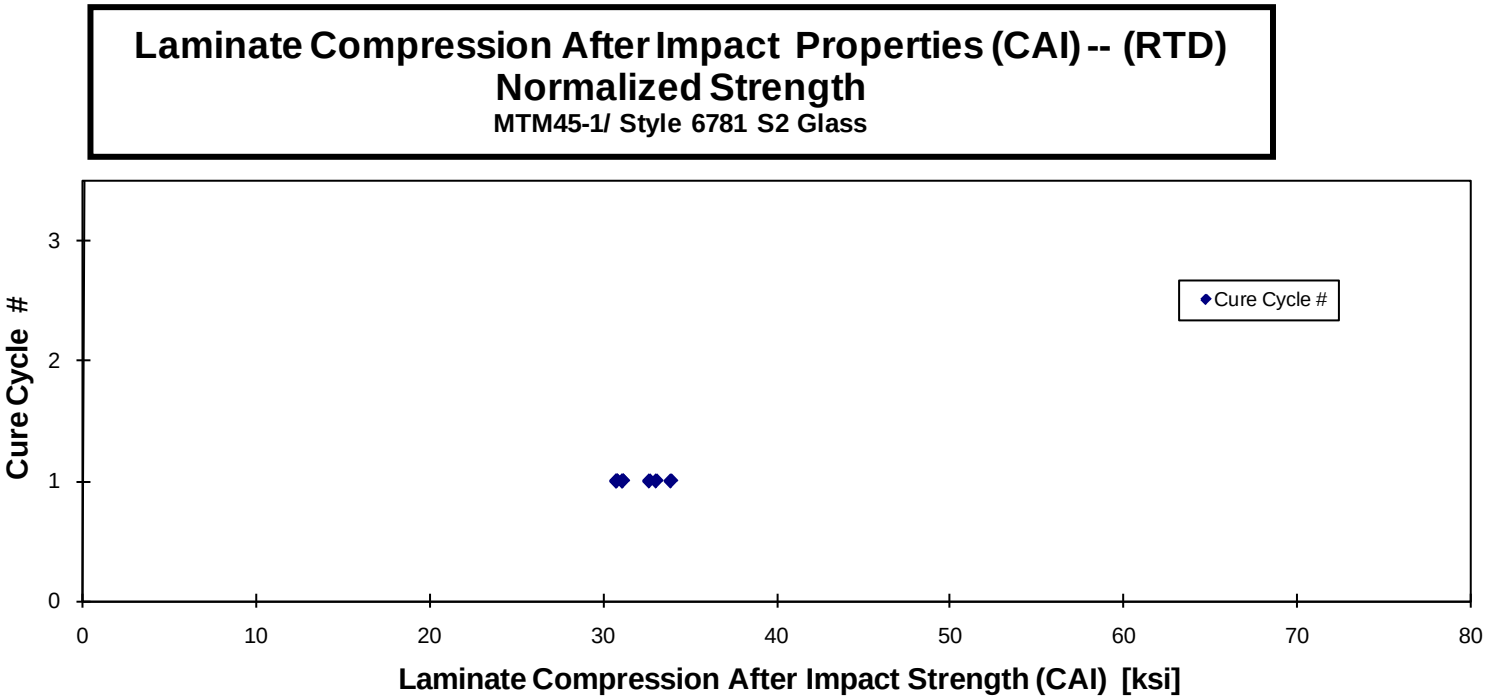
Laminate Compression After Impact Properties (CAI) -- (RTD) Strength
MTM45-1/ Style 6781 S2 Glass

normalizing t_{ply} [in]
0.0101

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Measured Impact Energy (in-lbf)	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
ABJKA111A	A	MH1	1	1	241.36	30.736	0.163	16	LDM	0.0102	31.079
ABJKA112A	A	MH1	1	1	241.40	32.597	0.164	16	LDM	0.0102	32.994
ABJKA113A	A	MH1	1	1	243.18	30.342	0.164	16	LDM	0.0102	30.748
ABJKA114A	A	MH1	1	1	243.55	33.372	0.164	16	LDM	0.0102	33.830
ABJKA115A	A	MH1	1	1	242.90	30.370	0.164	16	LDM	0.0102	30.727
ABJKA116A	A	MH1	1	1	244.86	30.755	0.163	16	LDM	0.0102	31.081
ABJKA117A	A	MH1	1	1	244.06	32.534	0.162	16	LDM	0.0101	32.605

Average	**31.529**	
Standard Dev.	**1.260**	
Coeff. of Var. [%]	**3.997**	
Min.	**30.342**	
Max.	**33.372**	
Number of Spec.	**7**	

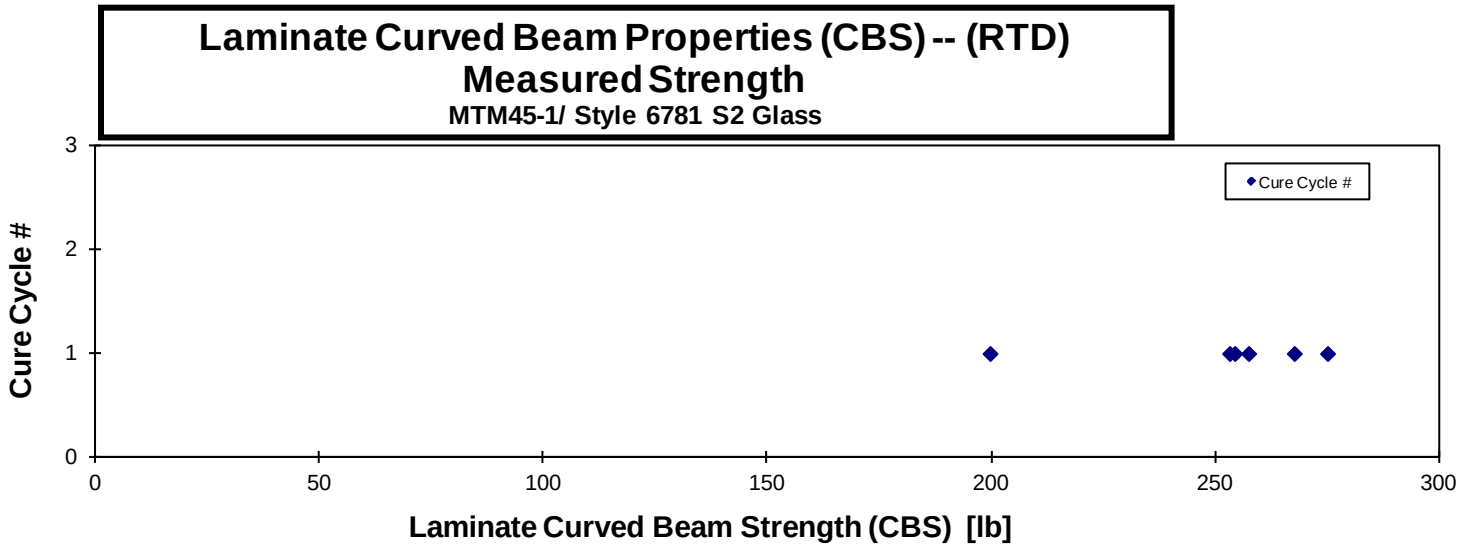
$Average_{norm}$	**0.01021**	**31.866**
Standard $Dev._{norm}$		**1.255**
Coeff. of Var. $[\%]_{norm}$		**3.940**
Min.	**0.0101**	**30.727**
Max.	**0.0102**	**33.830**
Number of Spec.		**7**

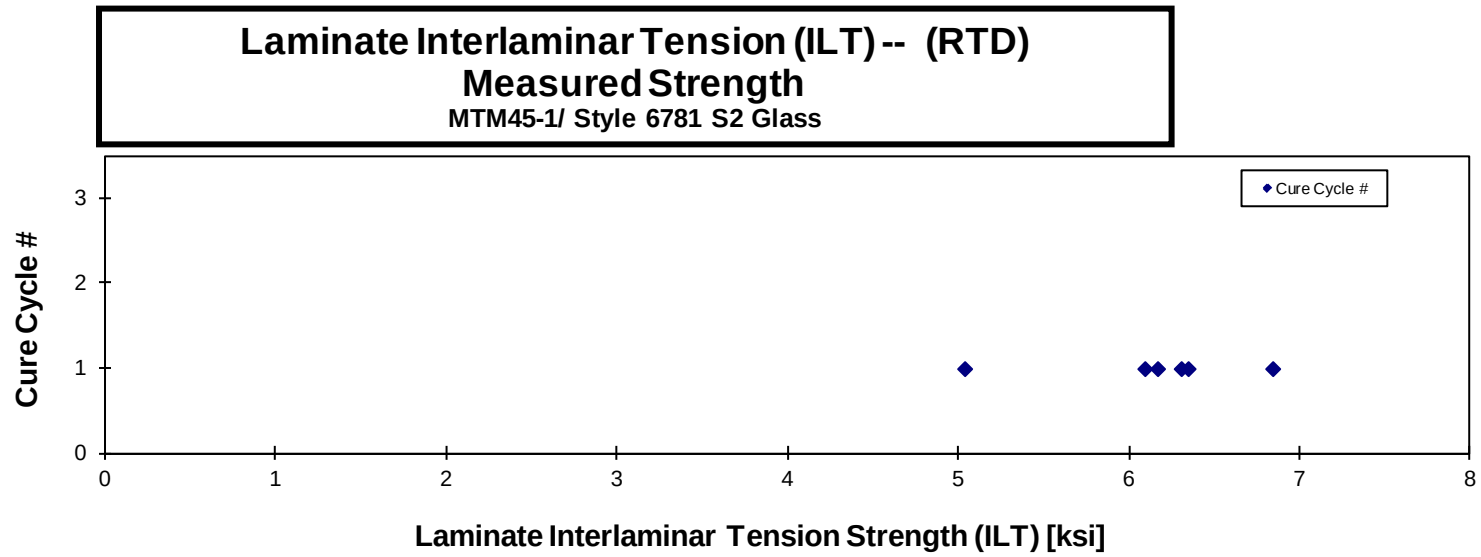

Laminate Compression After Impact Properties (CAI) -- (RTD)
Normalized Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Cure Cycle #
0
1
2
3
0
10
20
30
40
50
60
70
80
Laminate Compression After Impact Strength (CAI) [ksi]

4.20 Interlaminar Tension Properties

Laminate Curved Beam Strength Properties (ILT) -- (RTD) Strength
MTM45-1/ Style 6781 S2 Glass

Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Ave Ply Thickness
ABJMA111A	A	MH1	1	1	199.713	5.035	0.181	16	0.0113
ABJMA113A	A	MH1	1	1	257.454	6.091	0.191	16	0.0119
ABJMA114A	A	MH1	1	1	254.359	6.166	0.187	16	0.0117
ABJMA115A	A	MH1	1	1	253.210	6.345	0.182	16	0.0114
ABJMA116A	A	MH1	1	1	275.080	6.841	0.183	16	0.0115
ABJMA117A	A	MH1	1	1	267.655	6.304	0.192	16	0.0120
				Average	**251.245**	**6.130**	**0.186**		**0.0116**
				Standard Dev.	**26.627**	**0.597**			
				Coeff. of Var. [%]	**10.598**	**9.740**			
				Min.	**199.713**	**5.035**	**0.181**		**0.0113**
				Max.	**275.080**	**6.841**	**0.192**		**0.0120**
				Number of Spec.	**6**	**6**			

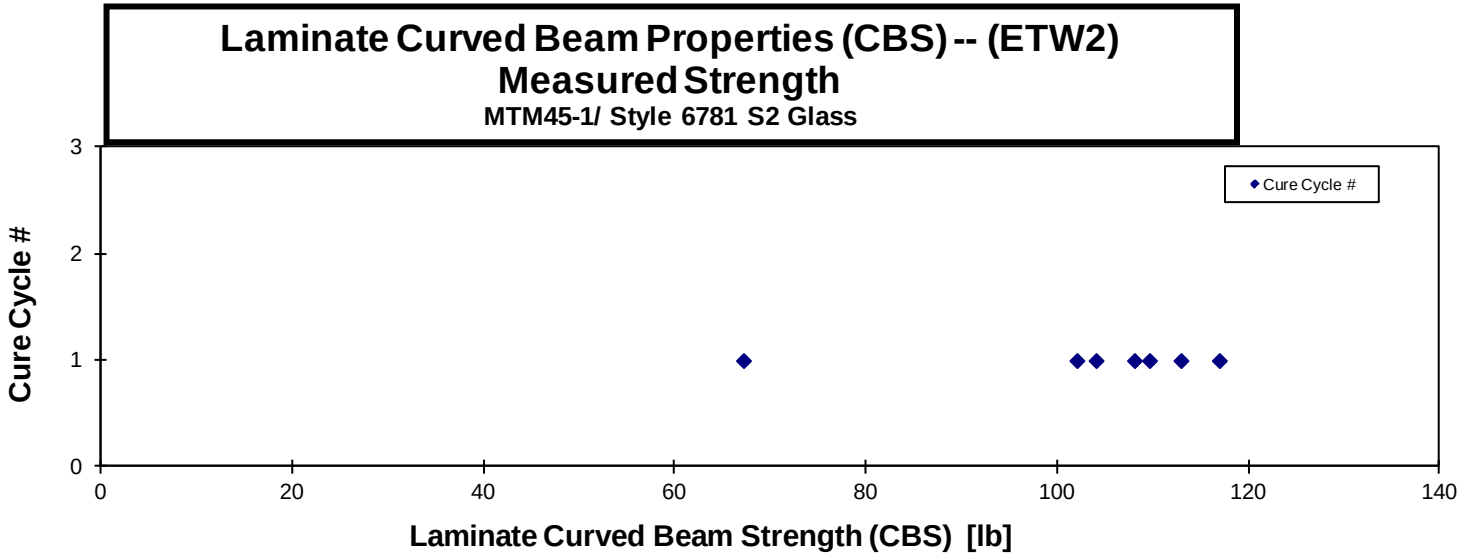

Laminate Curved Beam Properties (CBS) -- (RTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Cure Cycle #
0
1
2
3
0
50
100
150
200
250
300
Laminate Curved Beam Strength (CBS) [lb]

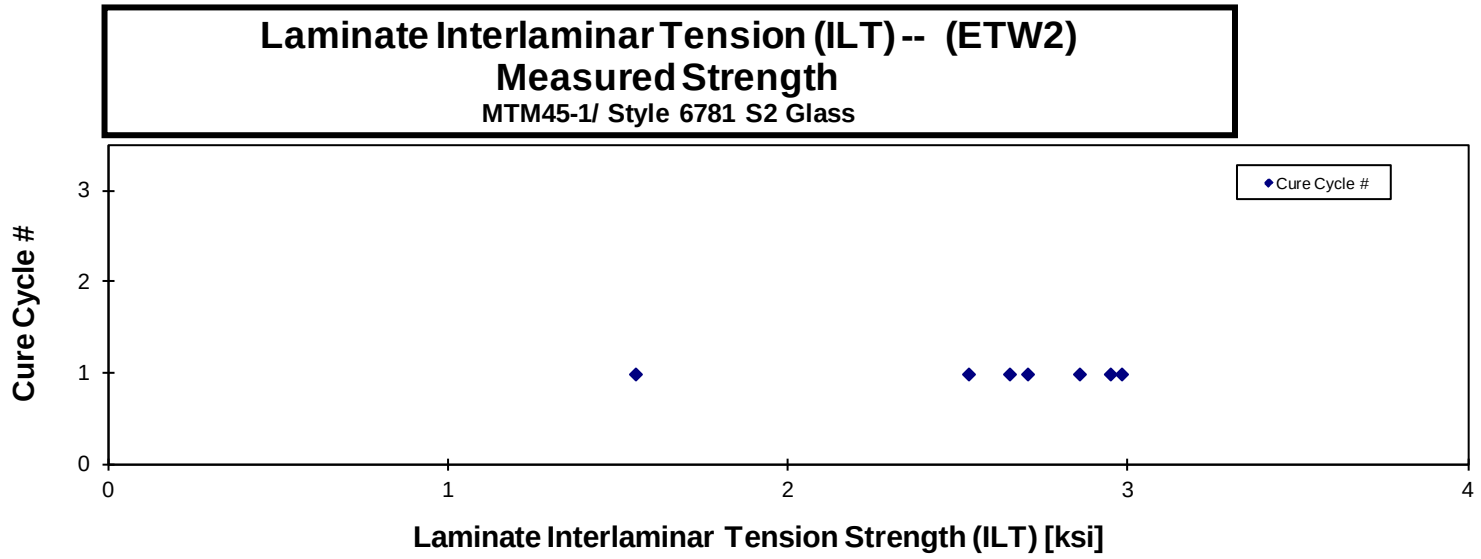

Laminate Interlaminar Tension (ILT) -- (RTD)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Cure Cycle #
0
1
2
3
0
1
2
3
4
5
6
7
8
Laminate Interlaminar Tension Strength (ILT) [ksi]

Laminate Curved Beam Strength Properties (ILT) -- (ETW2) Strength

MTM45-1/ Style 6781 S2 Glass

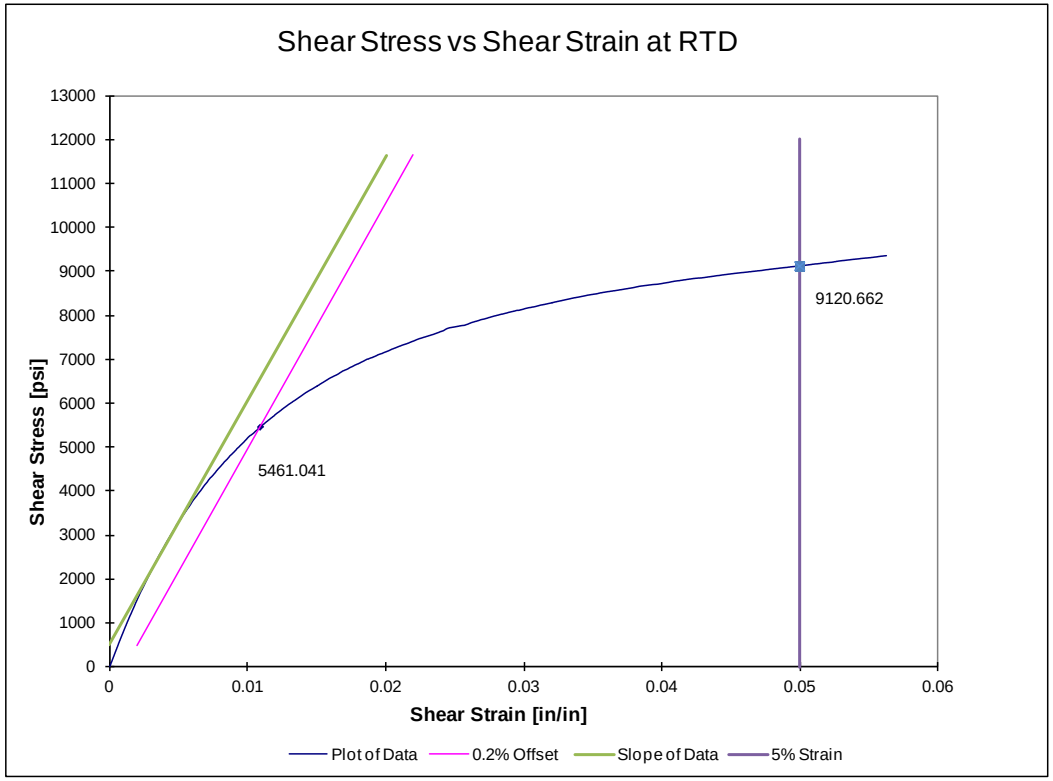
Specimen Number	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Ave Ply Thickness
ABJMA118D	A	MH1	1	1	116.929	2.978	0.180	16	0.0112
ABJMA119D	A	MH1	1	1	104.038	2.649	0.180	16	0.0112
ABJMA11AD	A	MH1	1	1	108.055	2.702	0.182	16	0.0114
ABJMA11BD	A	MH1	1	1	102.033	2.528	0.184	16	0.0115
ABJMA11CD	A	MH1	1	1	112.914	2.945	0.176	16	0.0110
ABJMA11DD	A	MH1	1	1	109.622	2.855	0.176	16	0.0110
ABJMA11ED	A	MH1	1	1	67.167	1.548	0.195	16	0.0122
				Average	**102.965**	**2.601**	**0.182**		**0.0114**
				Standard Dev.	**16.571**	**0.492**			
				Coeff. of Var. [%]	**16.094**	**18.910**			
				Min.	**67.167**	**1.548**	**0.176**		**0.0110**
				Max.	**116.929**	**2.978**	**0.195**		**0.0122**
				Number of Spec.	**7**	**7**	**7**		


Laminate Curved Beam Properties (CBS) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Cure Cycle #
0
1
2
3
0
20
40
60
80
100
120
140
Laminate Curved Beam Strength (CBS) [lb]


Laminate Interlaminar Tension (ILT) -- (ETW2)
Measured Strength
MTM45-1/ Style 6781 S2 Glass
Cure Cycle #
Cure Cycle #
0
1
2
3
0
1
2
3
4
Laminate Interlaminar Tension Strength (ILT) [ksi]

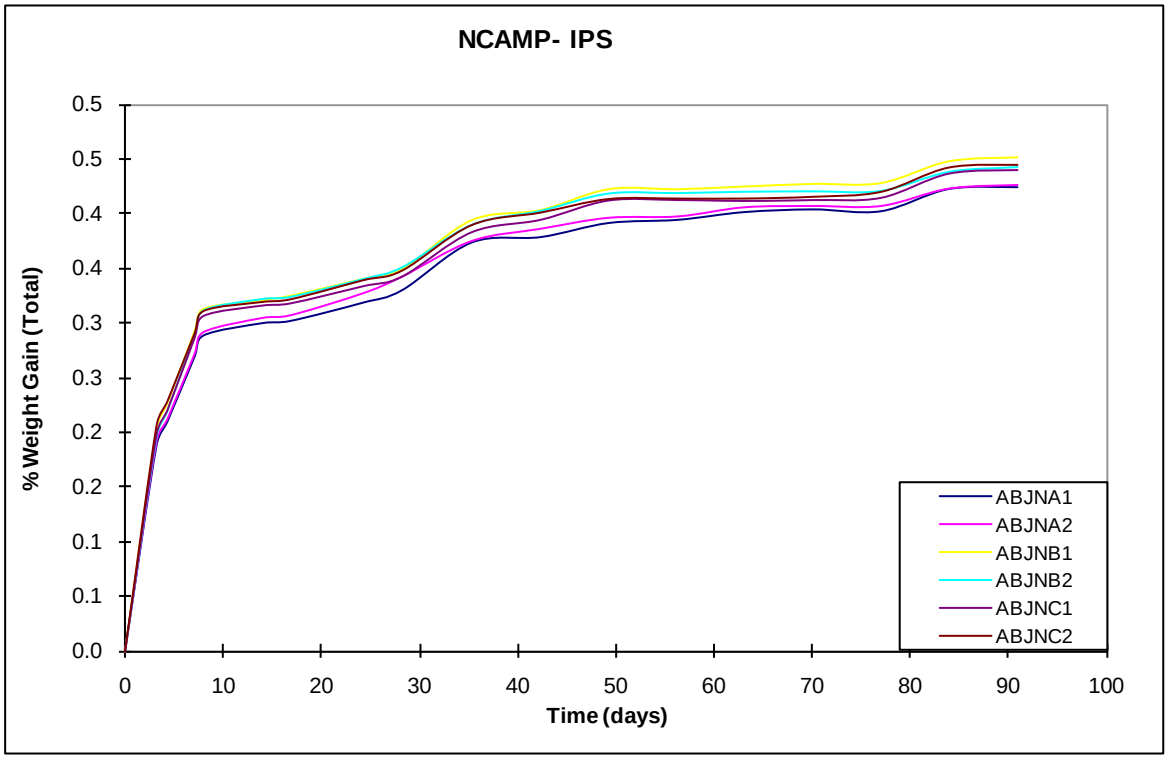
5. Shear Stress vs. Shear Strain, RTD

This is an example of a typical stress strain curve. The remaining curves can be found in the CD accompanying this report.

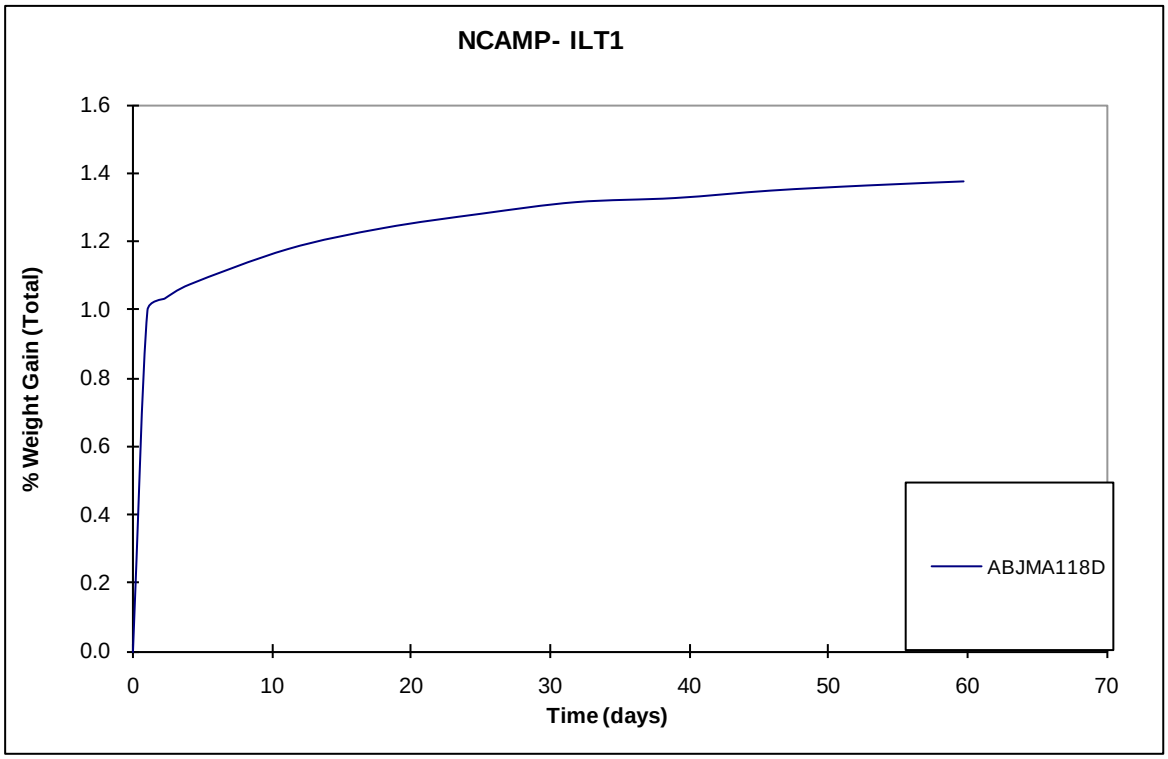


6. MOISTURE CONDITIONING CHARTS

6.1 In-Plane Shear – Thinnest Panel



6.2 Interlaminar Tension - Thickest Panel

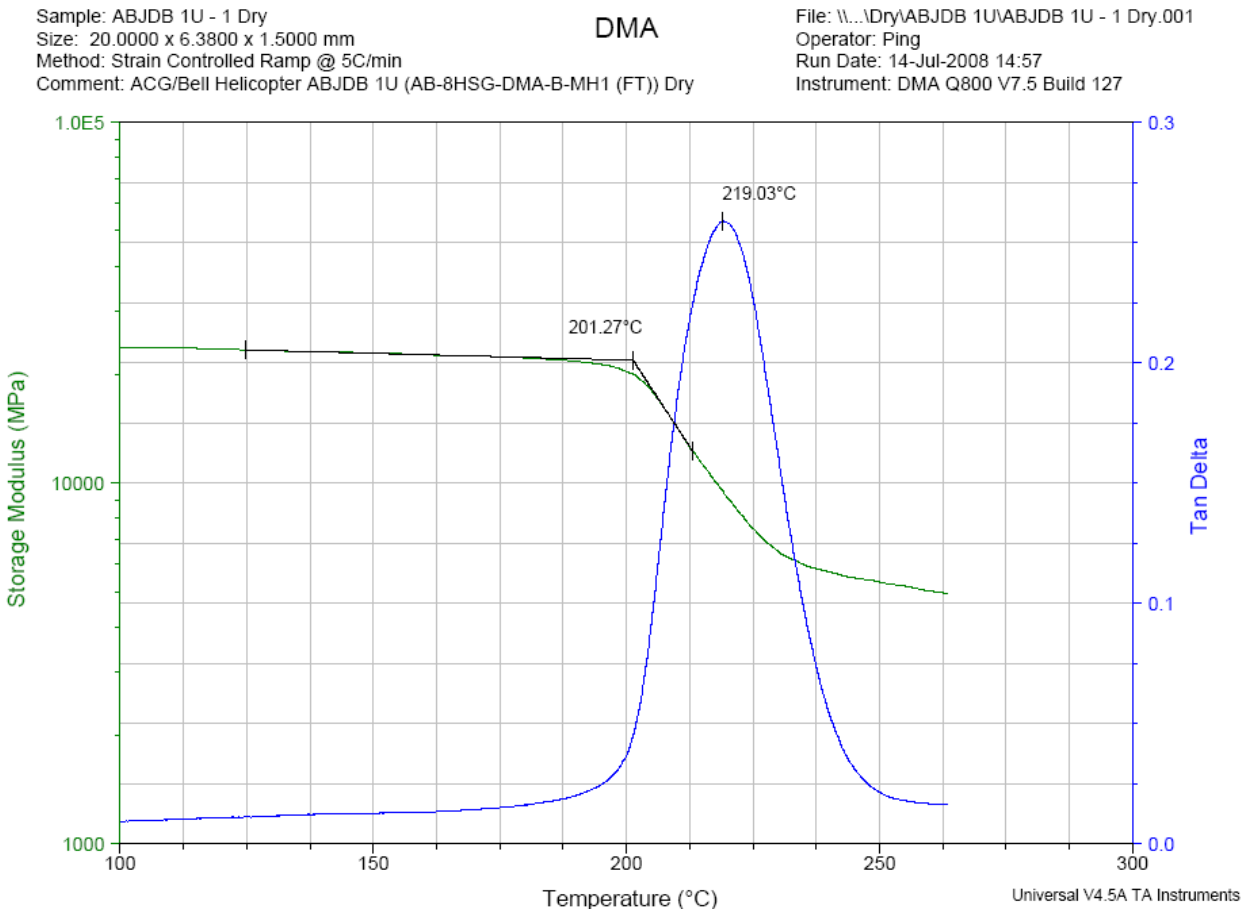


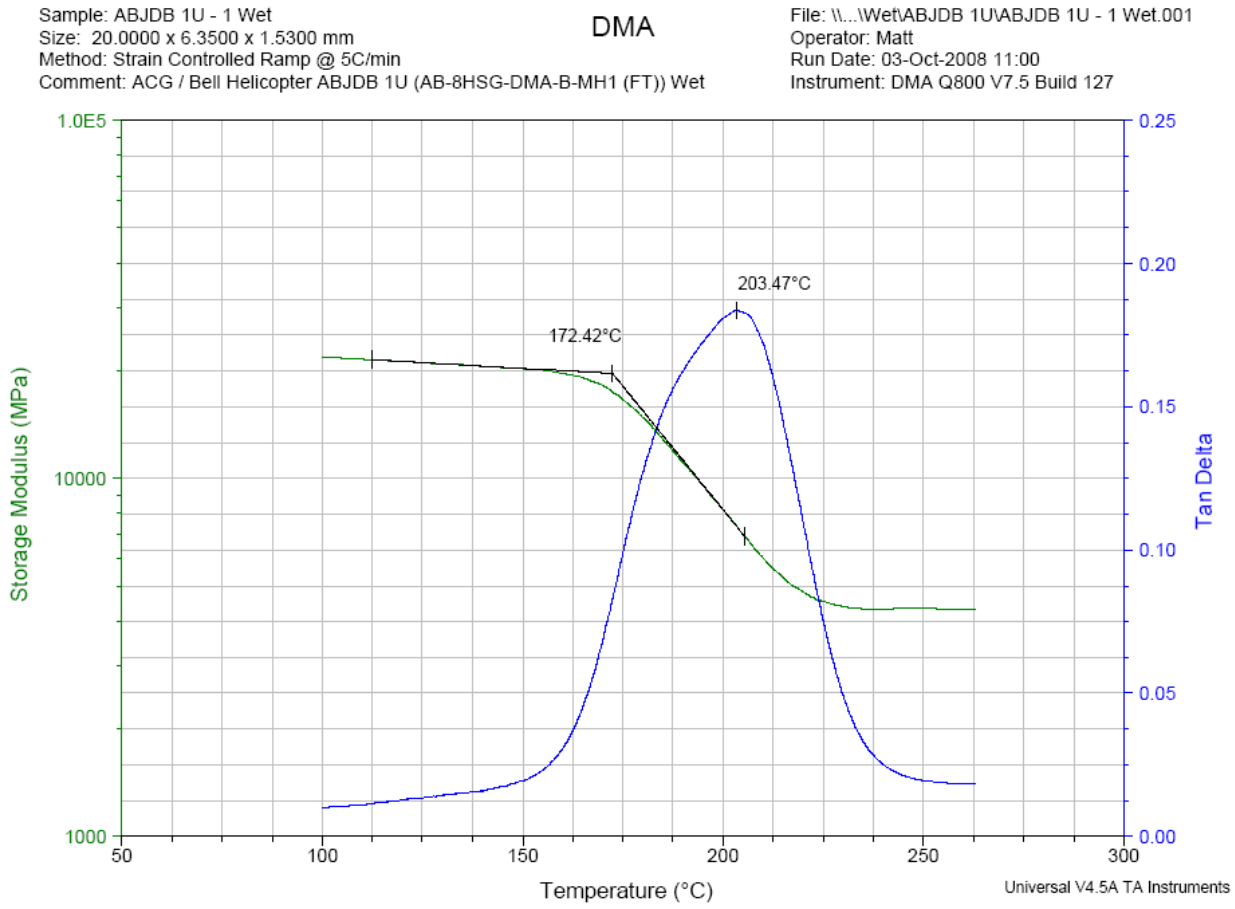
For “wet” mechanical test specimens, the drying procedures may not have completely dried the specimens prior to moisture conditioning, so the total amount of moisture absorbed by the specimens may be higher than those recorded in the moisture gain charts. Remaining curves can be found the CD that accompanies this report.

7. DMA Results

7.1 DMA Results – MH Cure Cycle Batches B, C & D

These charts are only examples. The remaining files can be obtained in the CD accompanying this report.




Sample: ABJDB 1U - 1 Wet
Size: 20.0000 x 6.3500 x 1.5300 mm
Method: Strain Controlled Ramp @ 5C/min
Comment: ACG / Bell Helicopter ABJDB 1U (AB-8HSG-DMA-B-MH1 (FT)) Wet
DMA
File: \\...\Wet\ABJDB 1U\ABJDB 1U - 1 Wet.001
Operator: Matt
Run Date: 03-Oct-2008 11:00
Instrument: DMA Q800 V7.5 Build 127
1.0E5
10000
1000
Storage Modulus (MPa)
0.25
0.20
0.15
0.10
0.05
0.00
Tan Delta
203.47°C
172.42°C
50
100
150
200
250
300
Temperature (°C)
Universal V4.5A TA Instruments

7.2 DMA Batches B, C & D

DMA Results Summary - ACG Bell				
ACG 6781 Glass 060922C1 AXJDX XX Dry				
Sample #	Onset Storage Modulus Average		Peak of Tangent Delta Average	
	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]
ABJDB 1U	201.19	394.14	219.20	426.55
ABJDB 2U	200.06	392.11	219.31	426.76
ABJDC 1L	199.19	390.54	219.64	427.35
ABJDC 2L	201.48	394.66	220.85	429.52
ABJDD 11	197.54	387.56	217.95	424.31
ABJDD 21	198.78	389.80	218.67	425.60

DMA Results Summary - ACG Bell				
ACG 6781 Glass 060922C1 AXJDX XX Wet				
Sample #	Onset Storage Modulus Average		Peak of Tangent Delta Average	
	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]
ABJDB 1U	173.24	343.82	203.32	397.97
ABJDB 2U	169.02	336.23	202.56	396.60
ABJDC 1L	169.21	336.58	205.33	401.59
ABJDC 2L	175.63	348.13	208.38	407.08
ABJDD 11	172.97	343.34	203.06	397.50
ABJDD 21	172.82	343.08	202.58	396.644

8. Prepreg Physical Test Results

The following physical test results were obtained at ACG's Tulsa, OK facility.

RESIN	FIBER	BATCH #	D.O.M.	J/G	PEAK TEMP	RC% RANGE	FAW RANGE	CUSTOMER:	LTCP
						INDIVIDUAL:	INDIVIDUAL:	MAT SPEC:	PCD020/ACGM
MTM45-1	6781	17278	18-Nov-05	N/A	N/A	AVERAGE: 35%+/-2%RC	AVERAGE:	SHIP DATE:	
								INITIALS:	
								S.O. # :	18624

ALL INFORMATION SHOULD BE OBTAINED FROM THE SALES ORDER

QUALITY INSPECTOR 17

	TEST PIECE	SAMPLE WEIGHT (GRAMS)	FOIL WEIGHT (GRAMS)	PREPREG WEIGHT (G.S.M.)	SAMPLE AFTER DEVOL	FIBER WEIGHT (G.S.M.)	FIBER WEIGHT (%)	RESIN WEIGHT (%)	VOLATILE CONTENT (%)	GEL TIME N/A
ROLL 1	M	4.6268	1.2925	462.68	4.2999	300.74	64.99957	35.00043	1.2769	FOIL WEIGHT
	C	4.6785	1.2907	467.85	4.285	299.43	64.00128	35.99872	6.116	SAMPLE & FOIL
	O	4.6375	1.2881	463.75	4.3066	301.85	65.08895	34.91105	6.1052	AFTER DEVOL.
AVERAGE				**464.76**		**300.67**	**64.70**	**35.30**	**0.22**	VOL (%)
ROLL 2	M	4.7393	1.2892	473.93	4.3068	301.76	63.67185	36.32815	1.291	FOIL WEIGHT
	C	4.798	1.2902	479.8	4.3816	309.14	64.43101	35.56899	6.031	SAMPLE & FOIL
	O	4.7595	1.2906	475.95	4.3018	301.12	63.26715	36.73285	6.0204	AFTER DEVOL.
AVERAGE				**476.56**		**304.01**	**63.79**	**36.21**	**0.22**	VOL (%)
									1.2882	FOIL WEIGHT
									6.1152	SAMPLE & FOIL
									6.103	AFTER DEVOL.
									0.25	VOL (%)
									1.2964	FOIL WEIGHT
									5.9864	SAMPLE & FOIL
									5.9747	AFTER DEVOL.
									0.25	VOL (%)
									1.2915	FOIL WEIGHT
									5.8565	SAMPLE & FOIL
									5.844	AFTER DEVOL.
									0.27	VOL (%)
									1.2867	FOIL WEIGHT
									5.9683	SAMPLE & FOIL
									5.9584	AFTER DEVOL.
									0.21	VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)

ACG431I/102196/ISSUE3

DSC Results	
Peak Exo.	231.95 °C
Enthalpy	320.45 J/g

Flow Results	
1	20.00%
2	22.00%
3	24.00%
Avg.	23.00%
1	20.00%
2	23.00%
3	19.00%
Avg.	20.66%

Gel Times	
Neat@200c	6m 25s
Prepreg@120°c	
1	59m 39s
2	60m 10s
3	60m 20s
Prepreg@120°c	
1	60m 33s
2	60m 56s
3	61m 10s

Table 8-1: Batch A Physical Test Results

RESIN	FIBER	BATCH #	D.O.M.	J/G	PEAK TEMP
MTM45-1	6781	17300	23-Nov-05	N/A	N/A

RC% RANGE	FAW RANGE
INDIVIDUAL:	INDIVIDUAL:
AVERAGE: 35%+/-2%RC	AVERAGE:

CUSTOMER:	LTCP
MAT SPEC:	PCD020/ACGM
SHIP DATE:	
INITIALS:	
S.O. # :	18624

ALL INFORMATION SHOULD BE OBTAINED FROM THE SALES ORDER

QUALITY 17 INSPECTOR

	TEST PIECE	SAMPLE WEIGHT (GRAMS)	FOIL WEIGHT (GRAMS)	PREPREG WEIGHT (G.S.M.)	SAMPLE AFTER DEVOL	FIBER WEIGHT (G.S.M.)	FIBER WEIGHT (%)	RESIN WEIGHT (%)	VOLATILE CONTENT (%)	GEL TIME N/A
ROLL 1	M	4.6778	1.2824	467.78	4.2533	297.09	63.51062	36.48938	1.2854	FOIL WEIGHT
	C	4.4672	1.2938	446.72	4.282	298.82	66.89201	33.10799	5.9797	SAMPLE & FOIL
	O	4.5737	1.2843	457.37	4.2732	298.89	65.34972	34.65028	5.9638	AFTER DEVOL.
AVERAGE				457.29		298.27	65.25	34.75	0.34	VOL (%)
ROLL 2	M	4.7098	1.2807	470.98	4.2785	299.78	63.65026	36.34974	1.2854	FOIL WEIGHT
	C	4.7056	1.2923	470.56	4.3224	303.01	64.39349	35.60651	5.9807	SAMPLE & FOIL
	O	4.7183	1.2845	471.83	4.32	303.55	64.33461	35.66539	5.9643	AFTER DEVOL.
AVERAGE				471.12		302.11	64.13	35.87	0.35	VOL (%)
									1.2888	FOIL WEIGHT
									5.957	SAMPLE & FOIL
									5.9448	AFTER DEVOL.
									0.26	VOL (%)
									1.2893	FOIL WEIGHT
									6.0546	SAMPLE & FOIL
									6.0398	AFTER DEVOL.
									0.31	VOL (%)
									1.7903	FOIL WEIGHT
									6.0519	SAMPLE & FOIL
									6.037	AFTER DEVOL.
									0.35	VOL (%)
									1.2942	FOIL WEIGHT
									6.0825	SAMPLE & FOIL
									6.0658	AFTER DEVOL.
									0.35	VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)

ACG431I/102196/ISSUE3

DSC Results	
Peak Exo.	231.34 °C
Enthalpy	396.17 j/g

Flow Results	
1	22.00%
2	22.00%
3	23.00%
Avg.	22.33%
1	24.00%
2	21.60%
3	19.00%
Avg.	21.53%

Gel Times	
Neat@200c	5m 44s
Prepreg@120°c	
1	60m 02s
2	60m 25s
3	60m 43s
Prepreg@120°c	
1	60m 53s
2	61m 02s
3	61m 22s

Table 8-2: Batch B Physical Test Results

RESIN	FIBER	BATCH #	D.O.M.	J/G	PEAK TEMP
MTM45-1	6781	17371	7-Dec-05	N/A	N/A

RC% RANGE	FAW RANGE
INDIVIDUAL:	INDIVIDUAL:
AVERAGE: 35%+/-2%RC	AVERAGE:

CUSTOMER:	LTCP
MAT SPEC:	PCD020/ACGM
SHIP DATE:	
INITIALS:	
S.O. # :	18624

ALL INFORMATION SHOULD BE OBTAINED FROM THE SALES ORDER

QUALITY 17 INSPECTOR

	TEST PIECE	SAMPLE WEIGHT (GRAMS)	FOIL WEIGHT (GRAMS)	PREPREG WEIGHT (G.S.M.)	SAMPLE AFTER DEVOL	FIBER WEIGHT (G.S.M.)	FIBER WEIGHT (%)	RESIN WEIGHT (%)	VOLATILE CONTENT (%)	GEL TIME N/A
ROLL 1	M	4.4982	1.2827	449.82	4.2991	301.64	67.05793	32.94207	1.215	FOIL WEIGHT
	C	4.4997	1.2823	449.97	4.2884	300.61	66.80668	33.19332	5.7852	SAMPLE & FOIL
	O	4.5815	1.2822	458.15	4.3053	302.31	65.98494	34.01506	5.7756	AFTER DEVOL.
AVERAGE				452.65		301.52	66.62	33.38	0.21	VOL (%)
ROLL 2	M	4.5983	1.3003	459.83	4.3017	300.14	65.27195	34.72805	1.2769	FOIL WEIGHT
	C	4.485	1.2953	448.5	4.2706	297.53	66.33891	33.66109	5.8246	SAMPLE & FOIL
	O	4.5914	1.2792	459.14	4.2764	299.72	65.27856	34.72144	5.8158	AFTER DEVOL.
AVERAGE				455.82		299.13	65.63	34.37	0.19	VOL (%)
ROLL 3	M	4.5549	1.2617	455.49	4.2122	295.05	64.77639	35.22361	1.2761	FOIL WEIGHT
	C	4.4697	1.2679	446.97	4.1868	291.89	65.30416	34.69584	5.8502	SAMPLE & FOIL
	O	4.571	1.2661	457.1	4.2137	294.76	64.4848	35.5152	5.8403	AFTER DEVOL.
AVERAGE				453.19		293.90	64.86	35.14	0.22	VOL (%)
									1.3016	FOIL WEIGHT
									5.8363	SAMPLE & FOIL
									5.8269	AFTER DEVOL.
									0.21	VOL (%)
									1.3009	FOIL WEIGHT
									5.8535	SAMPLE & FOIL
									5.845	AFTER DEVOL.
									0.19	VOL (%)
									1.2967	FOIL WEIGHT
									5.8966	SAMPLE & FOIL
									5.8868	AFTER DEVOL.
									0.21	VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)

ACG431I/102196/ISSUE3

DSC Results	
Peak Exo.	232.60 °C
Enthalpy	333.55 j/g

Flow Results	
1	19.70%
2	19.70%
3	19.30%
Avg.	19.56%
1	20.30%
2	21.10%
3	21.40%
Avg.	20.93%

Gel Times	
Neat@200c	6m 08s
Prepreg@120°c	
1	60m 55s
2	60m 42s
3	60m 30s
Prepreg@120°c	
1	61m 05s
2	60m 56s
3	61m 27s

Table 8-3: Batch C Physical Test Results

RESIN	FIBER	BATCH #	D.O.M.	J/G	PEAK TEMP
MTM45-1	6781	17558	13-Jan-06	N/A	N/A

RC% RANGE	FAW RANGE
INDIVIDUAL: 32-38	INDIVIDUAL:
AVERAGE: 33-37	AVERAGE:

CUSTOMER:	LTCP
MAT SPEC:	
SHIP DATE:	
INITIALS:	
S.O. # :	

ALL INFORMATION SHOULD BE OBTAINED FROM THE SALES ORDER

	TEST PIECE	SAMPLE WEIGHT (GRAMS)	FOIL WEIGHT (GRAMS)	PREPREG WEIGHT (G.S.M.)	SAMPLE AFTER DEVOL	FIBER WEIGHT (G.S.M.)	FIBER WEIGHT (%)	RESIN WEIGHT (%)	VOLATILE CONTENT (%)	GEL TIME N/A
ROLL 1	M	4.6611	1.276	466.11	4.3332	305.72	65.58967	34.41033	1.2765	FOIL WEIGHT
	C	4.6396	1.2835	463.96	4.3096	302.61	65.2233	34.7767	5.8906	SAMPLE & FOIL
	O	4.6348	1.281	463.48	4.3286	304.76	65.75473	34.24527	5.8796	AFTER DEVOL.
AVERAGE				464.52		304.36	65.52	34.48	0.24	VOL (%)
									1.2788	FOIL WEIGHT
									5.947	SAMPLE & FOIL
									5.9333	AFTER DEVOL.
									0.29	VOL (%)
									1.2787	FOIL WEIGHT
									5.933	SAMPLE & FOIL
									5.9199	AFTER DEVOL.
									0.28	VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)
										FOIL WEIGHT
										SAMPLE & FOIL
										AFTER DEVOL.
										VOL (%)

ACG431I/102196/ISSUE3

DSC Results	
Peak Exo.	230.58 °C
Enthalpy	346.30 j/g

Flow Results	
1	22.00%
2	22.00%
3	21.00%
Avg.	21.67%

Gel Times	
Neat@200c	5m 37s
Prepreg@120°c	
1	60m 05s
2	60m 11s
3	60m 16s

Table 8-4: Batch D Physical Test Results

9. Deviations

Deviations from ACG MTM45-1 G30-500 PW test plan:

1. Short beam shear specimen length is 6 times thickness, not 1.5 inches. Justification: Longer specimens may restrict shear failure to the center section only and preclude shear failures that run to one end of the specimens.
2. Used 350 ohm instead of 120 ohm strain gages. Specifically, in page 6,
    a. D3039: CEA-XX-250UW-120 was replaced by CEA-XX-250UW-350
    b. D6641: CEA-XX-125UT-120 was replaced by CEA-XX-125UT-350

Justification: 350 ohm gages will produce less heat than 120 ohm gages so we can increase excitation voltage to increase signal to noise ratio.

3. Option to use one 350 ohm biaxial gage instead of using two 120 ohm single axial gage
    a. D3518: two CEA-XX-250UW-120 will be replaced by one CEA-XX-125UT-350

Justification: Using one biaxial gage will ensure that the two single axial elements are perfectly perpendicular to each other.

4. Some CLC results were omitted due to a high CV obtained in the ETW coupons.
5. There was a concern about the void content for the qualification panels from Bell Helicopter. Below is an email correspondence between NCAMP, Mark Chris of Bell Helicopter and reference is made to the DER, Ric Abbott.

Mark,

Per our physical test results, you still meet Ric's standard of below 4 percent void content. All test methods were below 1 percent void content with the exception of Fill Compression, which was between 3 percent and 3.6 percent. Please let me know if you would still like to have more information on the results we found.

Thanks,

Kristin Marlett
(316) 978-6958

From: Yeow Ng
Sent: Thursday, May 29, 2008 12:10 AM
To: Kristin (Strole) Marlett
Subject: RE: acg bell physical testing

No

From: Kristin (Strole) Marlett
Sent: Wed 5/28/2008 1:13 PM
To: Yeow Ng
Subject: acg bell physical testing

Here are the physical test results from Bell (ACG Glass). It looks like Fill Compression has the highest void content. If Ric concurs that this void content is acceptable do we still want to create the website for Bell to review the data and photos?

Thanks,

Kristin Marlett

6. Below is an email conversation regarding the discovery of one panel with the wrong layup and Bell's acceptance of not testing the panel.

Thank you -

Mark Chris
TRS Non-Metallic Material & Process Engineering
phone (817) 280-8720
fax (817) 278-8720
mchris@bellhelicopter.textron.com

From: Kristin (Strole) Marlett [mailto:kmarlett@niar.wichita.edu]
Sent: Friday, June 06, 2008 4:17 PM
To: Chris, Mark
Subject: ACG 6781 Glass

Mark,

During testing of the ACG 6781 Glass, we discovered that one of your fill compression panels, FC-A-MH2, has the wrong layup. The panel should have all 90 degree plies, but it has half 0 degree plies and half 90 degree plies. Since we are pooling the data with the equivalency, we will have sufficient data points to grab from equivalency to meet the requirements for pooling for generating b-basis allowables. Therefore, we are not going to require you to make a new panel, we just wanted you to be aware of the discrepancy.

Thanks,

Kristin Marlett

7. The following panels were not submitted as part of this test matrix: FHT2,3, FHC2,3, PB2,3 UNC2,3 and UNT2,3. These are listed as part of the test matrix in the ACG test plan but were not provided by the qualification panel manufacturer Bell Helicopter.

I. Appendix I: FAA 8110-3 Data Approval and FAA Witness Form

The raw data was originally approved by DER Ric Abbott on March 26, 2009. The forms are illustrated below. New 8110-3 can be found on DVD accompanying report.

04/02/2007 MON 09:50 FAX 3169464107 FAA-ACO WICHITA 001
MAR. -30' 07(FRI) 11:33 NAT'L INST. AVIATION RSCH. TEL:316 978 3175 P. 002

Federal Aviation Administration
Wichita Aircraft Certification Office
Airframe - ACE-118W

Ric Abbott	David Ostrodka
	316-946-4129
733 7068	316-946-4107

REQUEST FOR SPECIAL DELEGATION

This form may be used to request a one-time only delegation authorization for such activities as witnessing certification tests, performing software verification activities, or approving certification data.

1a) FAA Project #: SP3505CPN

1b) Aircraft Model:

1c) Person(s) Seeking Designation: *(who is to witness test, verify software, or approve data?)*
Ric Abbott DERT 230561 CE
Date of this request March 30, 2007

1d) Requested Delegation: *(describe what you seek authority to accomplish. e.g.: for test witnessing provide Title and Number of test plan, for data approval provide type of data, certification plan, applicable regulations and guidance material, etc.)*
Test Plan:
FAA Approved AI/TR/1392 Revision E, Design Allowable Property Data Acquisition and Test Plan for MTM 45 & MTM 45-1 Prepregs
December 15, 2006

1e) If witnessing is proposed to be less than 100%, describe or reference agreement with ACO:
One Test of each type and each environment

1f) Additional Information: *(Location/duration/schedule, etc.)*
Tested at NIAR-WSU Structural Test Lab
Starting March 30, 2007

1g) Special Delegation Approval: *(reserved for FAA ACO signature and date)* David Ostrodka 4/2/07 by phone 3/29/07

2) CERTIFICATION TEST PRETEST CHECKLIST *(To be verified by witness prior to beginning of test)*	WITNESS' INITIALS
2a) TEST PLAN *(Confirm the test plan has been FAA APPROVED)*	
2b) TEST ARTICLE *(Confirm the test article has been FAA CONFORMED)*	
2c) TEST ARTICLE ACCEPTABILITY *(Confirm the test article is in CONFORMITY and all UNSATS have been ACCEPTABLY DISPOSITIONED.*	
2d) TEST SETUP *(Confirm the test setup has been FAA CONFORMED)*	
2e) TEST SETUP ACCEPTABILITY *(Confirm the test setup is in CONFORMITY and all UNSATS have been ACCEPTABLY DISPOSITIONED.*	

Rev (F) 07/04

TESTS WITNESSED BETWEEN JULY 2007 & OCT 2009

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

STATEMENT OF COMPLIANCE WITH THE FEDERAL AVIATION REGULATIONS

DATE: March 26, 2009

AIRCRAFT OR AIRCRAFT COMPONENT IDENTIFICATION

MAKE	MODEL NO.	TYPE *(Airplane, Radio, Helicopter, etc.)*	NAME OF APPLICANT
NA	NA	NA	NIAR/NCAMP

LIST OF DATA

IDENTIFICATION	TITLE
CAM-RP-2009-001 Rev. N/C Release Date: March 26, 2009	Advanced Composites Group ACG MTM45-1 6781 S-2 glass 35% RC Qualification Material Property Data Report

PURPOSE OF DATA: Test results of ACG material MTM45-1 6781 S-2 Glass.
FAA Project Number: SP3505CPN

APPLICABLE REQUIREMENTS (List specific sections): 14CFR 23.613, 14CFR 25.613, 14CFR 27.613 and 14CFR 29.613

CERTIFICATION - Under authority vested by direction of the Administrator and in accordance with conditions and limitations of appointment under Part 183 of the Federal Aviation Regulations, data listed above and on attached sheets numbered NA have been examined in accordance with established procedures and found to comply with applicable requirements of the Federal Aviation Regulations.

I (We) Therefore:
- ☐ **Recommend approval of these data**
- ☒ **Approve these data**

SIGNATURE(S) OF DESIGNATED ENGINEERING REPRESENTATIVE(S)	DESIGNATION NUMBERS(S)	CLASSIFICATION(S)
Ric Abbott	DERT-230561-CE	Structures

FAA Form 8110-3 (11-70) SUPERSEDES PREVIOUS EDITION — ELECTRONIC FORMAT (7-00)