



WICHITA STATE
UNIVERSITY
NATIONAL INSTITUTE
FOR AVIATION RESEARCH

Report No: CAM-RP-2008-007 Rev B
Report Date: March 28, 2018



SOLVAY
(Formerly known as Advanced Composites Group)
MTM45-1/ IM7-145 32%RW
12k IM7 Unidirectional 145 gsm
Qualification Material Property Data Report

FAA Special Project Number: SP3505WI-Q

NCAMP Test Report Number: CAM-RP-2008-007 Rev B

Report Date: March 28, 2018

Testing Facility:

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

Test Panel Fabrication Facility:

Advanced Composites Group
5350 S. 129th E. Ave,
Tulsa, OK 74134



WICHITA STATE
UNIVERSITY
NATIONAL INSTITUTE
FOR AVIATION RESEARCH

Report No: CAM-RP-2008-007 Rev B
Report Date: March 28, 2018

Edited by: _____
Evelyn Lian

Reviewed by: _____
Vinsensius Tanoto

Royal Lovingfoss

Approved by: _____
Ed Hooper (FAA DER)

Submitted to: Wichita FAA ACO Office



REVISIONS:

Rev	By	Date	Pages Revised or Added
N/C Draft	Allison Crockett and Kristin Marlett	12/4/2008	Document Initial Release
N/C Draft	Allison Crockett and Kristin Marlett	3/30/2009	Several values changed due to copy/paste error
N/C Draft	Allison Crockett and Kristin Marlett	4/7/2009	UNC0 Batch A cure cycle 2 (ETW) should not be included in calculations.
N/C Draft	Allison Crockett and Kristin Marlett	4/13/2009	Backout factor changed for ETW2 from 342.58 to 342.57 normalized and 333.94 to 333.93 as measured
N/C Draft	Allison Crockett and Kristin Marlett	7/15/2009	Strength value removed from LT values since tabs were not used.
N/C Draft	Allison Crockett and Kristin Marlett	11/19/2009	Updated DMA chart – eliminated incorrect values
N/C Draft	Allison Crockett and Kristin Marlett	12/9/2009	UNC0 file updated – all conditions affected by incorrect layup
N/C Draft	Allison Crockett and Kristin Marlett	3/10/2010	Pin bearing ultimate strength values removed
N/C Draft	Allison Crockett and Kristin Marlett	3/11/2010	UNC0 modulus values changed in Lamina summary sheet – modulus values were not changed after file updated on 12/9
N/C Draft	Allison Crockett and Kristin Marlett	4/22/2010	TT(CTD) value updated on Lamina summary to match value on individual summary sheet on page 32
N/C Draft	Allison Crockett and Kristin Marlett	4/21/2011	<ul style="list-style-type: none">- Naming Convention changed for ETW2 specimens: OHC1, OHC3, FHT2, FHT3, UNT3- Section 2.1.10 UNC0 prepreg lot number- Pg. 8, added fabricated and “Machined” at ACG- Section 4.10 changed RTD graph to CTD- Removed gridlines from all tables with gridlines and modified deviations to explain manufacturing problems
A	Allison Crockett and Kristin Marlett	4/21/2011	Introduction/Scope Section 1.1 wording edited



Rev	By	Date	Pages Revised or Added
B	Evelyn Lian		<ul style="list-style-type: none">- Typographical and Editorial changes- Updated Tg wet value in Lamina Summary Data Table 2-1(Pg. 22) & Laminate Summary Data Table 2.2(Pg. 23) to match value on DMA Results Table 3-1(Pg. 263)- Added physical testing values for all test methods in Section 2.3(Pg. 24 – 54)- Updated LC (CTD) strength data using backout factor calculation in Lamina Summary Data Table 2-1(Pg. 22) from 207.71 to 204.89 normalized and 203.47 to 200.54 as measured.- Removed high modulus data for AFLB213B from LC CTD due to strain gage malfunction and recommended by CMH-17 data review working group. Updated data for LC CTD in Section 2.1(Pg. 22), 2.3.3(Pg. 26), 3.3(Pg. 57), 4.3(Pg. 95 – 96)- Removed high strength and modulus data for AFAA211D from UNT1 ETW2(250F) due to strain gage malfunction and recommended by CMH-17 data review working group. Updated data for UNT1 ETW2 in Section 2.2(Pg. 23), 2.3.7(Pg. 30), 3.7(Pg. 62), 4.7(Pg. 135 – 136)- Removed high modulus data for AFCA114D and AFCA214D from UNT3 ETW2 due to strain gage malfunction and recommended by CMH-17 data review working group. Updated data for UNT3 ETW2 in Section 2.2(Pg. 23), 2.3.9(Pg. 32), 3.9(Pg. 64), 4.9(Pg. 147 – 148)- Updated data for IPS 5% Strain (CTD), 0.2% Offset Strength (RTD and ETW) in Section 2.1(Pg. 23), 2.3.5(Pg. 28), 3.5(Pg. 59), 4.5(Pg. 111 – 119) and updated Stress Strain graph in Section 5(Pg. 260)

Table of Contents

1. Introduction..... 9

 1.1 Scope..... 9

 1.2 Symbols Used..... 10

 1.3 NIAR NCAMP – ACG Specimen Naming Format 12

 1.4 References 13

 1.5 Methodology 14

 1.5.1 Process Definition 14

 1.5.2 Specimen & Testing Details 15

 1.5.3 Test Matrix 17

 1.5.4 Cured Laminate Physical Testing 19

 1.5.5 Physical Testing..... 19

 1.5.6 Environmental Conditioning 20

 1.5.7 Fluid Sensitivity Screening..... 20

 1.5.8 Normalization Procedures..... 21

 1.5.9 Conformity 21

 1.5.10 Material Pedigree Information..... 21

2. Test Results..... 23

 2.1 Lamina Level Test Summary 23

 2.2 Laminate Level Test Summary 24

 2.3 Individual Test Summaries..... 25

 2.3.1 Longitudinal Tension Properties (LT)..... 25

 2.3.2 Transverse Tension Properties (TT)..... 26

 2.3.3 Longitudinal Compression Properties (LC)..... 27

 2.3.4 Transverse Compression Properties (TC) 28

 2.3.5 In-Plane Shear Properties (IPS) 29

 2.3.6 “50/0/50” Unnotched Tension 0 Properties (UNT0) 30

 2.3.7 “25/50/25” Unnotched Tension 1 Properties (UNT1) 31

 2.3.8 “10/80/10” Unnotched Tension 2 Properties (UNT2) 32

 2.3.9 “50/40/10” Unnotched Tension 3 Properties (UNT3) 33

 2.3.10 “50/0/50” Unnotched Compression 0 Properties (UNC0)..... 34

 2.3.11 “25/50/25” Unnotched Compression 1 Properties (UNC1)..... 35

 2.3.12 “10/80/10” Unnotched Compression 2 Properties (UNC2)..... 36

 2.3.13 “50/40/10” Unnotched Compression 3 Properties (UNC3)..... 37

 2.3.14 Lamina Short-Beam Strength Properties (SBS)..... 38

 2.3.15 Laminate Short-Beam Strength Properties (SBS1)..... 39

 2.3.16 “25/50/25” Open-Hole Tension 1 Properties (OHT1) 40

 2.3.17 “10/80/10” Open-Hole Tension 2 Properties (OHT2) 41

 2.3.18 “50/40/10” Open-Hole Tension 3 Properties (OHT3) 42

 2.3.19 “25/50/25” Filled-Hole Tension 1 Properties (FHT1) 43

 2.3.20 “10/80/10” Filled-Hole Tension 2 Properties (FHT2) 44

 2.3.21 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)..... 45

 2.3.22 “25/50/25” Open-Hole Compression 1 Properties (OHC1)..... 46

 2.3.23 “10/80/10” Open-Hole Compression 2 Properties (OHC2)..... 47

 2.3.24 “50/40/10” Open-Hole Compression 3 Properties (OHC3)..... 48

 2.3.25 “25/50/25” Filled-Hole Compression 1 Properties (FHC1) 49

2.3.26	“10/80/10” Filled-Hole Compression 2 Properties (FHC2)	50
2.3.27	“50/40/10” Filled-Hole Compression 3 Properties (FHC3)	51
2.3.28	“25/50/25” Pin Bearing 1 Properties (PB1)	52
2.3.29	“10/80/10” Pin Bearing 2 Properties (PB2)	53
2.3.30	“50/40/10” Pin Bearing 3 Properties (PB3)	54
2.3.31	“25/50/25” Compression After Impact Properties (CAI1)	55
3.	Individual Test Charts	56
3.1	Longitudinal Tension Properties (LT)	56
3.2	Transverse Tension Properties (TT)	57
3.3	Longitudinal Compression Properties (LC)	58
3.4	Transverse Compression Properties (TC)	59
3.5	In-Plane Shear Properties (IPS)	60
3.6	“50/0/50” Unnotched Tension 0 Properties (UNT0)	62
3.7	“25/50/25” Unnotched Tension 1 Properties (UNT1)	63
3.8	“10/80/10” Unnotched Tension 2 Properties (UNT2)	64
3.9	“50/40/10” Unnotched Tension 3 Properties (UNT3)	65
3.10	“50/0/50” Unnotched Compression 0 Properties (UNC0)	66
3.11	“25/50/25” Unnotched Compression 1 Properties (UNC1)	67
3.12	“10/80/10” Unnotched Compression 2 Properties (UNC2)	68
3.13	“50/40/10” Unnotched Compression 3 Properties (UNC3)	69
3.14	Lamina Short Beam Strength Properties (SBS)	70
3.15	Laminate Short Beam Strength Properties (SBS1)	70
3.16	“25/50/25” Open-Hole Tension 1 Properties (OHT1)	71
3.17	“10/80/10” Open-Hole Tension 2 Properties (OHT2)	71
3.18	“50/40/10” Open-Hole Tension 3 Properties (OHT3)	72
3.19	“25/50/25” Filled-Hole Tension 1 Properties (FHT1)	72
3.20	“10/80/10” Filled-Hole Tension 2 Properties (FHT2)	73
3.21	“50/40/10” Filled-Hole Tension 3 Properties (FHT3)	73
3.22	“25/50/25” Open-Hole Compression 1 Properties (OHC1)	74
3.23	“10/80/10” Open-Hole Compression 2 Properties (OHC2)	74
3.24	“50/40/10” Open-Hole Compression 3 Properties (OHC3)	75
3.25	“25/50/25” Filled-Hole Compression 1 Properties (FHC1)	75
3.26	“10/80/10” Filled-Hole Compression 2 Properties (FHC2)	76
3.27	“50/40/10” Filled-Hole Compression 3 Properties (FHC3)	76
3.28	“25/50/25” Pin Bearing 1 Properties (PB1)	77
3.29	“10/80/10” Pin Bearing 2 Properties (PB2)	77
3.30	“50/40/10” Pin Bearing 3 Properties (PB3)	78
3.31	“25/50/25” Compression After Impact 1 Properties (CAI1)	78
4.	Raw Data	79
4.1	Longitudinal Tension Properties (LT)	79
4.2	Transverse Tension Properties (TT)	87
4.3	Longitudinal Compression Properties (LC)	95
4.4	Transverse Compression Properties (TC)	103
4.5	In-Plane Shear Properties (IPS)	111
4.6	“50/0/50” Unnotched Tension 0 Properties (UNT0)	123
4.7	“25/50/25” Unnotched Tension 1 Properties (UNT1)	131

4.8 “10/80/10” Unnotched Tension 2 Properties (UNT2)..... 137

4.9 “50/40/10” Unnotched Tension 3 Properties (UNT3)..... 143

4.10 “50/0/50” Unnotched Compression 0 Properties (UNC0)..... 149

4.11 “25/50/25” Unnotched Compression 1 Properties (UNC1)..... 159

4.12 “10/80/10” Unnotched Compression 2 Properties (UNC2)..... 165

4.13 “50/40/10” Unnotched Compression 3 Properties (UNC3)..... 169

4.14 Lamina Short-Beam Strength Properties (SBS)..... 173

4.15 Laminate Short-Beam Strength Properties (SBS1)..... 183

4.16 “25/50/25” Open Hole Tension 1 Properties (OHT1)..... 189

4.17 “10/80/10” Open Hole Tension 2 Properties (OHT2)..... 197

4.18 “50/40/10” Open Hole Tension 3 Properties (OHT3)..... 203

4.19 “25/50/25” Filled-Hole Tension 1 Properties (FHT1) 209

4.20 “10/80/10” Filled-Hole Tension 2 Properties (FHT2) 213

4.21 “50/40/10” Filled-Hole Tension 3 Properties (FHT3) 219

4.22 “25/50/25” Open-Hole Compression 1 Properties (OHC1)..... 221

4.23 “10/80/10” Open-Hole Compression 2 Properties (OHC2)..... 227

4.24 “50/40/10” Open-Hole Compression 3 Properties (OHC3)..... 231

4.25 “25/50/25” Filled-Hole Compression 1 Properties (FHC1) 235

4.26 “10/80/10” Filled-Hole Compression 2 Properties (FHC2) 239

4.27 “50/40/10” Filled-Hole Compression 3 Properties (FHC3) 243

4.28 “25/50/25” Pin Bearing 1 Properties (PB1)..... 246

4.29 “10/80/10” Pin Bearing 2 Properties (PB2)..... 250

4.30 “50/40/10” Pin Bearing 3 Properties (PB3)..... 254

4.31 “25/50/25” Compression After Impact 1 Properties (CAI1)..... 258

5. Shear Stress vs. Shear Strain, RTD 260

6. MOISTURE CONDITIONING CHARTS..... 261

6.1 In-Plane Shear Properties – Thinnest Panel 261

6.2 Pin Bearing 1 - Thickest Panel..... 261

7. DMA Results..... 262

7.1 DMA Wet Batch B 264

7.2 DMA Dry Batch B..... 265

8. Prepreg Physical Test Results..... 266

9. Deviations..... 269

List of Tables

Table 1-1: Fastener and Corresponding Grip Length 15
Table 1-2: Lamina Level Tests – Unidirectional Tape 17
Table 1-3: Laminate Level Tests – Unidirectional Tape 18
Table 1-4: Physical Testing Matrix..... 19
Table 2-1: Lamina Summary Data 23
Table 2-2: Laminate Summary Data..... 24
Table 3-1: DMA Results Summary 263
Table 8-1: Batch A Prepreg Physical Test Results 266
Table 8-2: Batch B Prepreg Physical Test Results 267
Table 8-3: Batch C Prepreg Physical Test Results 268

List of Figures

Figure 1-1: NIAR – ACG Specimen Naming Format Correlation 12
Figure 1-2: Specimen Selection Methodology 14
Figure 1-3: Specimen Traceability Line 14
**Figure 1-4: Modified ASTM D5961 (Pin Bearing) Specimen and Loading
Arrangement..... 16**

1. Introduction

1.1 Scope

The test methods and results described in this document are intended to provide basic composite properties essential to most methods of analysis and are consistent with CMH-17-1G — Composite Materials Handbook for Polymer Matrix Composites.

This report contains material property data of common usefulness to wide range of projects. The lamina 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/IM7-145gsm-32%RW Qualification Statistical Analysis Report NCP-RP-2008-006 Rev B.

The qualification material was procured to ACG Material Specification ACGM 1001-06 Revision A dated January 19, 2005. An equivalent NCAMP Material Specification NMS 451/6 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 and machined at Advanced Composites Group, 5350 S 129th E. Ave, Tulsa, OK 74134. 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-17-1G. The applicability of equivalency process must be evaluated on program-by-program basis by the applicant and certifying agency. The applicant and certifying agency must agree that the equivalency test plan along with the equivalency process described in Section 6 of DOT/FAA/AR-03/19 and Section 8.4.1 of CMH-17-1G are adequate for the given program.

Aircraft companies should not use the data published in this report without specifying NCAMP Material Specification NMS 451/6. NMS 451/6 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 451/6.* NMS 451/6 is a free, publicly available, non-proprietary aerospace industry material specification.

1.2 Symbols Used

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

Superscripts

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

Subscripts

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

SPECIMEN NAMING FORMAT

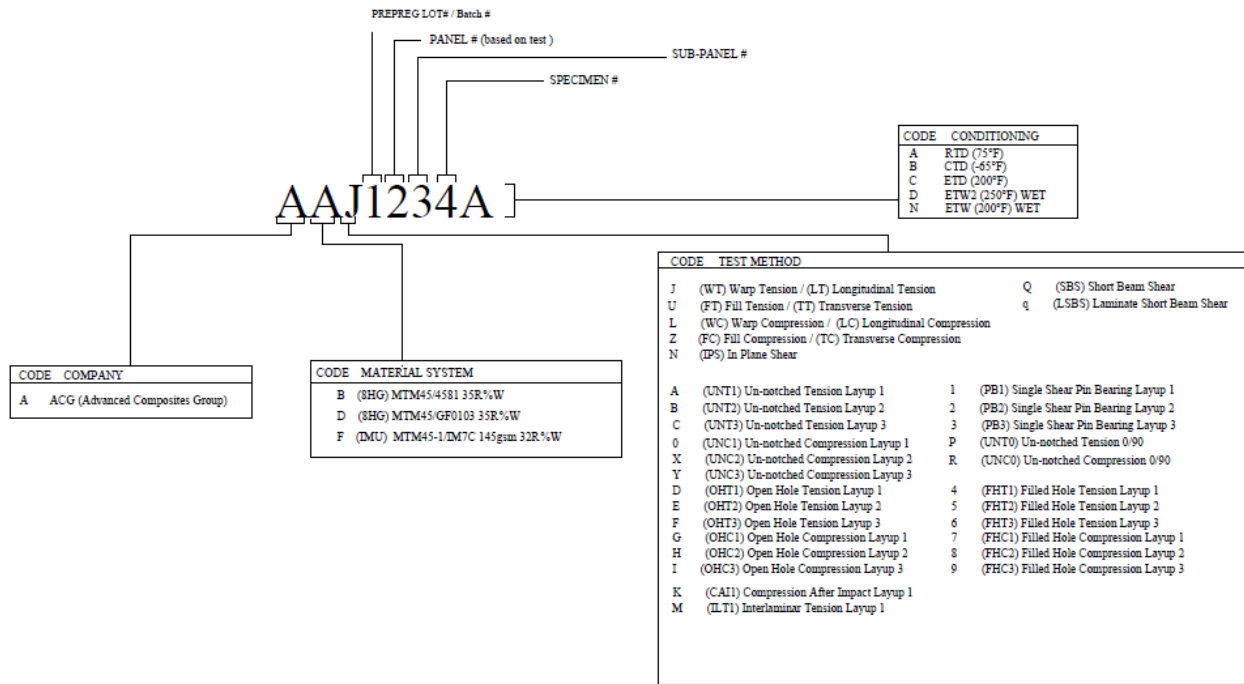


Figure 1-1: NIAR – ACG Specimen Naming Format Correlation

1.4 References

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

ASTM Standards

- ASTM D2344/D2344M-00^{e1} – Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
- ASTM D3039/D3039M-00^{e2} – Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials
- ASTM D3518/D3518M-94(2001) – Standard Test Method for In-Plane Shear Response of Polymer Matrix Composite Materials by Tensile Test of a $\pm 45^\circ$ Laminate In-Plane Shear Strength and Modulus
- ASTM D5766/D5766M-02a – Standard Test Method for Open-Hole Tensile Strength of Polymer Matrix Composite Laminates
- ASTM D5961/D5961M-05 – Standard Test Method for Bearing Response of Polymer Matrix Composite Laminates
- ASTM D6484/D6484M-04 – Standard Test Method for Open-Hole Compressive Strength of Polymer Matrix Composite Laminates
- ASTM D6641/D6641M-01^{e1} – Standard Test Method for Determining the Compressive Properties of Polymer Matrix Composite Laminates Using a Combined Loading Compression (CLC) Test Fixture
- ASTM D6742/D6742M-02 – Standard Practice for Filled-Hole Tension and Compression Testing of Polymer Matrix Composite Laminates

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. If more than 2 panels were required to obtain the minimum specimens, the additional panels were labeled accordingly and an equal number of specimens were tested from each panel.

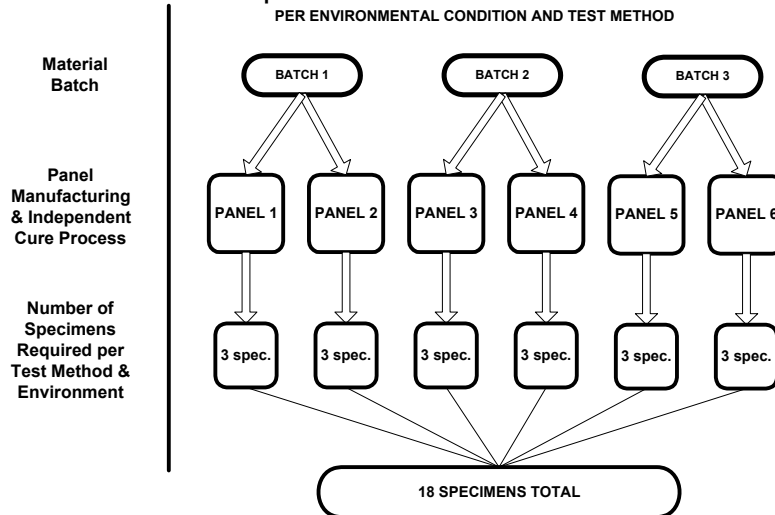


Figure 1-2: Specimen Selection Methodology

All panels were cured in accordance with ACG process specification ACGP 1001-02 Revision E.

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.

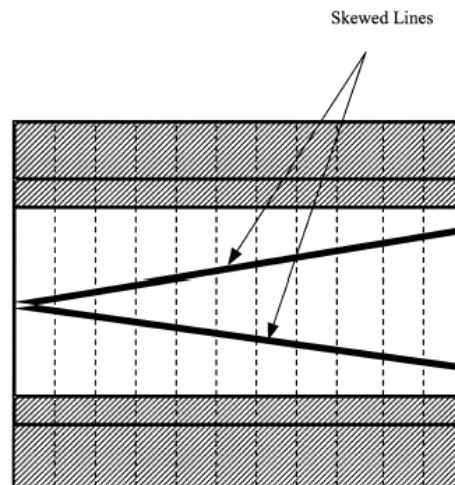


Figure 1-3: Specimen Traceability Line

1.5.2 Specimen & Testing Details

1.5.2.1 Tabbings

No tabs were used for this material system.

1.5.2.2 Strain gages

Strain gages were employed for modulus on selected test methods. The callouts below are requirements of the test plan and actual strain gages used.

ASTM D3039 tensile:
 CEA-XX-250UW-120 or 350
 (refer to AI/TR/1392 Rev E 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 was required for other tests, extensometers were used.

1.5.2.3 Specimen Hole Dimensions & Test Configuration

For the open-hole tests, the hole diameter was 0.25 in ±0.003 in. For filled-hole and bearing tests, the hole diameter as 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 in Table 1-1 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 0.500 and nominal thickness 0.032 inches) and the nut type was 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 lbs above the run on torque required to bring the fastener/specimen/fixture flush. For example, if it required 15 in-lbs to flush the specimen/fastener/fixture with no gap, an additional 10-15 in-lb 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”.

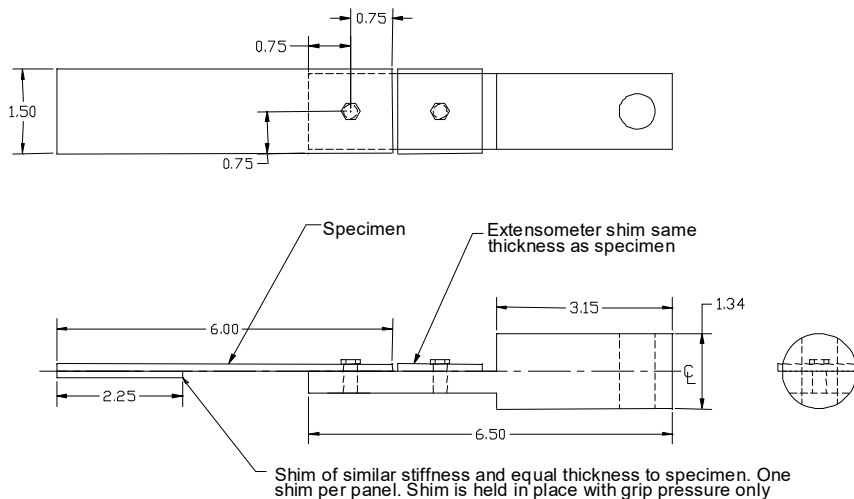


Figure 1-4: Modified ASTM D5961 (Pin Bearing) Specimen and Loading Arrangement

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

1.5.3 Test Matrix

Table 1-2 summarizes the lamina level tests carried out on unidirectional materials. The lay-ups chosen have been designed to produce the appropriate thickness required for the various types of tests performed. Table 1-3 summarizes the laminate level tests carried out on unidirectional materials. Lamina and Laminate stacking sequence can be obtained from page 13 of Appendix 1 of AI/TR/1392 Rev E Appendix (or later revisions).

Layup	Test Type and Direction	Property	Number of Batches x No. of Panels x Number of Test Specimens Test Temperature / Moisture Condition				
			CTD	RTD	ETD	ETW	ETW2
[0°]16	ASTM D3039 0° Tension (1)	Modulus	3x2x3	3x2x3		3x2x3	3x2x3
[0°]16	ASTM D6641 0° Compression (1)	Modulus and Poisson's Ratio	3x2x3	3x2x3		3x2x3	3x2x3
[90°]16	ASTM D3039 90° Tension	Strength and Modulus	3x2x3	3x2x3		3x2x3	3x2x3
[90°]16	ASTM D6641 90° Compression	Strength, Modulus and Poisson's Ratio	3x2x3	3x2x3		3x2x3	3x2x3
[0°/90°]4S	ASTM D3039 0° Tension (1)	Strength and Modulus	3x2x3	3x2x3		3x2x3	3x2x3
[90°/0°]4S	ASTM D6641 90° Compression (1)	Strength, Modulus and Poisson's Ratio	3x2x3	3x2x3	3x2x3	3x2x3	3x2x3
[45°/-45°]2S	ASTM D3518 In-Plane Shear	Strength and Modulus	3x2x3	3x2x3		3x2x3	3x2x3
[0°]16	ASTM D2344 Short Beam Strength	Strength	3x2x3	3x2x3	3x2x3	3x2x3	3x2x3

Table 1-2: Lamina Level Tests – Unidirectional Tape

Note 1: 0° tension and compression strengths will be derived from the 0°/90° tension and compression strength values in accordance with:

$$F_{0^\circ}^{cu} = F_{0^\circ/90^\circ}^{cu} \frac{E_1}{E_{0^\circ/90^\circ}}$$

Where:

- $F_{0^\circ}^{cu}$ = 0° strength
- $F_{0^\circ/90^\circ}^{cu}$ = 0°/90° or 90°/0° strength
- E_1 = 0° modulus
- $E_{0^\circ/90^\circ}$ = 0°/90° or 90°/0° modulus

Table 1-3 below indicates the laminate level tests performed on the IM7 12K unidirectional 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 contained in this document.

(%0°/%±45°/%90°) Actual Test Type	Test Type and Layout	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) OHT1	ASTM D5766 Open Hole Tension (1) [45/0/-45/90]3S	Strength	3x2x3	3x2x3	1x2x3	3x2x3
(10/80/10) OHT2	ASTM D5766 Open Hole Tension (1) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength	3x2x3	1x2x3		1x2x3
(50/40/10) OHT3	ASTM D5766 Open Hole Tension (1) [0/0/45/0/90/-45/0/45/0/-45]S	Strength	3x2x3	1x2x3		1x2x3
(25/50/25 - QI) OHC1	ASTM D6484 Open Hole Compression (1) [45/0/-45/90]3S	Strength		3x2x3	1x2x3	3x2x3
(10/80/10) OHC2	ASTM D6484 Open Hole Compression (1) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength		1x2x3		3x2x3
(50/40/10) OHC3	ASTM D6484 Open Hole Compression (1) [0/0/45/0/90/-45/0/45/0/-45]S	Strength		1x2x3		3x2x3
(25/50/25 - QI) UNT1	ASTM D3039 Un-notched Tension [45/0/-45/90]3S	Strength & Modulus	3x2x3	3x2x3	1x2x3	3x2x3
(10/80/10) UNT2	ASTM D3039 Un-notched Tension [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength & Modulus	3x2x3	1x2x3		1x2x3
(50/40/10) UNT3	ASTM D3039 Un-notched Tension [0/0/45/0/90/-45/0/45/0/-45]S	Strength & Modulus	3x2x3	1x2x3		1x2x3
(25/50/25 - QI) UNC1	ASTM D6641 Un-notched Compression [45/0/- 45/90]3S	Strength & Modulus		3x2x3	1x2x3	3x2x3
(10/80/10) UNC2	ASTM D6641 Un-notched Compression [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength & Modulus		1x2x3		3x2x3
(50/40/10) UNC3	ASTM D6641 Un-notched Compression [0/0/45/0/90/-45/0/45/0/-45]S	Strength & Modulus		1x2x3		3x2x3
(25/50/25 - QI) SBS1	ASTM D2344 Short Beam [45/0/-45/90]3S	Strength		3x2x3	1x2x3	3x2x3
(25/50/25 - QI) FHT1	ASTM D6742 Filled Hole Tension (2) [45/0/-45/90]3S	Strength	3x2x3	1x2x3		
(10/80/10) FHT2	ASTM D6742 Filled Hole Tension (2) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength	1x2x3	1x2x3		1x2x3
(50/40/10) FHT3	ASTM D6742 Filled Hole Tension (2) [0/0/45/0/90/-45/0/45/0/-45]S	Strength	1x2x3	1x2x3		
(25/50/25 - QI) FHC1	ASTM D6742 Filled Hole Compression (2) [45/0/-45/90]3S	Strength		1x2x3		3x2x3
(10/80/10) FHC2	ASTM D6742 Filled Hole Compression (2) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength		1x2x3		3x2x3
(50/40/10) FHC3	ASTM D6742 Filled Hole Compression (2) [0/0/45/0/90/-45/0/45/0/-45]S	Strength		1x2x3		3x2x3
(25/50/25 - QI) SSB1	ASTM D5961 Single Shear Bearing (3) [45/0/-45/90]3S	Strength		3x2x3		3x2x3
(10/80/10) SSB2	ASTM D5961 Single Shear Bearing (3) [45/-45/0/45/-45/90/45/-45/45/-45]S	Strength		1x2x3		3x2x3
(50/40/10) SSB3	ASTM D5961 Single Shear Bearing (3) [0/0/45/0/90/-45/0/45/0/-45]S	Strength		1x2x3		3x2x3
(100/0/0) ILT	ASTM D6415 Interlaminar Tension (4) [0/45/90/-45]4S	Strength		1x1x6		1x1x6
(25/50/25 - QI) CAI1	SACMA SRM 2R Compression After Impact (1500 in.lb/in) [0/45/90/-45]4S	Strength		1x1x6		

Note 1: Open-hole configuration: 0.25" hole diameter, 1.5 inch width

Note 2: Filled-hole test configuration: 0.25" diameter, protruding head fastener, 1.5" width

Note 3: Single shear bearing test configuration: 0.25: hole diameter, 1.5" width, one protruding head fastener, e/D=3

Note 4: Interlaminar tension test as specified above

Table 1-3: Laminate Level Tests – Unidirectional Tape

1.5.4 Cured Laminate Physical Testing

The cured physical testing was conducted at ACG can be found in Table 1-4.

The following physical test results were conducted on all test laminates 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.

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)

Table 1-4: Physical Testing Matrix

- Note 1:** Where the applicable standard allows variations in specimen form or test method, the specific parameters to be used will be specified in the test work instructions and reported in the applicable test report.
- Note 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) shall be tested by Method I, Procedure B for carbon reinforcements and Procedure G for glass or quartz reinforcements.
- Note 3:** Minimum 24 dry and 24 wet for each material system, 3 dry & 3 wet per traveler coupon for equivalency testing.

1.5.5 Physical Testing

Physical testing was conducted at the prepreg level at ACG. See results in section 8 below. The cured physical testing results obtained by NIAR can be found in the individual summary charts in section 2.1 below.

1.5.6 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 = $-65\pm 5^{\circ}\text{F}$, ambient moisture content dry
RTD = room temperature ambient dry
RTA = room temperature ambient – no drying required
ETD = $200\pm 5^{\circ}\text{F}$ dry
ETW = $200\pm 5^{\circ}\text{F}$, wet (equilibrium moisture content)
ETW2 = $250\pm 5^{\circ}\text{F}$, wet (equilibrium moisture content)

Unless otherwise specified, a tolerance of $\pm 5^{\circ}\text{F}$ applied to all temperature conditions specified in this document.

For dry testing, specimens were dried at $160^{\circ}\text{F}\pm 5^{\circ}\text{F}$ for 120 to 130 hours. When drying was completed, specimens were either stored until testing in a sealed oven maintained at $85^{\circ}\text{F} \pm 5^{\circ}\text{F}$ or alternately stored with desiccant in a sealed container. For wet testing, specimens were conditioned to equilibrium in a $160^{\circ}\text{F}\pm 5^{\circ}\text{F}$ and $85\% \pm 5\% \text{RH}$ 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.

1.5.7 Fluid Sensitivity Screening

Fluid sensitivity was not conducted on this material. Per the test plan, it is only performed on a limited number of reinforcement types.

1.5.8 Normalization Procedures

The nominal cure ply thicknesses for each material type are given in Appendix 3 of AI/TR/1392 Rev E (or later revisions). 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 145 g/m² and the average of the four batches of material was 143.85 g/m² therefore normalization by cured ply thickness (CPT) was used, i.e.:

$$\text{Normalized strength} = \text{Measured Strength} \times \text{Measured CPT} / \text{Nominal CPT}$$

The nominal CPT is 0.0055 inch and the average CPT was 0.0056 inch. Individual ply thicknesses can be found in each individual summary sheet, but as an example, the range for each panel was between 0.0050 and 0.0066 inch CPT. The CPT of the individual specimens was also shown to be close to the nominal CPT.

1.5.9 Conformity

All laminates and specimens for design allowable were inspected for conformance with the requirements of this document and Appendices 1 and 2 of AI/TR/1392 Rev E. 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.

1.5.10 Material Pedigree Information

The PMC Data collection template includes the material pedigree information required, such as material and batch information, as well as environmental conditioning and test results.

2. Test Results

2.1 Lamina Level Test Summary

Prepreg Material: Advanced Composites Group - MTM45-1/IM7-145 gsm Unidirectional Tape Material Specification: ACGM 1001-06 or NMS 451/6 Process Specification: ACGP 1001-02 or NPS 81451 "MH" Cure Cycle		ACG - MTM45-1/IM7 Unidirectional Tape Lamina Properties Summary								
Fiber: Hexcel Corp., IM7-GP fiber, 12K tow (HS-CP-5000/IM7specification)		Resin: MTM45-1								
Tg(dry): 349.06°F	Tg(wet): 317.11°F	Tg METHOD: DMA (SRM 18R-94)								
Fiber Batch Information:		Batch A 3763-7H 12/12/2006	Batch B 3117-7B 1/20/2005	Batch C 3666-7E 8/31/2006						
Resin Batch Information:		2781 1/17/2007	2699 8/25/2006	2751 12/6/2006						
Date of fiber manufacture:		Date of testing: 3/2007 to 2/2008		Date of data submittal: 6/1/2008						
Date of resin manufacture:		Date of composite manufacture:		1/18/2007						
Date of prepreg manufacture:		9/25/2006		12/6/2007						
Date of composite manufacture:		12/6/2007		12/6/2007						
LAMINA MECHANICAL PROPERTY SUMMARY Data reported as: Normalized & Measured (Normalized by CPT= 0.0055 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]	370.50	354.11	357.65	343.61	---	---	368.98	355.73	342.57	333.93
from UNT0*										
E_1^t [Msi]	23.36	22.34	22.90	22.00	---	---	22.12	21.37	23.82	23.24
F_2^{TU} [ksi]	---	8.34	---	7.59	---	---	---	4.30	---	3.49
E_2^t [Msi]	---	1.24	---	1.11	---	---	---	0.95	---	0.82
F_1^{CU} [ksi]	204.89	200.54	181.54	177.80	---	---	154.23	154.11	138.09	136.37
from UNC0*										
E_1^c [Msi]	20.41	19.96	20.24	19.84	---	---	20.25	20.13	20.42	20.21
ν_{12}^c	---	0.346	---	0.361	---	---	---	0.373	---	0.389
F_2^{CU} [ksi]	---	38.26	---	27.96	---	---	---	15.71	---	12.91
E_2^c [Msi]	---	1.30	---	1.22	---	---	---	1.09	---	1.01
ν_{21}^c	---	0.027	---	0.026	---	---	---	0.021	---	0.022
UNT0 Strength [ksi]	184.31	177.76	181.55	174.71	---	---	190.61	186.51	188.22	183.80
UNT0 Modulus [Msi]	11.62	11.21	11.62	11.19	---	---	11.43	11.20	13.09	12.79
UNC0 Strength [ksi]	116.81	113.57	99.65	96.80	90.17	87.80	83.27	82.24	76.56	75.32
UNC0 Modulus [Msi]	11.64	11.30	11.11	10.80	11.24	10.98	10.93	10.74	11.32	11.16
ν_{UNC0}	---	0.047	---	0.040	---	0.039	---	0.039	---	0.036
$F_{12}^{s0.2\%}$ [ksi]	---	7.74	---	5.90	---	---	---	3.53	---	3.00
$F_{12}^{s5\%strain}$ [ksi]	---	13.00	---	9.63	---	---	---	5.48	---	4.58
G_{12}^s [Msi]	---	0.632	---	0.525	---	---	---	0.358	---	0.325
SBS [ksi]	---	20.85	---	14.47	---	11.15	---	8.54	---	6.92

* Derived from cross-ply using back-out factor

Table 2-1: Lamina Summary Data

2.2 Laminate Level Test Summary

Prepreg Material: Advanced Composites Group - MTM45-1/IM7-145 gsm Unidirectional Tape Material Specification: ACGM 1001-06 or NMS 451/6 Process Specification: ACGP 1001-02 or NPS 81451 "MH" Cure Cycle						ACG - MTM45-1/IM7 Unidirectional Tape Laminate Properties Summary	
Fiber: Hexcel Corp., IM7-GP fiber, 12K tow (HS-CP-5000/IM7specification)		Resin: MTM45-1					
Tg(dry)	349.06°F	Tg(wet)	317.11°F	Tg METHOD:	DMA (SRM 18R-94)		
Fiber Batch Information:		Batch A	Batch B	Batch C			
Date of fiber manufacture:		3763-7H 12/12/2006	3117-7B 1/20/2005	3666-7E 8/31/2006			
Resin Batch Information:		2781	2699	2751	Date of testing: 3/2007 to 2/2008		
Date of resin manufacture:		1/17/2007	8/25/2006	12/6/2006	Date of data submittal: 6/1/2008		
Date of prepreg manufacture:		1/17/2007	8/25/2006	12/6/2006			
Date of composite manufacture:		1/18/2007	9/25/2006	12/6/2007			
LAMINATE MECHANICAL PROPERTY SUMMARY Data reported as: Normalized & Measured (Normalized by CPT= 0.0055 inch)							
Layup:		25/50/25		10/80/10		50/40/10	
	Test Condition	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT Strength [ksi]	CTD	66.59	65.42	48.77	48.06	108.07	106.97
	RTD	68.01	66.79	46.98	46.41	115.39	113.42
	ETW	73.24	71.45	---	---	---	---
	ETW2	72.99	71.68	42.72	42.04	134.75	133.60
OHC Strength [ksi]	RTD	42.87	42.32	38.05	36.76	49.93	49.12
	ETW	34.76	33.97	---	---	---	---
	ETW2	31.91	31.61	25.71	25.20	39.70	39.41
UNT Strength [ksi]	CTD	130.69	128.55	78.43	75.90	207.55	200.97
	RTD	132.81	130.80	75.11	73.05	206.81	199.82
	ETW2	124.13	120.97	58.64	57.41	205.72	198.73
UNT Modulus [Msi]	CTD	8.27	8.14	5.07	4.90	12.96	12.55
	RTD	8.13	8.01	4.91	4.78	12.68	12.25
	ETW2	8.31	8.10	4.73	4.63	12.78	12.35
UNC Strength [ksi]	RTD	80.93	80.24	58.08	57.14	93.43	91.70
	ETW	70.42	67.84	---	---	---	---
	ETW2	59.76	59.32	42.47	41.77	71.40	70.08
UNC Modulus [Msi]	RTD	7.59	7.52	4.81	4.73	12.25	12.00
	ETW	7.67	7.39	---	---	---	---
	ETW2	7.52	7.46	4.45	4.37	11.53	11.30
vUNC	RTD	---	0.292	---	0.574	---	0.447
	ETW	---	0.319	---	---	---	---
	ETW2	---	0.292	---	0.584	---	0.440
FHT Strength [ksi]	CTD	69.79	68.61	52.73	50.82	105.08	100.27
	RTD	70.35	69.65	48.76	47.21	106.60	101.87
	ETW2	---	---	43.80	42.04	---	---
FHC Strength [ksi]	RTD	66.57	65.58	53.80	52.58	77.85	77.20
	ETW2	44.43	43.92	35.67	35.34	51.87	51.44
SBS1 Strength [ksi]	RTD	---	10.22	---	---	---	---
	ETW	---	7.12	---	---	---	---
	ETW2	---	5.80	---	---	---	---
2% Offset Bearing Strength [ksi]	RTD	94.24	93.92	101.38	99.58	99.93	98.65
	ETW2	82.04	82.33	78.84	76.16	77.41	77.50
CAI Strength [ksi]	RTD	36.83	36.47	---	---	---	---

Table 2-2: Laminate Summary Data

2.3 Individual Test Summaries

2.3.1 Longitudinal Tension Properties (LT)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Tension, 1-axis Gr/ Ep ACG - MTM45-1/ IM7 Uni [0]16							
Resin content: 33.997 % w t	Comp. density: 1.534 [g/cc]								
Fiber volume: 57.183 % vol									
Ply count: 16									
Test method: ASTM D3039-00	Modulus calculation: 1000 to 3000 microstrain								
Normalized by: 0.0055 in. CPT									
	CTD	RTD	ETW	ETW2					
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	AFJX X1XB	AFJX X1XA	AFJX X1XN	AFJX X1XD					
	Normalized	Measured	Normalized	Measured	Normalized				
	Measured	Normalized	Measured	Normalized	Measured				
Mean	23.36	22.34	22.90	22.00	22.12	21.37	23.82	23.24	
Minimum	21.96	21.22	21.46	21.10	20.73	20.36	22.68	21.56	
Maximum	25.11	22.99	25.47	22.75	23.74	22.34	25.23	25.07	
E_t (Msi)	C.V.(%)	4.81	2.21	5.28	2.23	3.64	2.90	3.19	4.52
No. Specimens	17		16		16		15		
No. Prepreg Lots	3		3		3		3		

2.3.2 Transverse Tension Properties (TT)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Tension, 2-axis Gr/ Ep ACG - MTM45-1/ IM7 Uni [90]16			
Resin content: 34.546 % w t	Comp. density: 1.538 [g/cc]				
Fiber volume: 56.863 % vol					
Ply count: 16					
Test method: ASTM D3039-00	Modulus calculation: 1000 to 3000 microstrain				
Normalized by: NA					
	CTD	RTD	ETW	ETW2	
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	AFUX X1XB	AFUX X1XA	AFUX X1XN	AFUX X1XD	
	Normalized	Measured	Normalized	Measured	Normalized
	Measured	Normalized	Measured	Normalized	Measured
F₂^{tu} (ksi)	8.34	7.59	4.30	3.49	5.33
Mean	5.33	5.41	2.56	2.43	10.42
Minimum	10.42	9.52	5.29	4.52	16.97
Maximum	16.97	16.97	23.44	21.10	18
C.V.(%)	18	21	19	18	3
No. Specimens	3	3	3	3	
No. Prepreg Lots					
E₂^t (Msi)	1.24	1.11	0.95	0.82	1.14
Mean	1.14	1.01	0.87	0.70	1.45
Minimum	1.45	1.24	1.03	0.97	6.07
Maximum	6.07	5.08	5.12	7.55	22
C.V.(%)	22	23	19	18	3
No. Specimens	3	3	3	3	
No. Prepreg Lots					

2.3.3 Longitudinal Compression Properties (LC)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Compression, 1-axis Gr/ Ep ACG - MTM45-1/ IM7 Uni [0]16						
Resin content: 32.970 % wt	Comp. density: 1.536 [g/cc]							
Fiber volume: 58.174 % vol								
Ply count: 16								
Test method: ASTM D6641-01e1	Modulus calculation: 1000 to 3000 microstrain							
Normalized by: 0.0055	in. CPT							
	CTD	RTD	ETW	ETW2				
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	AFLX X1XB	AFLX X1XA	AFLX X1XN	AFLX X1XD				
	Normalized	Measured	Normalized	Measured	Normalized			
	Measured	Normalized	Measured	Normalized	Measured			
E₁^c (Msi)	20.41	19.96	20.24	19.84	20.25	20.13	20.42	20.21
Minimum	17.71	18.36	18.01	18.25	18.54	18.61	18.91	18.82
Maximum	22.49	21.60	21.75	21.03	22.22	21.34	21.75	21.45
C.V.(%)	6.89	5.17	4.86	3.78	5.06	3.73	4.43	3.17
No. Specimens	20		23		18		20	
No. Prepreg Lots	3		3		3		3	
Mean	0.346		0.361		0.373		0.389	
v₁₂^c								
No. Specimens	21		22		18		20	
No. Prepreg Lots	3		3		3		3	

2.3.4 Transverse Compression Properties (TC)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Compression, 2-axis Gr/ Ep ACG - MTM45-1/ IM7 Uni [90]16							
Resin content: 34.262 % wt	Comp. density: 1.534 [g/cc]								
Fiber volume: 56.995 % vol									
Ply count: 16									
Test method: ASTM D6641-01e1		Modulus calculation: 1000 to 3000 microstrain							
Normalized by: NA									
		CTD		RTD		ETW		ETW2	
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		AFZX X1XB		AFZX X1XA		AFZX X1XN		AFZX X1XD	
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured
F₂^{cu} (ksi)	Mean		38.26		27.96		15.71		12.91
	Minimum		33.54		26.37		13.58		12.16
	Maximum		43.16		29.30		17.06		14.50
	C.V.(%)		6.20		3.29		5.41		5.03
	No. Specimens		19		18		18		19
No. Prepreg Lots		3		3		3		3	
E₂^c (Msi)	Mean		1.30		1.22		1.09		1.01
	Minimum		1.18		1.16		0.96		0.93
	Maximum		1.48		1.30		1.15		1.15
	C.V.(%)		6.16		3.07		4.70		6.69
	No. Specimens		18		18		18		19
No. Prepreg Lots		3		3		3		3	
v₂₁^c	Mean		0.027		0.026		0.021		0.022
	No. Specimens		18		18		18		19
	No. Prepreg Lots		3		3		3		3

2.3.5 In-Plane Shear Properties (IPS)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		In-Plane Shear Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45]2S			
Resin content: 31.494 % w t	Comp. density: 1.526 [g/cc]				
Fiber volume: 59.062 % vol					
Ply count: 8					
Test method: ASTM D3518-94	Modulus calculation: 2000 to 6000 microstrain				
Normalized by: NA					
	CTD	RTD	ETW	ETW2	
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	AFNX X1XB	AFNX X1XA	AFNX X1XN	AFNX X1XD	
	Normalized	Measured	Normalized	Measured	Normalized
					Measured
Mean		13.00	9.63	5.48	4.58
Minimum		10.56	7.96	4.68	4.07
Maximum		14.53	11.03	6.02	5.03
F₁₂^{s5% strain} (ksi) C.V.(%)		9.05	8.71	6.93	5.12
No. Specimens		18	18	18	18
No. Prepreg Lots		2	2	2	2
Mean		7.74	5.90	3.53	3.00
Minimum		6.66	4.76	3.08	2.60
Maximum		9.08	6.99	3.89	3.35
F₁₂^{s0.2%} (ksi) C.V.(%)		7.98	8.77	7.12	5.75
No. Specimens		38	20	19	18
No. Prepreg Lots		2	2	2	2
Mean		0.632	0.525	0.358	0.325
Minimum		0.54	0.42	0.32	0.27
Maximum		0.75	0.62	0.40	0.36
G₁₂^s (Msi) C.V.(%)		8.44	9.14	7.11	7.52
No. Specimens		38	20	19	18
No. Prepreg Lots		2	2	2	2

2.3.6 “50/0/50” Unnotched Tension 0 Properties (UNT0)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Tension 0 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/90]4S									
Resin content:	33.477 % w t									Comp. dens 1.528 [g/cc]	
Fiber volume:	57.441 % vol										
Ply count:	16										
Test method: ASTM D3039-00		Modulus calculation: 1000 to 3000 microstrain									
Normalized by: 0.0055 in. CPT											
		CTD		RTD		ETW		ETW2			
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		AFPX X1XB		AFPX X1XA		AFPX X1XN		AFPX X1XD			
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured		
UNT0 Strength (ksi)	Mean	184.31	177.76	181.55	174.71	190.61	186.51	188.22	183.80		
	Minimum	165.01	158.18	167.36	160.60	172.78	165.17	167.83	161.29		
	Maximum	202.16	189.25	200.54	192.10	211.61	203.85	205.76	199.45		
	C.V.(%)	5.81	4.95	4.94	4.76	5.38	4.82	6.60	6.00		
	No. Specimens	18		19		22		20			
	No. Prepreg Lots	3		3		3		3			
UNT0 Modulus (Msi)	Mean	11.62	11.21	11.62	11.19	11.43	11.20	13.09	12.79		
	Minimum	9.92	9.51	10.69	10.29	10.74	10.34	11.04	10.51		
	Maximum	12.53	11.91	12.33	11.77	12.15	11.91	14.90	14.44		
	C.V.(%)	5.20	4.70	4.48	3.91	3.99	3.39	6.92	7.41		
	No. Specimens	18		20		22		20			
	No. Prepreg Lots	3		3		3		3			

2.3.7 “25/50/25” Unnotched Tension 1 Properties (UNT1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Tension 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S				
Resin content: 32.666 % wt	Comp. density: 1.532 [g/cc]					
Fiber volume: 58.292 % vol						
Ply count: 24						
Test method: ASTM D3039-00		Modulus calculation: 1000 to 3000 microstrain				
Normalized by: 0.0055 in. CPT						
	CTD	RTD		ETW2		
Test Temperature [°F]	-65	75		250		
Moisture Conditioning	dry	dry		equilibrium		
Equilibrium at T, RH				160 F,85%		
Source code	AFAX X1XB	AFAX X1XA		AFAX X1XD		
	Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT1 Strength (ksi)						
Mean	130.69	128.55	132.81	130.80	124.13	120.97
Minimum	119.58	117.88	125.59	123.17	114.85	111.02
Maximum	144.13	140.31	146.63	142.85	129.07	126.33
C.V.(%)	5.78	5.26	4.94	4.23	4.37	4.62
No. Specimens	18		18		6	
No. Prepreg Lots	3		3		1	
UNT1 Modulus (Msi)						
Mean	8.27	8.14	8.13	8.01	8.31	8.10
Minimum	7.71	7.59	7.65	7.50	7.89	7.63
Maximum	8.83	8.83	8.41	8.32	9.00	8.75
C.V.(%)	3.58	3.91	2.33	2.59	5.38	5.50
No. Specimens	18		18		6	
No. Prepreg Lots	3		3		1	

2.3.8 “10/80/10” Unnotched Tension 2 Properties (UNT2)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Tension 2 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45/0/45/-45/90/45/-45/45/-					
Resin content:	32.040 % wt						
Fiber volume:	58.903 % vol						
Ply count:	20						
Test method: ASTM D3039-00		Modulus calculation: 1000 to 3000 microstrain					
Normalized by:	0.0055	in. CPT					
		CTD		RTD		ETW2	
Test Temperature [°F]		-65		75		250	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F,85%	
Source code		AFBX X1XB		AFBX X1XA		AFBX X1XD	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
UNT2 Strength (ksi)	Mean	78.43	75.90	75.11	73.05	58.64	57.41
	Minimum	74.13	71.98	73.09	71.66	56.96	55.29
	Maximum	82.57	79.74	77.60	75.28	61.22	60.14
	C.V.(%)	4.06	3.98	1.95	1.69	3.23	3.61
	No. Specimens	6		6		6	
	No. Prepreg Lots	1		1		1	
UNT2 Modulus (Msi)	Mean	5.07	4.90	4.91	4.78	4.73	4.63
	Minimum	4.82	4.66	4.80	4.67	4.58	4.45
	Maximum	5.30	5.13	5.12	5.00	4.98	4.89
	C.V.(%)	3.01	3.14	2.35	2.45	3.37	3.75
	No. Specimens	6		6		6	
	No. Prepreg Lots	1		1		1	

2.3.9 “50/40/10” Unnotched Tension 3 Properties (UNT3)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Tension 3 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/0/45/0/90/-45/0/45/0/-45]S									
Resin content:	32.006 % wt							Comp. density: 1.538 [g/cc]			
Fiber volume:	59.072 % vol										
Ply count:	20										
Test method: ASTM D3039-00		Modulus calculation: 1000 to 3000 microstrain									
Normalized by: 0.0055 in. CPT											
		CTD		RTD		ETW2					
Test Temperature [°F]		-65		75		250					
Moisture Conditioning		dry		dry		equilibrium					
Equilibrium at T, RH						160 F,85%					
Source code		AFCX X1XB		AFCX X1XA		AFCX X1XD					
		Normalized	Measured	Normalized	Measured	Normalized	Measured				
UNT3 Strength (ksi)	Mean	207.55	200.97	206.81	199.82	205.72	198.73				
	Minimum	186.03	182.87	193.50	185.90	195.18	188.08				
	Maximum	217.78	211.81	217.97	213.13	215.26	205.64				
	C.V.(%)	5.37	4.95	5.08	4.99	3.91	3.78				
	No. Specimens	6		6		6					
	No. Prepreg Lots	1		1		1					
UNT3 Modulus (Msi)	Mean	12.96	12.55	12.68	12.25	12.78	12.35				
	Minimum	11.70	11.50	11.70	11.24	11.78	11.35				
	Maximum	13.78	13.40	13.16	12.81	13.70	13.23				
	C.V.(%)	5.51	5.03	4.30	4.42	6.16	6.36				
	No. Specimens	6		6		4					
	No. Prepreg Lots	1		1		1					

2.3.10 “50/0/50” Unnotched Compression 0 Properties (UNC0)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Compression 0 Gr/ Ep ACG - MTM45-1/ IM7 Uni [90/0]4S									
Resin content: 34.557 % wt	Comp. density: 1.537 [g/cc]										
Fiber volume: 56.824 % vol											
Ply count: 16											
Test method: ASTM D6641-01e1	Modulus calculation: 1000 to 3000 microstrain										
Normalized by: 0.0055	in. CPT										
		CTD		RTD		ETD		ETW		ETW2	
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	AFRX X1XB	AFRX X1XA		AFRX X1XC		AFRX X1XN		AFRX X1XD			
	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured	
UNC0 Strength (ksi)	Mean	116.81	113.57	99.65	96.80	90.17	87.80	83.27	82.24	76.56	75.32
	Minimum	100.64	97.97	82.62	82.16	80.27	77.88	76.37	74.28	59.64	60.63
	Maximum	134.00	131.53	114.34	108.43	98.91	95.86	88.91	89.36	86.65	84.62
	C.V.(%)	8.84	8.99	9.69	8.52	6.76	7.00	6.62	6.71	9.90	9.03
	No. Specimens	10		8		8		6		9	
	No. Prepreg Lots	2		2		2		2		2	
UNC0 Modulus (Msi)	Mean	11.64	11.30	11.11	10.80	11.24	10.98	10.93	10.74	11.32	11.16
	Minimum	9.88	9.71	10.16	9.76	9.78	9.59	9.23	9.05	10.31	10.07
	Maximum	13.25	12.70	12.24	11.86	12.05	11.72	12.42	12.10	12.83	12.69
	C.V.(%)	10.38	9.30	6.54	6.64	6.46	6.40	7.90	7.62	6.89	6.95
	No. Specimens	10		8		11		12		11	
	No. Prepreg Lots	2		2		2		2		2	
√UNC0	Mean	0.047		0.040		0.039		0.039		0.036	
	No. Specimens	12		11		11		12		11	
	No. Prepreg Lots	2		2		2		2		2	

*See Section 9.0 Deviations, for further explanation on the data not included.

2.3.11 “25/50/25” Unnotched Compression 1 Properties (UNC1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Compression 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S					
Resin content: 32.597 % wt	Comp. density: 1.511 [g/cc]						
Fiber volume: 57.543 % vol							
Ply count: 24							
Test method: ASTM D6641-01e1		Modulus calculation: 1000 to 3000 microstrain					
Normalized by: 0.0055 in. CPT							
	RTD	ETW		ETW2			
Test Temperature [°F]	75	200		250			
Moisture Conditioning	dry	equilibrium		equilibrium			
Equilibrium at T, RH		160 F,85%		160 F,85%			
Source code	AFOX X1XA	AFOX X1XN		AFOX X1XD			
	Normalized	Measured	Normalized	Measured	Normalized	Measured	
UNC1 Strength (ksi)	Mean	80.93	80.24	70.42	67.84	59.76	59.32
	Minimum	76.38	73.65	68.74	66.22	54.04	53.78
	Maximum	84.90	84.97	71.71	69.21	68.08	65.41
	C.V.(%)	3.57	4.61	2.16	2.23	7.51	6.29
	No. Specimens	12		3		13	
	No. Prepreg Lots	3		1		3	
UNC1 Modulus (Msi)	Mean	7.59	7.52	7.67	7.39	7.52	7.46
	Minimum	7.23	7.22	7.64	7.36	7.09	6.96
	Maximum	8.01	7.90	7.74	7.44	8.07	8.10
	C.V.(%)	3.05	2.52	0.74	0.61	3.36	4.00
	No. Specimens	13		3		15	
	No. Prepreg Lots	3		1		3	

2.3.12 “10/80/10” Unnotched Compression 2 Properties (UNC2)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Compression 2 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45/0/45/-45/90/45/-45/45/-]			
Resin content: 33.050 % wt	Comp. density: 1.526 [g/cc]				
Fiber volume: 57.736 % vol					
Ply count: 20					
Test method: ASTM D6641-01e1		Modulus calculation: 1000 to 3000 microstrain			
Normalized by: 0.0055 in. CPT					
	RTD	ETW2			
Test Temperature [°F]	75	250			
Moisture Conditioning	dry	equilibrium			
Equilibrium at T, RH		160 F, 85%			
Source code	AFX X1XA	AFX X1XD			
	Normalized	Measured	Normalized	Measured	
UNC2 Strength (ksi)	Mean	58.08	57.14	42.47	41.77
	Minimum	53.44	52.91	41.07	40.49
	Maximum	63.71	62.96	44.39	43.57
	C.V.(%)	5.63	5.48	3.14	3.11
	No. Specimens	7		6	
	No. Prepreg Lots	1		1	
UNC2 Modulus (Msi)	Mean	4.81	4.73	4.45	4.37
	Minimum	4.57	4.52	4.38	4.31
	Maximum	4.93	4.88	4.52	4.46
	C.V.(%)	2.71	2.49	1.22	1.30
	No. Specimens	6		7	
	No. Prepreg Lots	1		1	

2.3.13 “50/40/10” Unnotched Compression 3 Properties (UNC3)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Unnotched Compression 3 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/0/45/0/90/-45/0/45/0/-45]S			
Resin content: 33.394 % wt	Comp. density: 1.531 [g/cc]				
Fiber volume: 57.627 % vol					
Ply count: 20					
Test method: ASTM D6641-01e1		Modulus calculation: 1000 to 3000 microstrain			
Normalized by: 0.0055 in. CPT					
	RTD	ETW2			
Test Temperature [°F]	75	250			
Moisture Conditioning	dry	equilibrium			
Equilibrium at T, RH		160 F, 85%			
Source code	AFYX X1XA	AFYX X1XD			
	Normalized	Measured	Normalized	Measured	
UNC3 Strength (ksi)	Mean	93.43	91.70	71.40	70.08
	Minimum	87.24	84.40	65.61	66.02
	Maximum	98.71	95.83	75.52	73.84
	C.V.(%)	4.63	4.40	5.28	4.50
	No. Specimens	6		6	
	No. Prepreg Lots	1		1	
UNC3 Modulus (Msi)	Mean	12.25	12.00	11.53	11.30
	Minimum	11.60	11.57	10.73	10.75
	Maximum	12.70	12.29	11.91	11.63
	C.V.(%)	3.14	2.42	3.92	3.24
	No. Specimens	7		7	
	No. Prepreg Lots	1		1	

2.3.14 Lamina Short-Beam Strength Properties (SBS)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Short Beam Strength Gr/ Ep ACG - MTM45-1/ IM7 Uni [0]16			
Resin content: NA	Comp. density: NA				
Fiber volume: NA					
Ply count: 16					
Test method: ASTM D2344-00					
Normalized by: NA					
	CTD	RTD	ETD	ETW	ETW2
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	AFQX X1XB	AFQX X1XA	AFQX X1XC	AFQX X1XN	AFQX X1XD
	Normalized	Measured	Normalized	Measured	Normalized
	Measured	Normalized	Measured	Normalized	Measured
Mean	20.85	14.47	11.15	8.54	6.92
Minimum	18.95	13.85	10.59	8.33	6.18
Maximum	22.39	15.18	11.57	9.12	7.65
SBS (ksi) C.V.(%)	4.64	3.75	2.77	2.24	4.10
No. Specimens	14	6	13	18	19
No. Prepreg Lots	3	3	3	3	3

2.3.15 Laminate Short-Beam Strength Properties (SBS1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Laminate Short Beam Strength Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S				
Resin content: NA	Comp. density: NA					
Fiber volume: NA						
Ply count: 24						
Test method: ASTM D2344-00						
Normalized by: NA						
	RTD	ETW		ETW2		
Test Temperature [°F]	75	200		250		
Moisture Conditioning	dry	equilibrium		equilibrium		
Equilibrium at T, RH		160 F,85%		160 F,85%		
Source code	AFqX XGXA	AFqX XGXN		AFqX XGXD		
	Normalized	Measured	Normalized	Measured	Normalized	Measured
Mean		10.22		7.12		5.80
Minimum		8.85		6.51		3.24
Maximum		11.65		7.46		6.34
SBS1 (ksi) C.V.(%)		8.59		7.38		13.48
No. Specimens		12		3		13
No. Prepreg Lots		3		1		3

2.3.16 “25/50/25” Open-Hole Tension 1 Properties (OHT1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Open-Hole Tension 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S															
Resin content:	33.396 % w t									Comp. density: 1.531 [g/cc]							
Fiber volume:	57.592 % vol																
Ply count:	24																
Test method: ASTM D5766-02a																	
Normalized by: 0.0055 in. CPT																	
		CTD		RTD		ETW		ETW2									
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		AFDX X1XB		AFDX X1XA		AFDX X1XN		AFDX X1XD									
		Normalized	Measured	Normalized	Measured	Normalized	Measured	Normalized	Measured								
OHT1 Strength (ksi)	Mean	66.59	65.42	68.01	66.79	73.24	71.45	72.99	71.68								
	Minimum	62.52	60.59	64.64	63.40	70.05	67.65	65.96	65.38								
	Maximum	70.75	69.38	73.19	71.30	77.07	75.73	78.69	75.95								
	C.V.(%)	3.57	3.72	3.67	3.17	3.36	3.78	5.14	4.54								
	No. Specimens	18		19		6		19									
	No. Prepreg Lots	3		3		1		3									

2.3.17 “10/80/10” Open-Hole Tension 2 Properties (OHT2)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Open-Hole Tension 2 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45/0/45/-45/90/45/-45/45/-45]S					
Resin content: 32.093 % wt	Comp. density: 1.533 [g/cc]						
Fiber volume: 58.824 % vol							
Ply count: 20							
Test method: ASTM D5766-02a							
Normalized by: 0.0055 in. CPT							
	CTD		RTD		ETW2		
Test Temperature [°F]	-65		75		250		
Moisture Conditioning	dry		dry		equilibrium		
Equilibrium at T, RH					160 F,85%		
Source code	AFEX X1XB		AFEX X1XA		AFEX X1XD		
	Normalized	Measured	Normalized	Measured	Normalized	Measured	
OHT2 Strength (ksi)	Mean	48.77	48.06	46.98	46.41	42.72	42.04
	Minimum	47.50	46.12	44.34	44.46	40.44	40.34
	Maximum	52.81	52.19	48.68	48.90	44.11	43.79
	C.V.(%)	2.79	2.81	3.50	3.54	3.44	2.75
	No. Specimens	18		6		6	
No. Prepreg Lots	3		1		1		

2.3.18 “50/40/10” Open-Hole Tension 3 Properties (OHT3)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Open-Hole Tension 3 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/0/45/0/90/-45/0/45/0/-45]S				
Resin content: 32.707 % wt	Comp. density: 1.530 [g/cc]					
Fiber volume: 58.187 % vol						
Ply count: 20						
Test method: ASTM D5766-02a						
Normalized by: 0.0055 in. CPT						
	CTD		RTD		ETW2	
Test Temperature [°F]	-65		75		250	
Moisture Conditioning	dry		dry		equilibrium	
Equilibrium at T, RH					160 F,85%	
Source code	AFFX X1XB		AFFX X1XA		AFFX X1XD	
	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHT3 Strength (ksi)						
Mean	108.07	106.97	115.39	113.42	134.75	133.60
Minimum	95.97	94.08	108.07	103.46	109.98	112.02
Maximum	117.28	118.68	123.73	124.07	147.71	143.92
C.V.(%)	6.04	6.16	3.80	5.51	9.80	8.14
No. Specimens	18		8		7	
No. Prepreg Lots	3		1		1	

2.3.19 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Filled-Hole Tension 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S			
Resin content: 32.804 % w t	Comp. density 1.530 [g/cc]				
Fiber volume: 58.097 % vol					
Ply count: 24					
Test method: ASTM D6742-02					
Normalized by: 0.0055 in. CPT					
	CTD		RTD		
Test Temperature [°F]	-65		75		
Moisture Conditioning	dry		dry		
Equilibrium at T, RH					
Source code	AF4X X1XB		AF4X X1XA		
	Normalized	Measured	Normalized	Measured	
FHT1 Strength (ksi)					
Mean	69.79	68.61	70.35	69.65	
Minimum	66.98	65.54	67.78	66.18	
Maximum	74.36	73.75	73.19	72.10	
C.V.(%)	2.46	2.83	2.51	2.82	
No. Specimens	22		8		
No. Prepreg Lots	2		1		

2.3.20 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Filled-Hole Tension 2 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45/0/45/-45/90/45/-45/45/-45]S					
Resin content: 33.586 % wt Fiber volume: 57.662 % vol Ply count: 20	Comp. density 1.537 [g/cc]						
Test method: ASTM D6742-02							
Normalized by: 0.0055 in. CPT							
		CTD		RTD		ETW2	
Test Temperature [°F]		-65		75		250	
Moisture Conditioning		dry		dry		equilibrium	
Equilibrium at T, RH						160 F, 85%	
Source code		AF5X X1XB		AF5X X1XA		AF5X X1XD	
		Normalized	Measured	Normalized	Measured	Normalized	Measured
FHT2 Strength (ksi)	Mean	52.73	50.82	48.76	47.21	43.80	42.04
	Minimum	50.84	48.50	47.37	45.46	41.25	40.00
	Maximum	53.96	52.13	50.72	48.90	45.46	43.36
	C.V.(%)	1.87	2.21	2.44	2.38	3.16	2.75
	No. Specimens	7		7		6	
No. Prepreg Lots	1		1		1		

2.3.21 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Filled-Hole Tension 3 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/0/45/0/90/-45/0/45/0/-45]S			
Resin content: 34.156 % wt	Comp. density 1.538 [g/cc]				
Fiber volume: 57.213 % vol					
Ply count: 20					
Test method: ASTM D6742-02					
Normalized by: 0.0055 in. CPT					
		CTD		RTD	
Test Temperature [°F]	-65		75		
Moisture Conditioning	dry		dry		
Equilibrium at T, RH					
Source code	AF6X X1XB		AF6X X1XA		
	Normalized	Measured	Normalized	Measured	
FHT3 Strength (ksi)	Mean	105.08	100.27	106.60	101.87
	Minimum	94.56	90.44	103.80	99.11
	Maximum	109.74	104.73	109.33	104.30
	C.V.(%)	6.77	6.60	2.84	2.42
	No. Specimens	4		4	
	No. Prepreg Lots	1		1	

2.3.22 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Open-Hole Compression 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S				
Resin content: 33.327 % wt	Comp. density: 1.527 [g/cc]					
Fiber volume: 57.525 % vol						
Ply count: 24						
Test method: ASTM D6484-04						
Normalized by: 0.0055	in. CPT					
	RTD	ETW		ETW2		
Test Temperature [°F]	75	200		250		
Moisture Conditioning	dry	equilibrium		equilibrium		
Equilibrium at T, RH		160 F,85%		160 F,85%		
Source code	AFGX X1XA	AFGX X1XN		AFGX X1XD		
	Normalized	Measured	Normalized	Measured	Normalized	Measured
OHC1 Strength (ksi)	42.87	42.32	34.76	33.97	31.91	31.61
Mean	41.35	40.80	34.12	33.57	30.18	30.44
Minimum	45.10	43.43	35.40	34.89	34.36	33.46
Maximum	2.44	1.77	1.29	1.39	3.42	2.65
C.V.(%)						
No. Specimens	18		6		18	
No. Prepreg Lots	3		1		3	

2.3.23 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Open-Hole Compression 2 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45/0/45/-45/90/45/-45/45/-45]S			
Resin content: 33.740 % wt	Comp. density: 1.534 [g/cc]				
Fiber volume: 57.424 % vol	Ply count: 20				
Test method: ASTM D6484-04					
Normalized by: 0.0055 in. CPT					
	RTD	ETW2			
Test Temperature [°F]	75	250			
Moisture Conditioning	dry	equilibrium			
Equilibrium at T, RH		160 F,85%			
Source code	AFHX X1XA	AFHX X1XD			
	Normalized	Measured	Normalized	Measured	
Mean	38.05	36.76	25.71	25.20	
Minimum	36.84	35.90	24.11	23.88	
Maximum	39.94	37.53	27.39	26.78	
OHC2 Strength (ksi) C.V.(%)	3.26	1.53	3.82	3.08	
No. Specimens	6		18		
No. Prepreg Lots	1		3		

2.3.24 “50/40/10” Open-Hole Compression 3 Properties (OHC3)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Open-Hole Compression 3 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/0/45/0/90/-45/0/45/0/-45]S			
Resin content: 33.155 % wt	Comp. density: 1.527 [g/cc]				
Fiber volume: 57.660 % vol	Ply count: 20				
Test method: ASTM D6484-04					
Normalized by: 0.0055 in. CPT					
		RTD		ETW2	
Test Temperature [°F]	75			250	
Moisture Conditioning	dry			equilibrium	
Equilibrium at T, RH				160 F,85%	
Source code	AFIX X1XA			AFIX X1XD	
		Normalized	Measured	Normalized	Measured
OHC3 Strength (ksi)					
Mean		49.93	49.12	39.70	39.41
Minimum		44.21	41.99	35.42	34.13
Maximum		56.62	56.77	45.27	45.34
C.V.(%)		7.64	9.90	6.55	7.49
No. Specimens		7		18	
No. Prepreg Lots		1		3	

2.3.25 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Filled-Hole Compression 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S			
Resin content: 33.465 % wt	Comp. density 1.534 [g/cc]				
Fiber volume: 57.681 % vol					
Ply count: 24					
Test method: ASTM D6742-02					
Normalized by: 0.0055 in. CPT					
	RTD		ETW2		
Test Temperature [°F]	75		250		
Moisture Conditioning	dry		equilibrium		
Equilibrium at T, RH			160 F,85%		
Source code	AF7X X1XA		AF7X X1XD		
	Normalized	Measured	Normalized	Measured	
Mean	66.57	65.58	44.43	43.92	
Minimum	64.41	63.22	42.09	41.35	
Maximum	68.25	67.38	48.33	47.89	
FHC1 Strength (ksi) C.V.(%)	2.64	2.80	4.56	4.81	
No. Specimens	6		18		
No. Prepreg Lots	1		3		

2.3.26 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Filled-Hole Compression 2 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45/0/45/-45/90/45/-45/45/-45]S			
Resin content: 33.467 % wt	Comp. density: 1.537 [g/cc]				
Fiber volume: 57.775 % vol					
Ply count: 20					
Test method: ASTM D6742-02					
Normalized by: 0.0055 in. CPT					
	RTD			ETW2	
Test Temperature [°F]	75			250	
Moisture Conditioning	dry			equilibrium	
Equilibrium at T, RH				160 F,85%	
Source code	AF8X X1XA			AF8X X1XD	
	Normalized	Measured	Normalized	Measured	
FHC2 Strength (ksi)	Mean	53.80	52.58	35.67	35.34
	Minimum	50.93	50.29	32.68	32.17
	Maximum	55.39	53.45	39.72	40.30
	C.V.(%)	2.75	2.15	6.07	6.92
	No. Specimens	7		18	
	No. Prepreg Lots	1		3	

2.3.27 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Filled-Hole Compression 3 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/0/45/0/90/-45/0/45/0/-45]S			
Resin content: 33.129 % wt	Comp. density: 1.539 [g/cc]				
Fiber volume: 58.157 % vol					
Ply count: 20					
Test method: ASTM D6742-02					
Normalized by: 0.0055 in. CPT					
	RTD			ETW2	
Test Temperature [°F]	75			250	
Moisture Conditioning	dry			equilibrium	
Equilibrium at T, RH				160 F,85%	
Source code	AF9X X1XA			AF9X X1XD	
	Normalized	Measured	Normalized	Measured	
FHC3 Strength (ksi)	Mean	77.85	77.20	51.87	51.44
	Minimum	75.38	74.50	42.47	42.73
	Maximum	80.89	80.52	59.21	58.51
	C.V.(%)	3.60	3.96	9.18	9.03
	No. Specimens	3		15	
	No. Prepreg Lots	1		3	

2.3.28 “25/50/25” Pin Bearing 1 Properties (PB1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Pin Bearing 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/0/-45/90]3S			
Resin content: 33.291 % wt	Comp. density 1.539 [g/cc]				
Fiber volume: 57.993 % vol					
Ply count: 24					
Test method: ASTM D5961-05					
Normalized by: 0.0055	in CPT				
	RTD	ETW2			
Test Temperature [°F]	75	250			
Moisture Conditioning	dry	equilibrium			
Equilibrium at T, RH		160 F,85%			
Source code	AF1X X1XA	AF1X X1XD			
	Normalized	Measured	Normalized	Measured	
Mean	94.24	93.92	82.04	82.33	
Minimum	88.49	89.00	70.97	72.86	
Maximum	102.71	102.33	89.58	90.73	
PB1 2% Offset Strength (ksi) C.V.(%)	3.80	3.77	6.56	6.29	
No. Specimens	19		18		
No. Prepreg Lots	3		3		

2.3.29 “10/80/10” Pin Bearing 2 Properties (PB2)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Pin Bearing 2 Gr/ Ep ACG - MTM45-1/ IM7 Uni [45/-45/0/45/-45/90/45/-45/45/-45]S			
Resin content: 33.576 % wt	Comp. density 1.534 [g/cc]				
Fiber volume: 57.576 % vol					
Ply count: 20					
Test method: ASTM D5961-05					
Normalized by: 0.0055	in CPT				
	RTD		ETW2		
Test Temperature [°F]	75		250		
Moisture Conditioning	dry		equilibrium		
Equilibrium at T, RH			160 F,85%		
Source code	AF2X X1XA		AF2X X1XD		
	Normalized	Measured	Normalized	Measured	
Mean	101.38	99.58	78.84	76.16	
Minimum	95.73	94.19	62.31	59.91	
Maximum	106.99	106.41	89.66	89.83	
PB2 2% Offset Strength (ksi) C.V.(%)	3.73	4.26	9.02	10.87	
No. Specimens		6		18	
No. Prepreg Lots		1		3	

2.3.30 “50/40/10” Pin Bearing 3 Properties (PB3)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Pin Bearing 3 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/0/45/0/90/-45/0/45/0/-45]S			
Resin content: 33.446 % wt	Comp. density 1.538 [g/cc]				
Fiber volume: 57.818 % vol					
Ply count: 20					
Test method: ASTM D5961-05					
Normalized by: 0.0055	in CPT				
	RTD		ETW2		
Test Temperature [°F]	75		250		
Moisture Conditioning	dry		equilibrium		
Equilibrium at T, RH			160 F,85%		
Source code	AF3X X1XA		AF3X X1XD		
	Normalized	Measured	Normalized	Measured	
Mean	99.93	98.65	77.41	77.50	
Minimum	89.50	87.90	66.50	66.27	
Maximum	106.37	103.82	85.63	86.84	
PB3 2% Offset Strength (ksi) C.V.(%)	6.04	5.98	5.93	6.19	
No. Specimens	6		18		
No. Prepreg Lots	1		3		

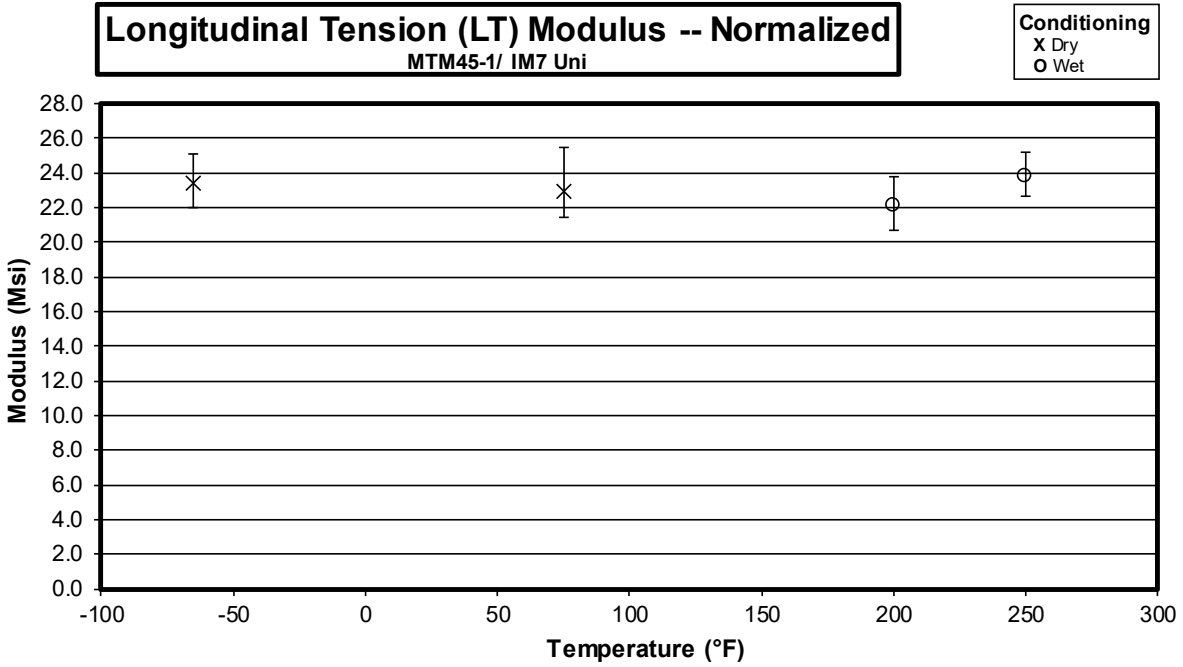
2.3.31 “25/50/25” Compression After Impact Properties (CAI1)

Material: Advanced Composites Group - MTM45-1/ IM7 Uni		Compression After Impact Layup 1 Gr/ Ep ACG - MTM45-1/ IM7 Uni [0/45/90/-45]4S	
Resin content: NA	Comp. density: NA		
Fiber volume: NA			
Ply count: 32			
Test method: SACMA SRM 2R-94			
Normalized by: 0.0055 in. CPT			
RTD			
Test Temperature [°F]	75		
Moisture Conditioning	dry		
Equilibrium at T, RH			
Source code	AFKXX1XA		
	Normalized	Measured	
CAI1 Strength (ksi)	Mean	36.83	36.47
	Minimum	35.71	35.05
	Maximum	39.22	38.84
	C.V.(%)	3.52	3.85
	No. Specimens	6	
No. Prepreg Lots	1		

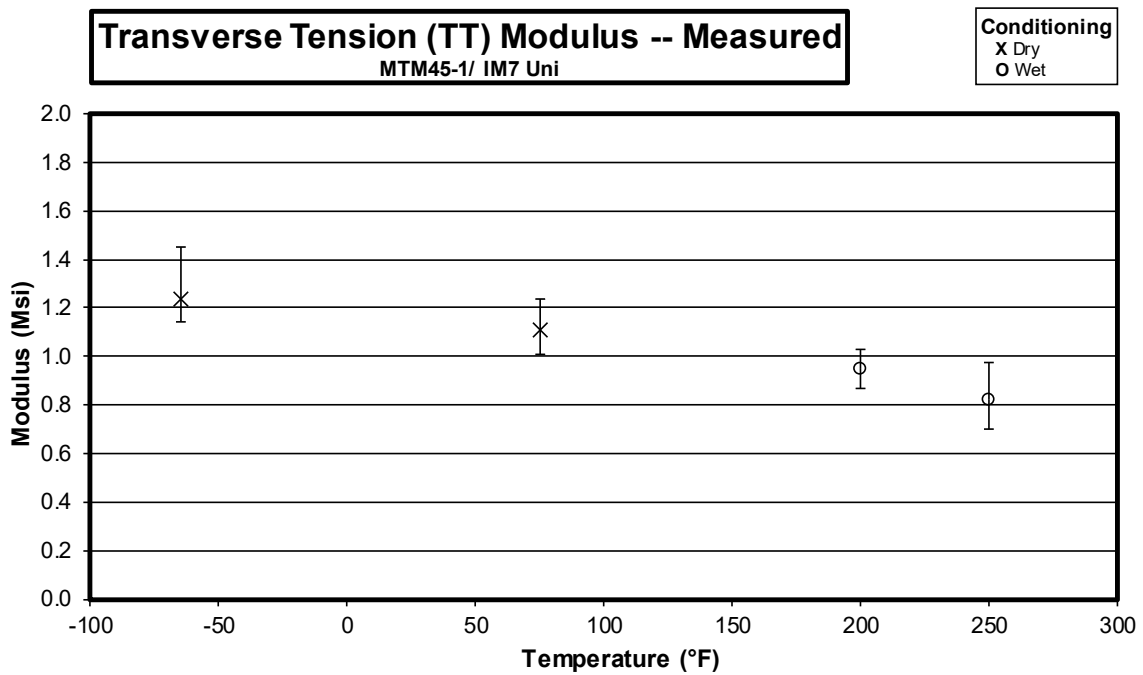
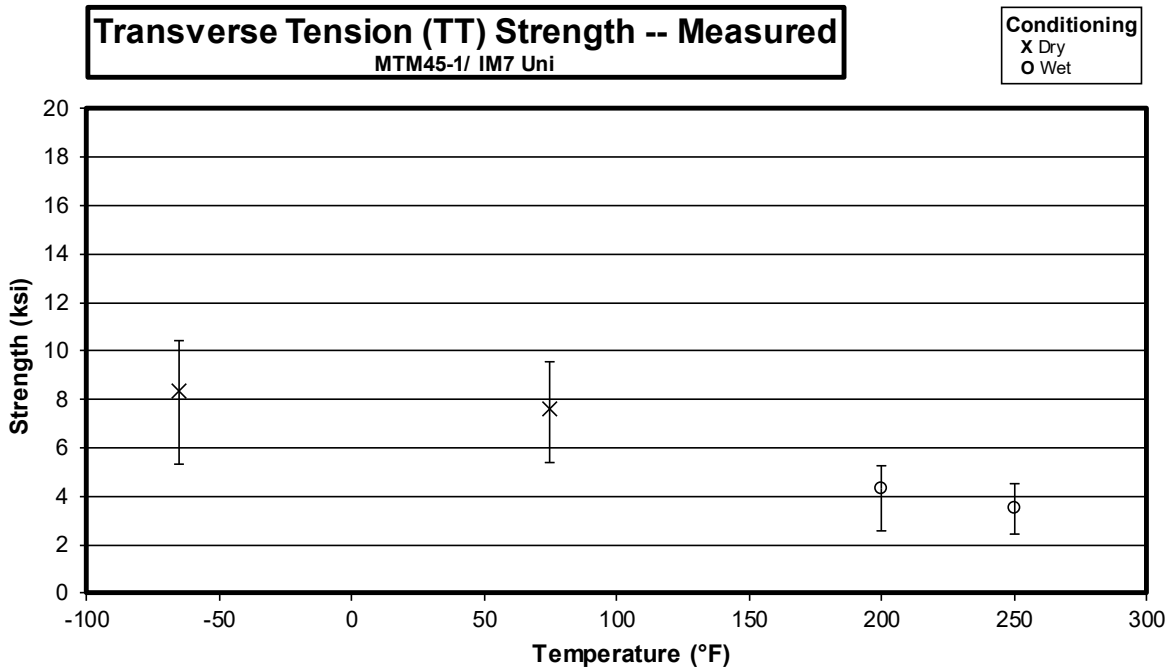
3. Individual Test Charts

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

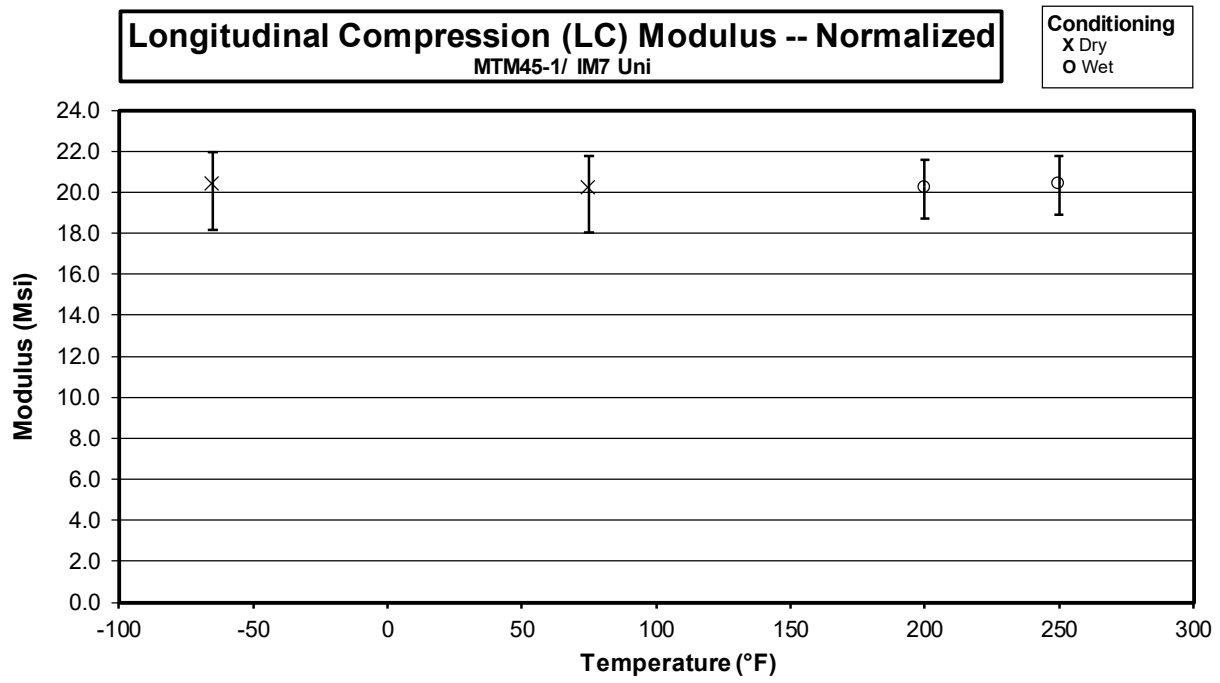
3.1 Longitudinal Tension Properties (LT)



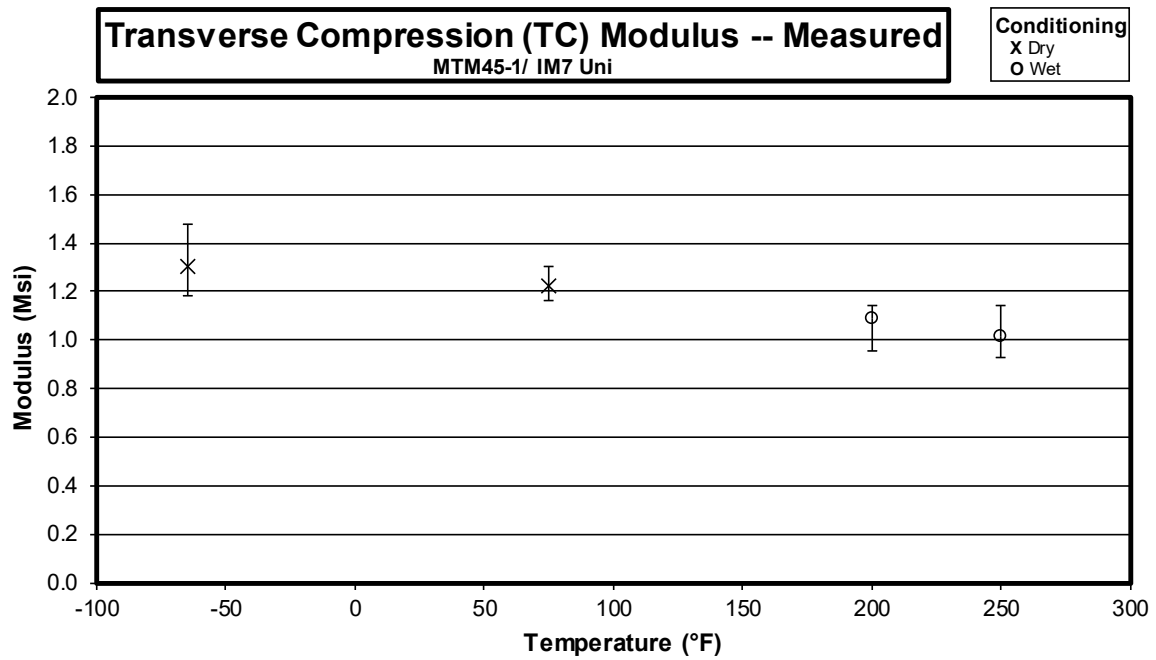
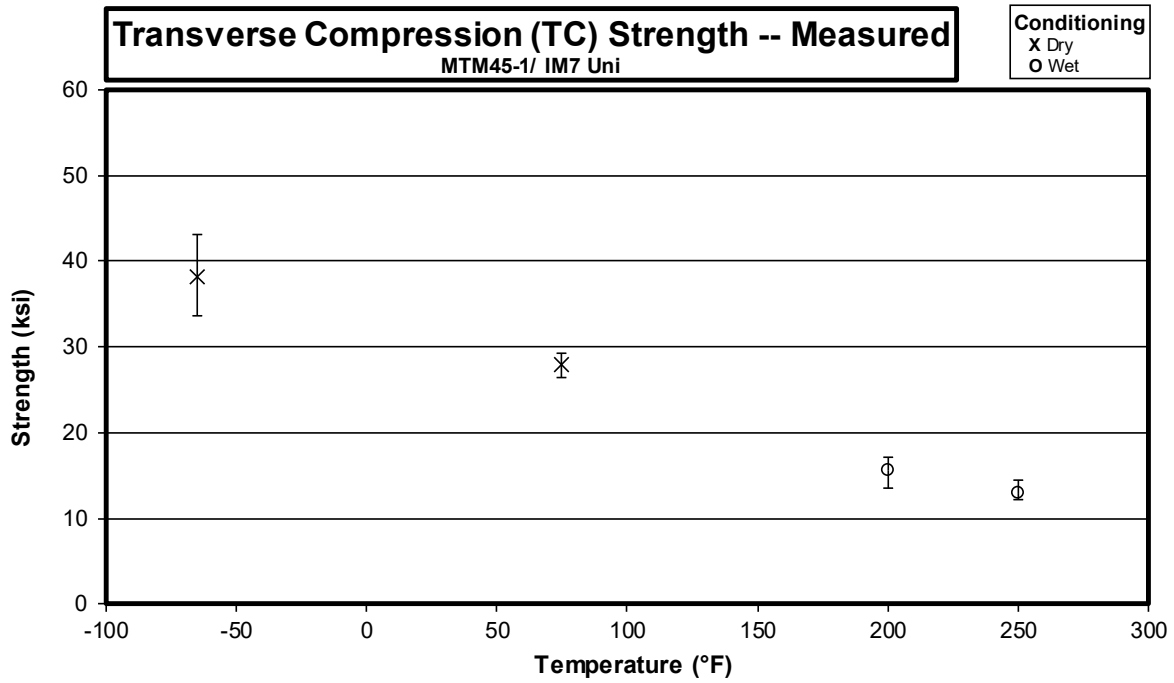
3.2 Transverse Tension Properties (TT)



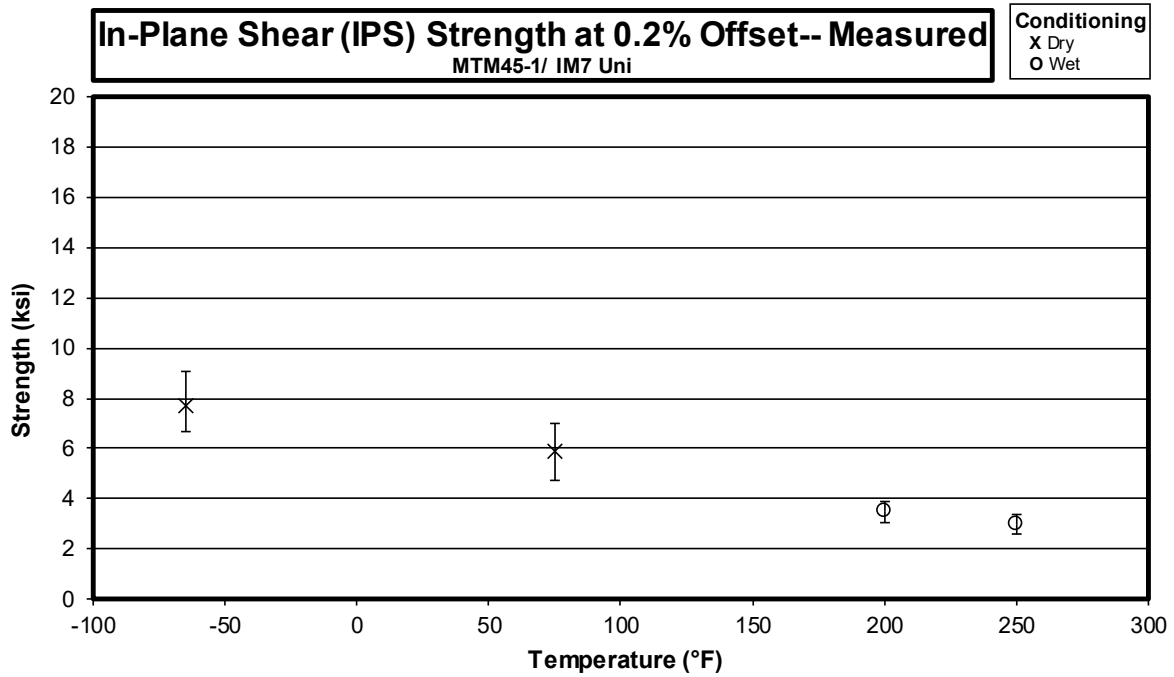
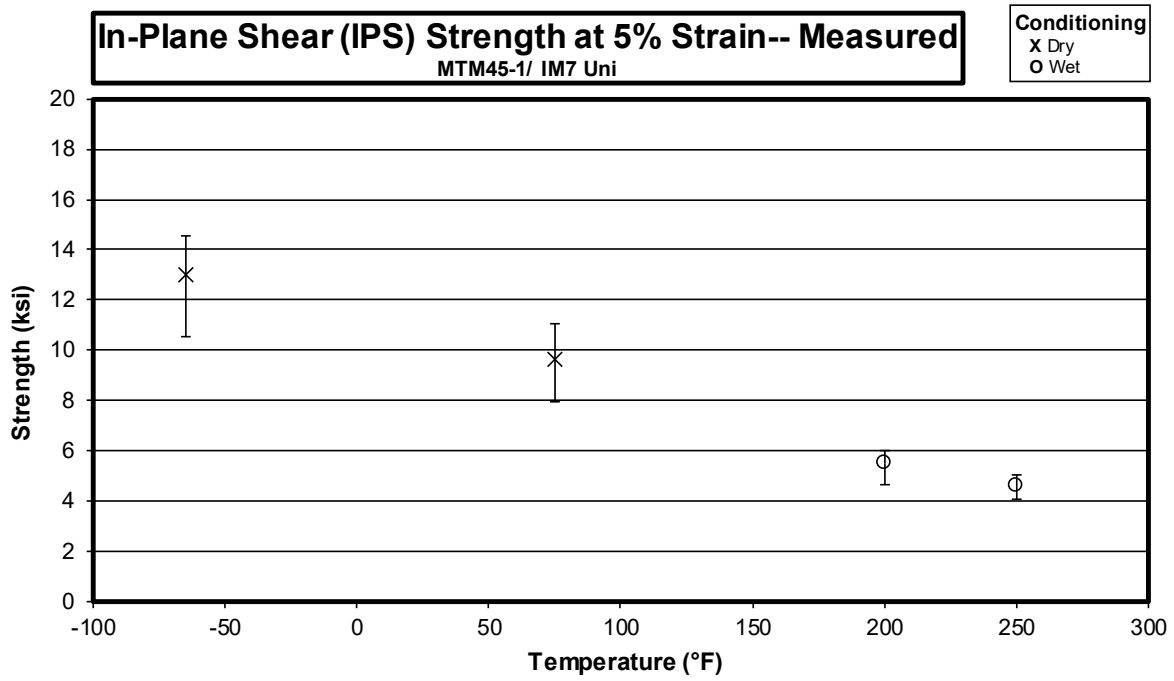
3.3 Longitudinal Compression Properties (LC)

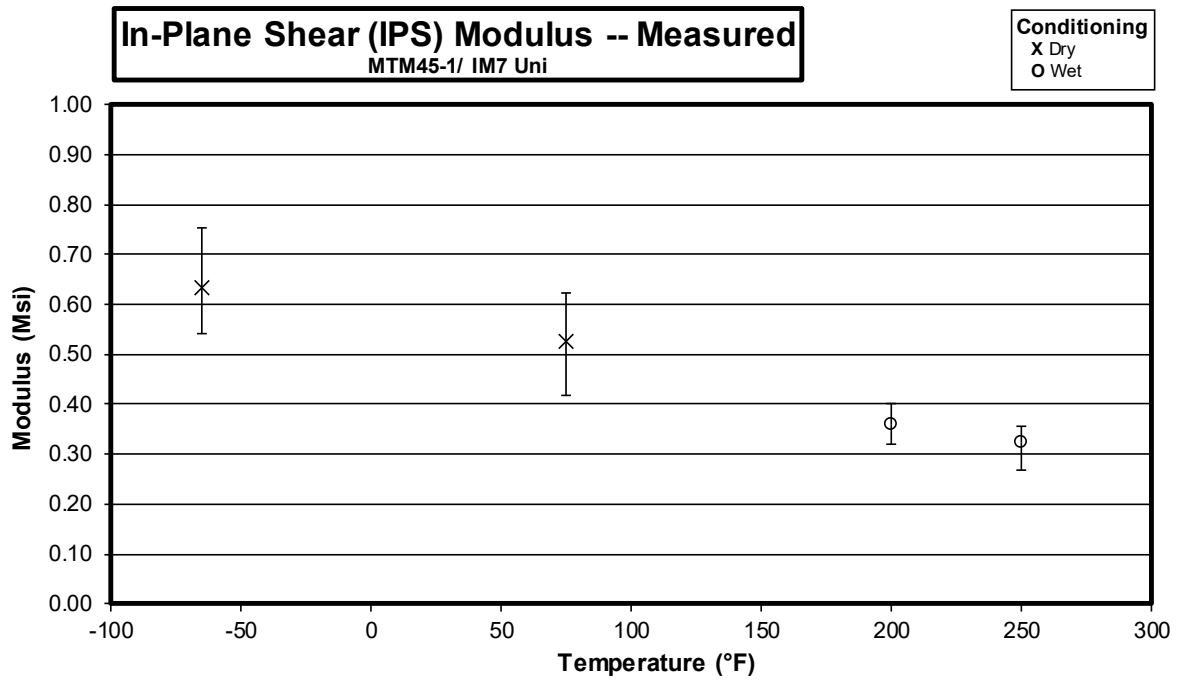


3.4 Transverse Compression Properties (TC)

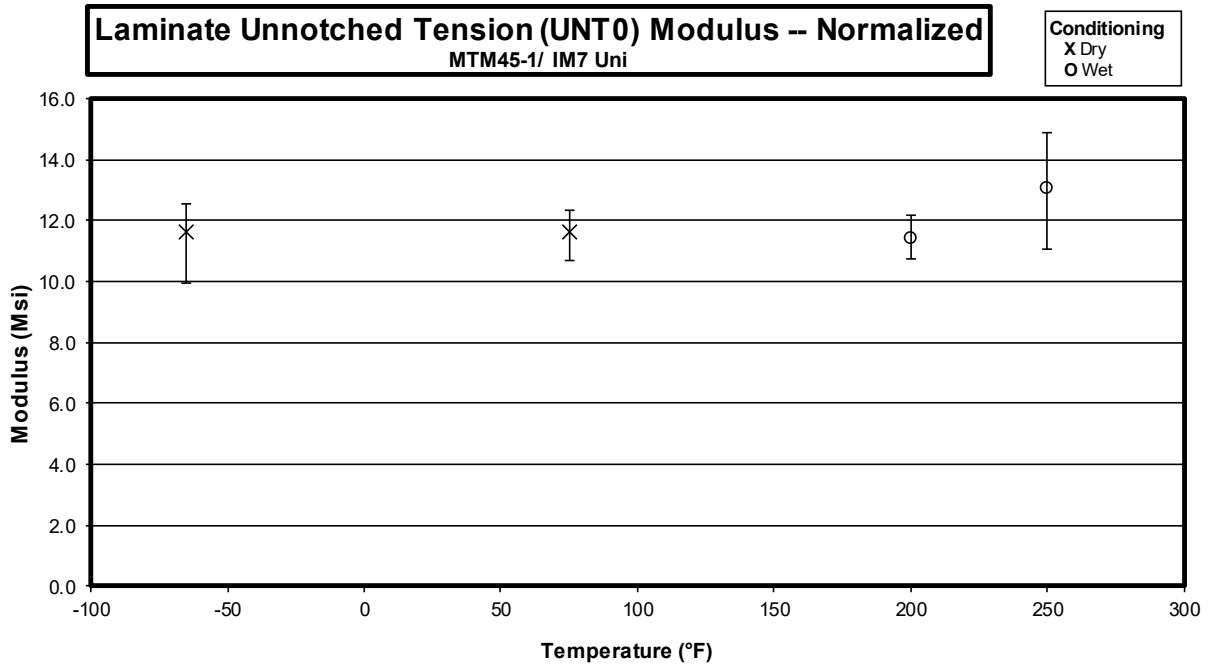
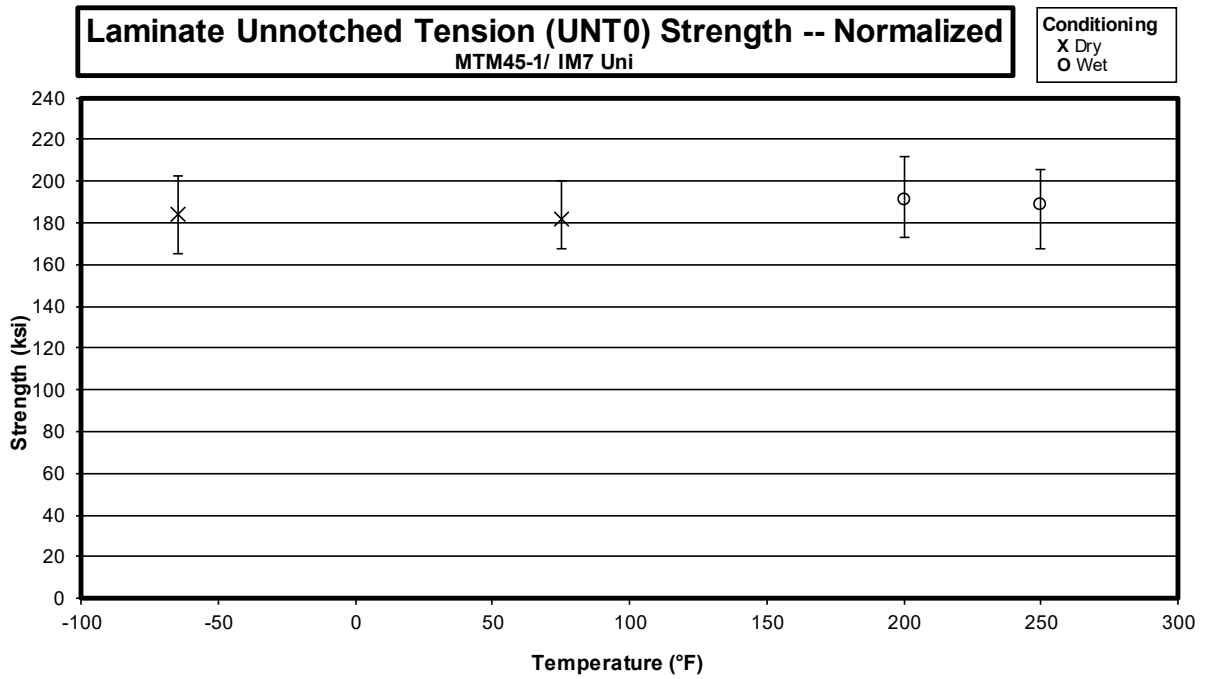


3.5 In-Plane Shear Properties (IPS)

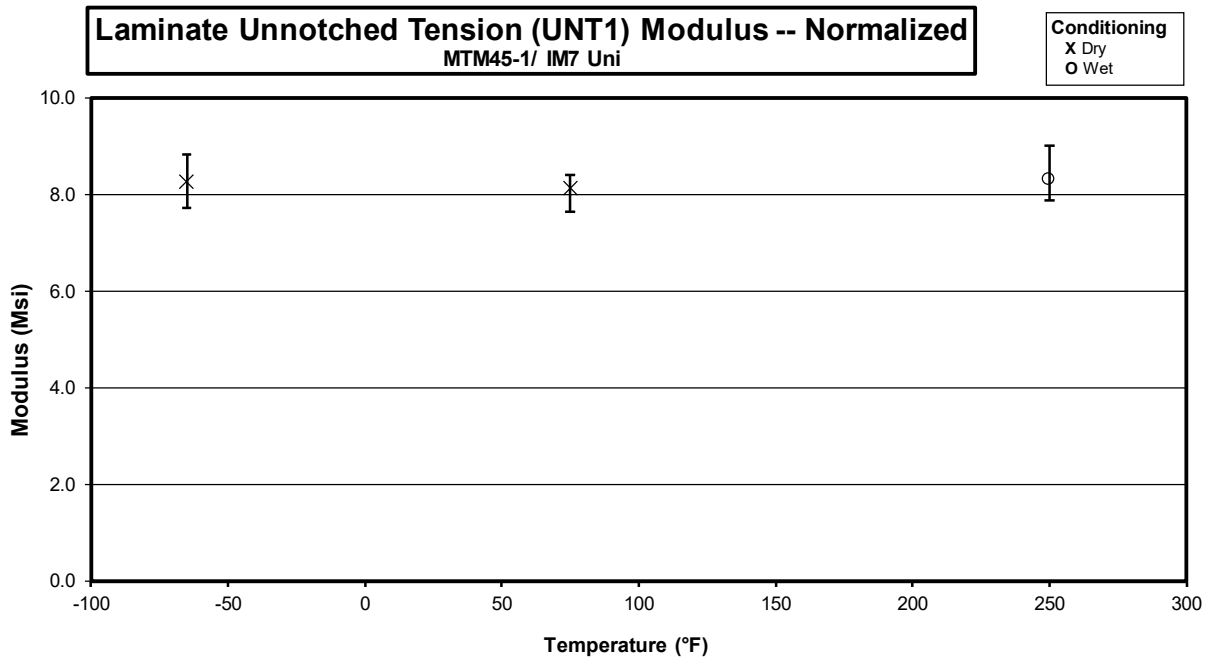
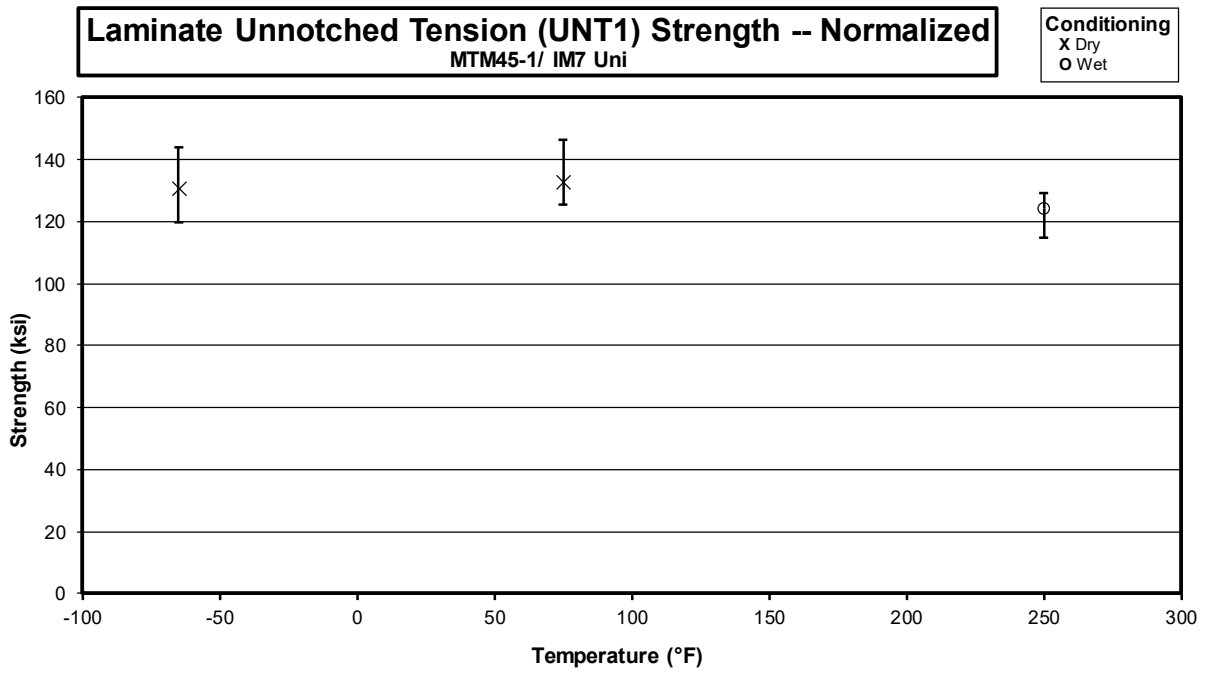




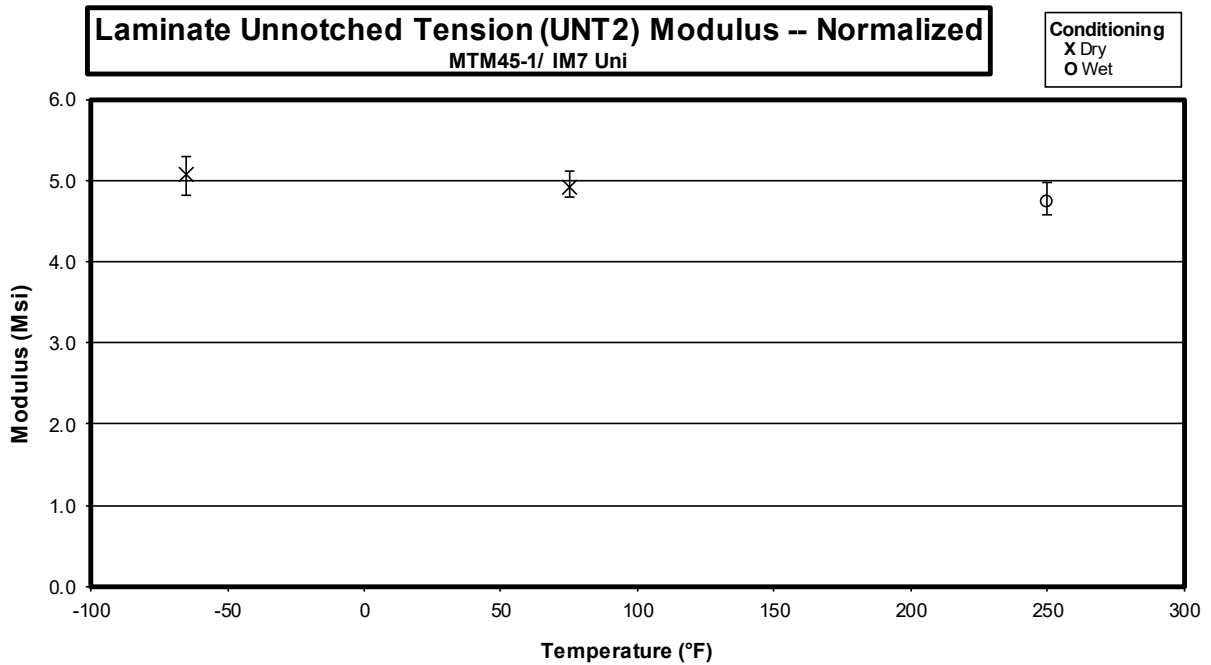
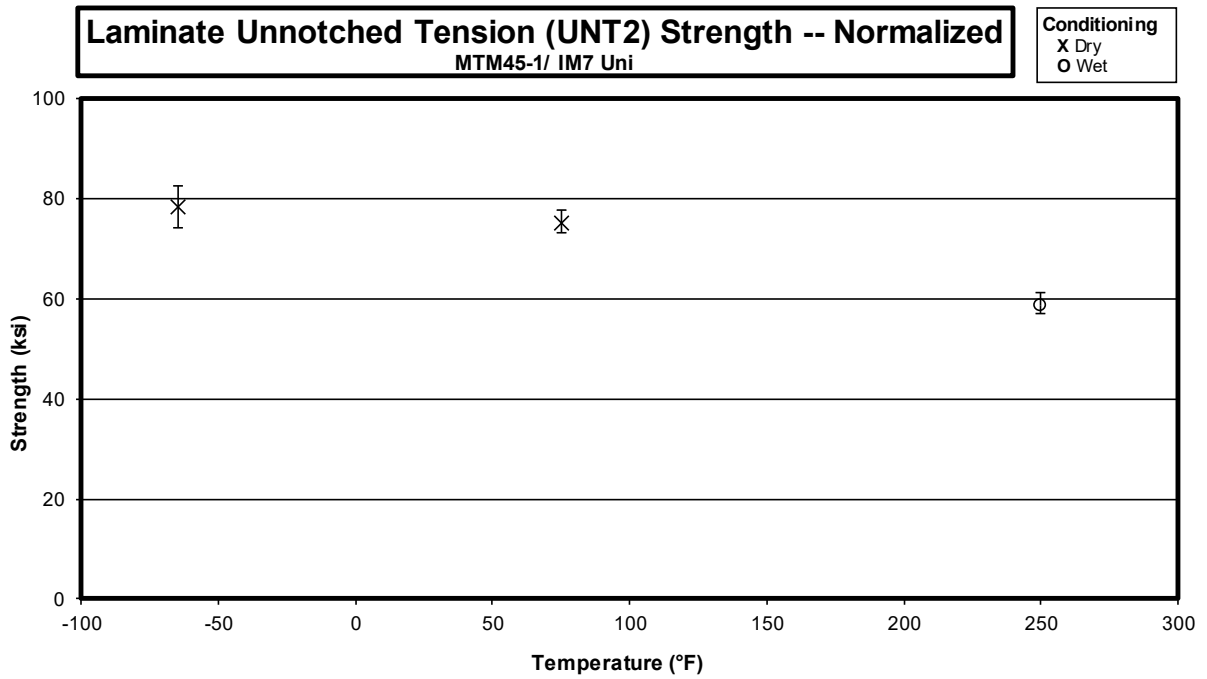
3.6 "50/0/50" Unnotched Tension 0 Properties (UNT0)



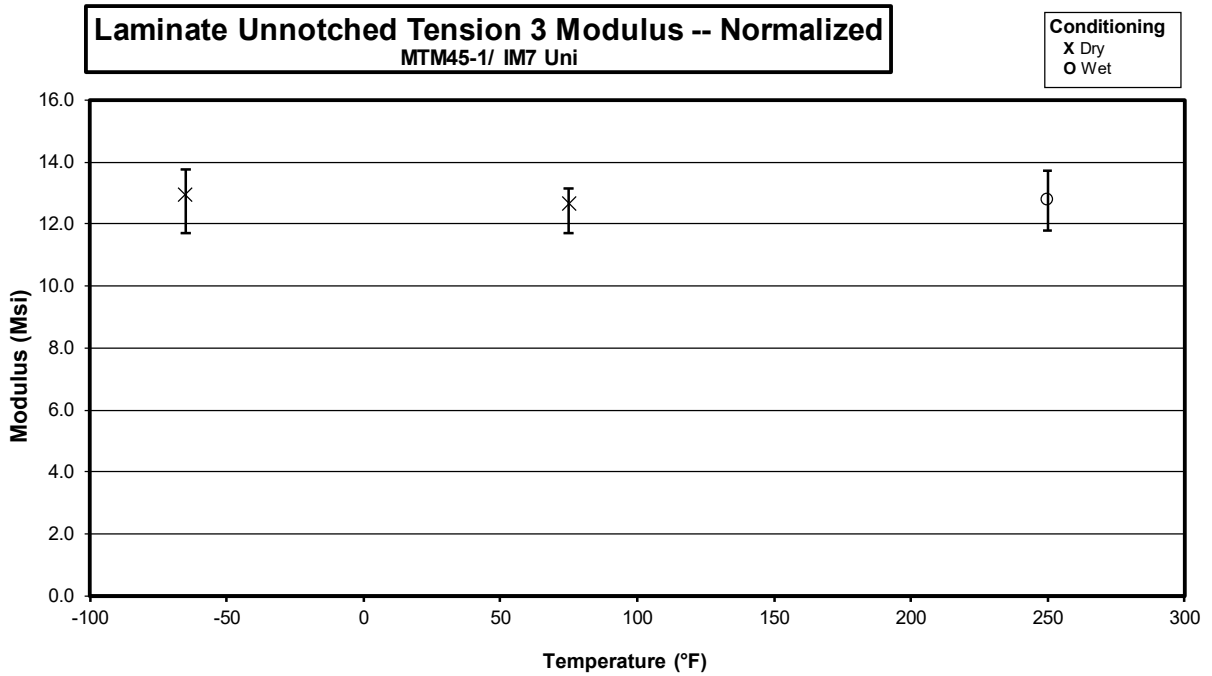
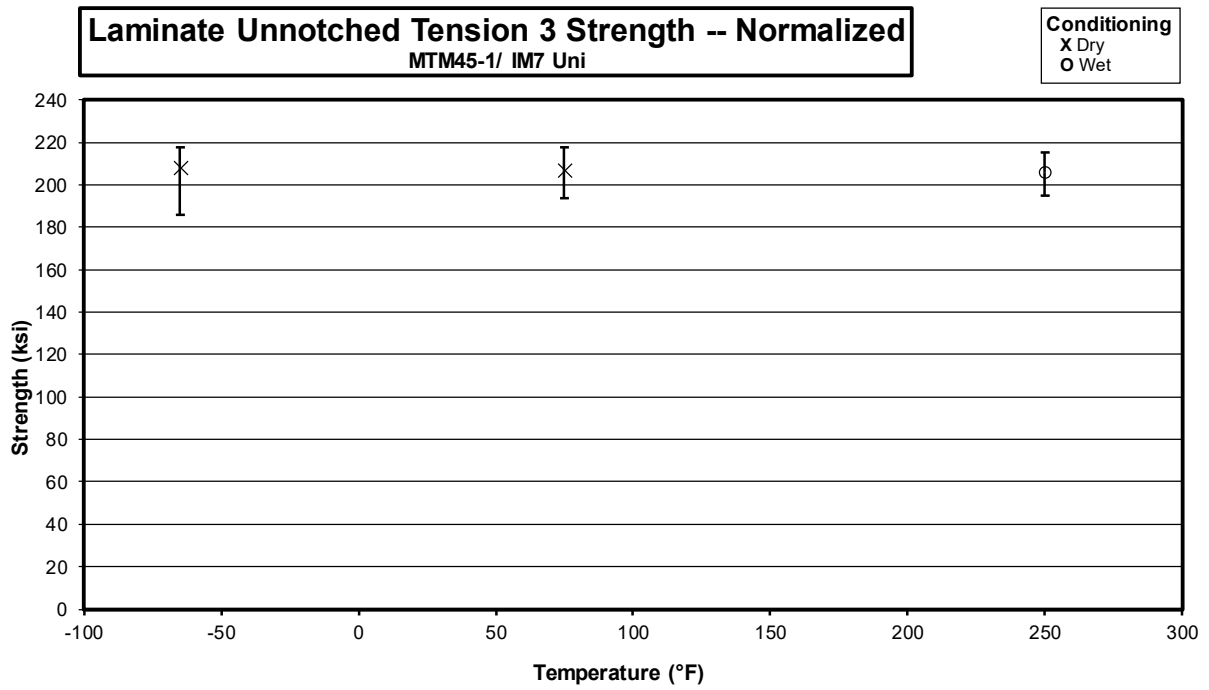
3.7 “25/50/25” Unnotched Tension 1 Properties (UNT1)



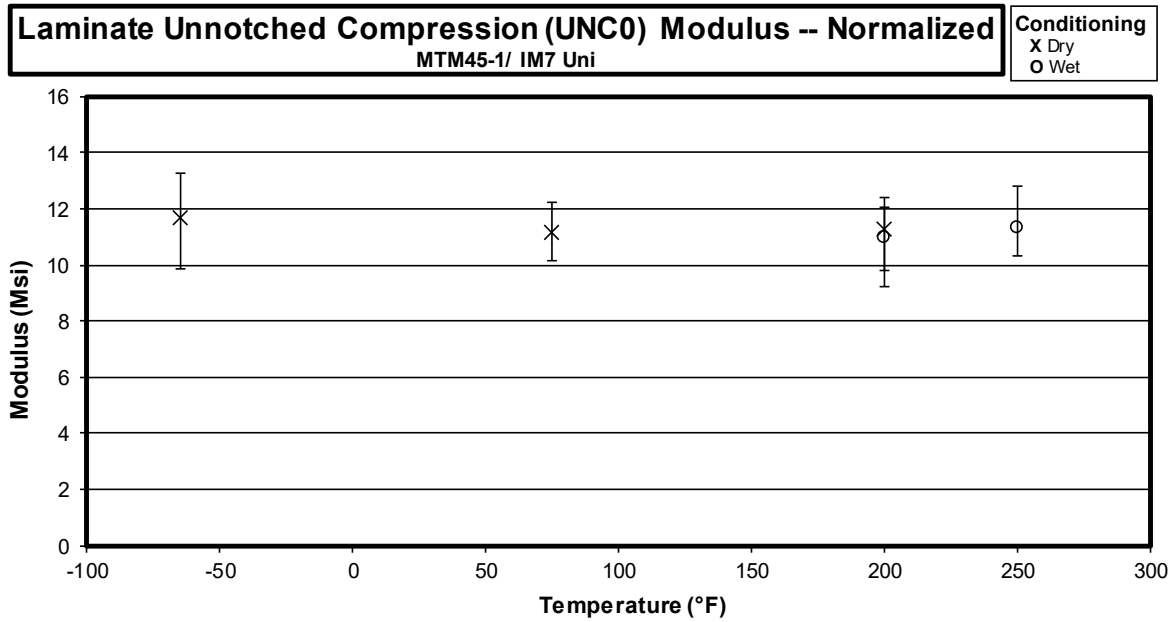
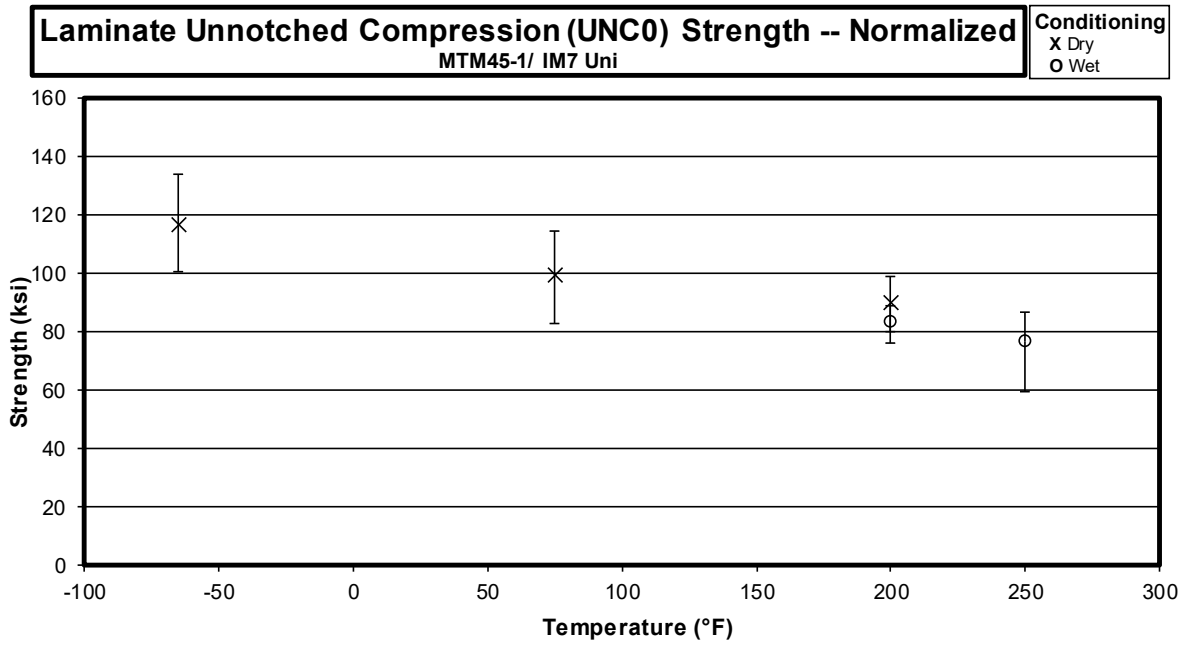
3.8 "10/80/10" Unnotched Tension 2 Properties (UNT2)



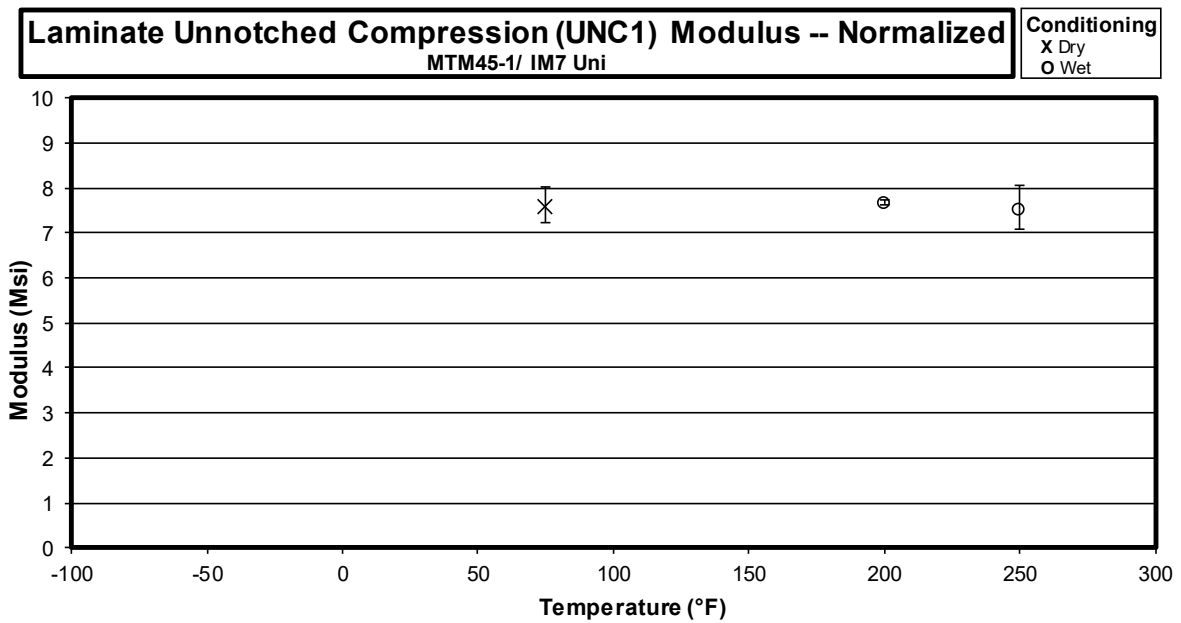
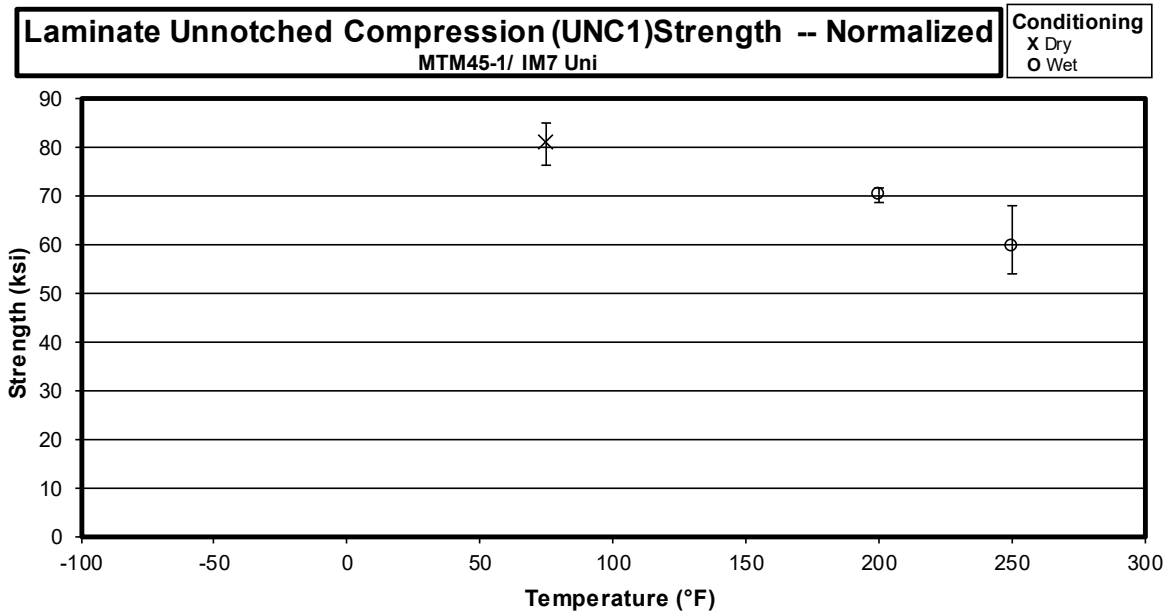
3.9 “50/40/10” Unnotched Tension 3 Properties (UNT3)



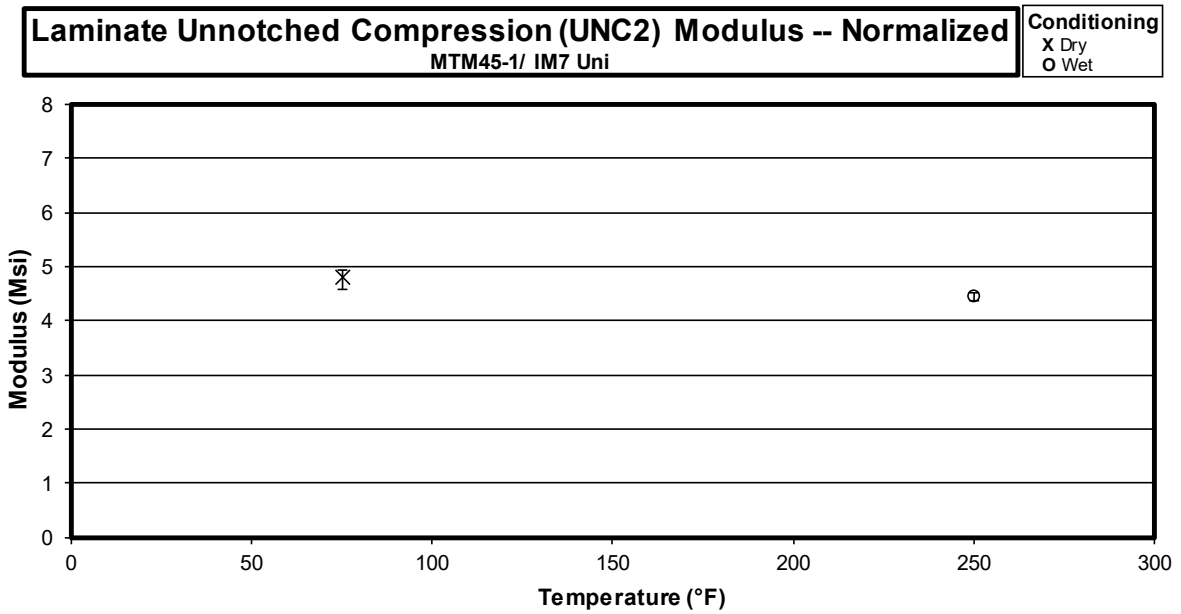
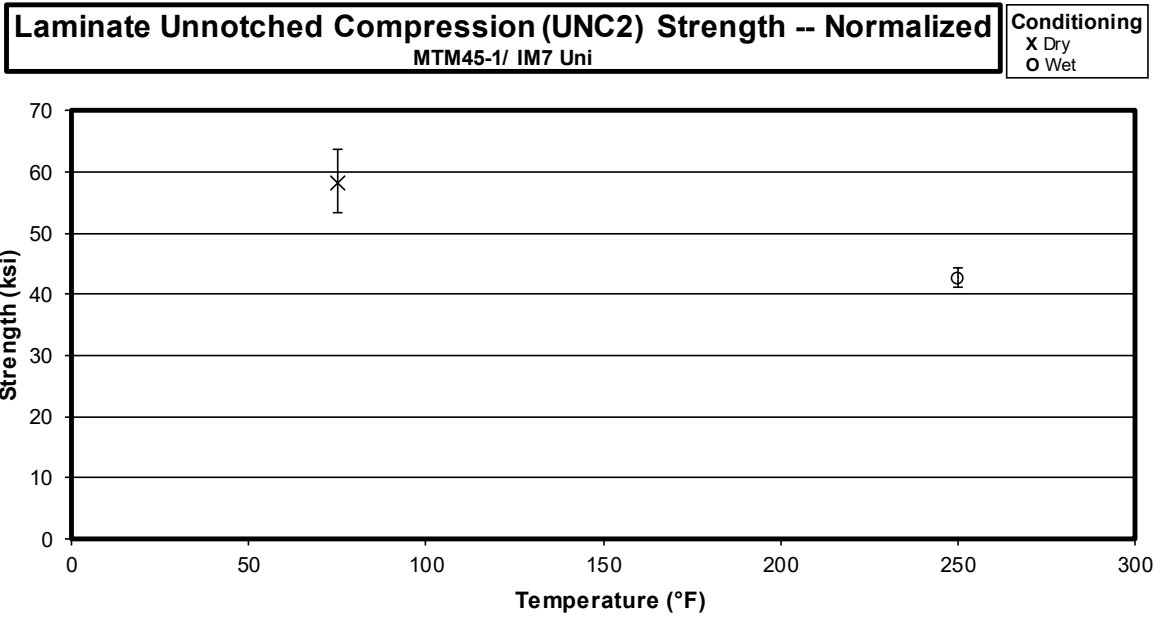
3.10 "50/0/50" Unnotched Compression 0 Properties (UNC0)



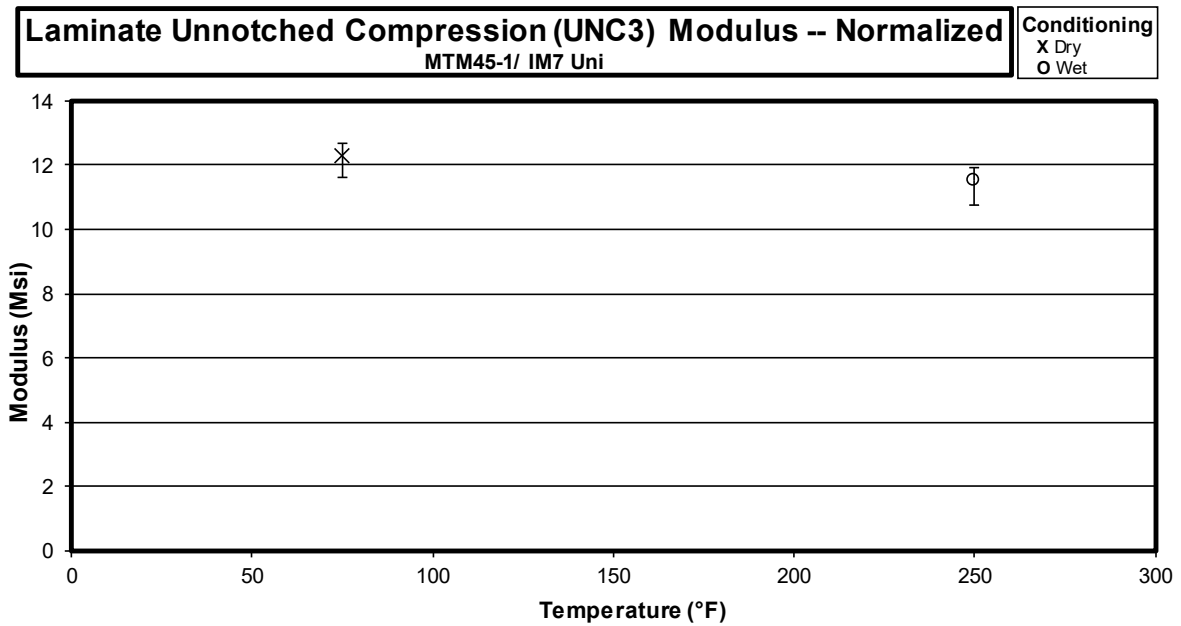
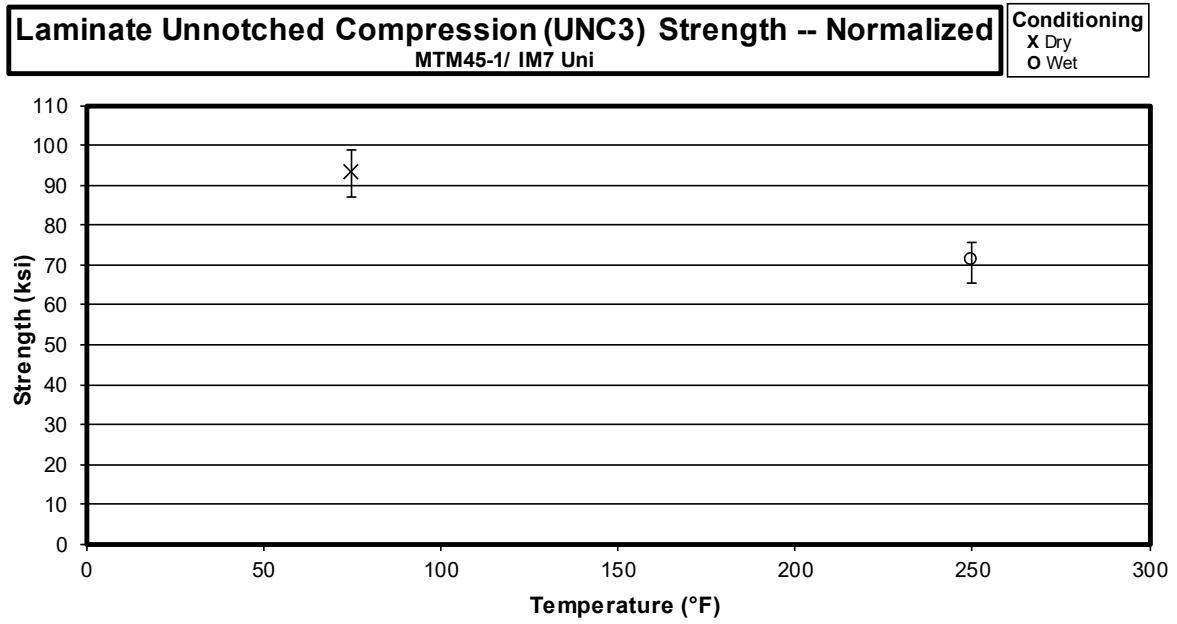
3.11 “25/50/25” Unnotched Compression 1 Properties (UNC1)



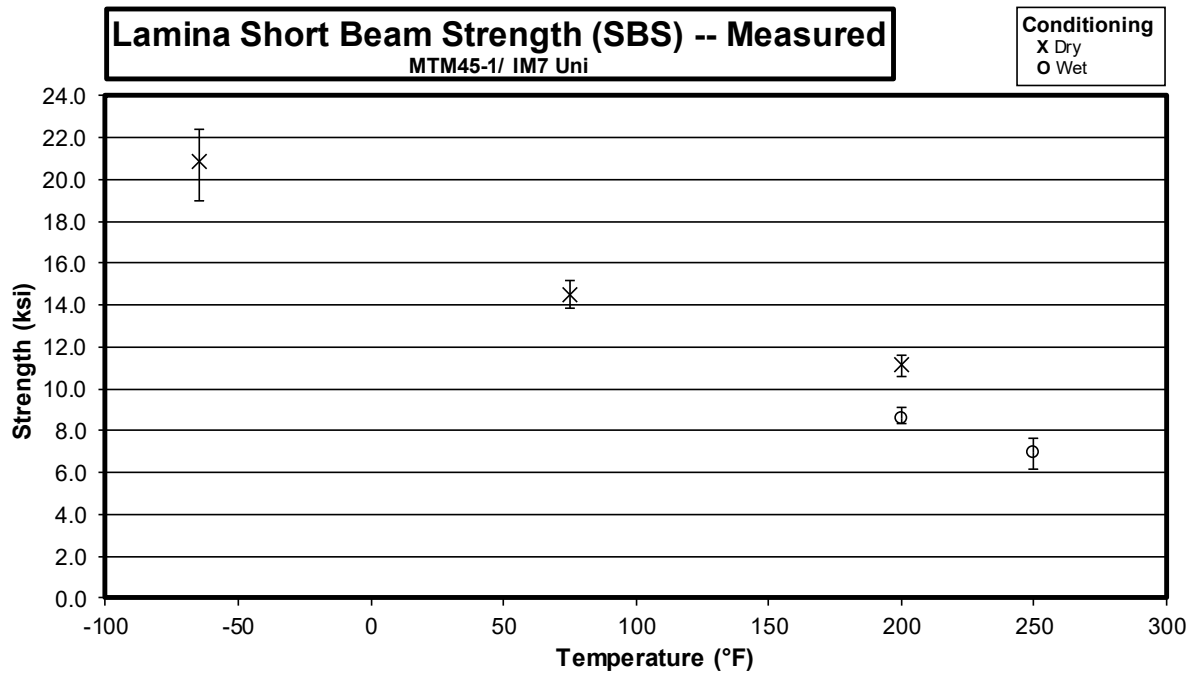
3.12 “10/80/10” Unnotched Compression 2 Properties (UNC2)



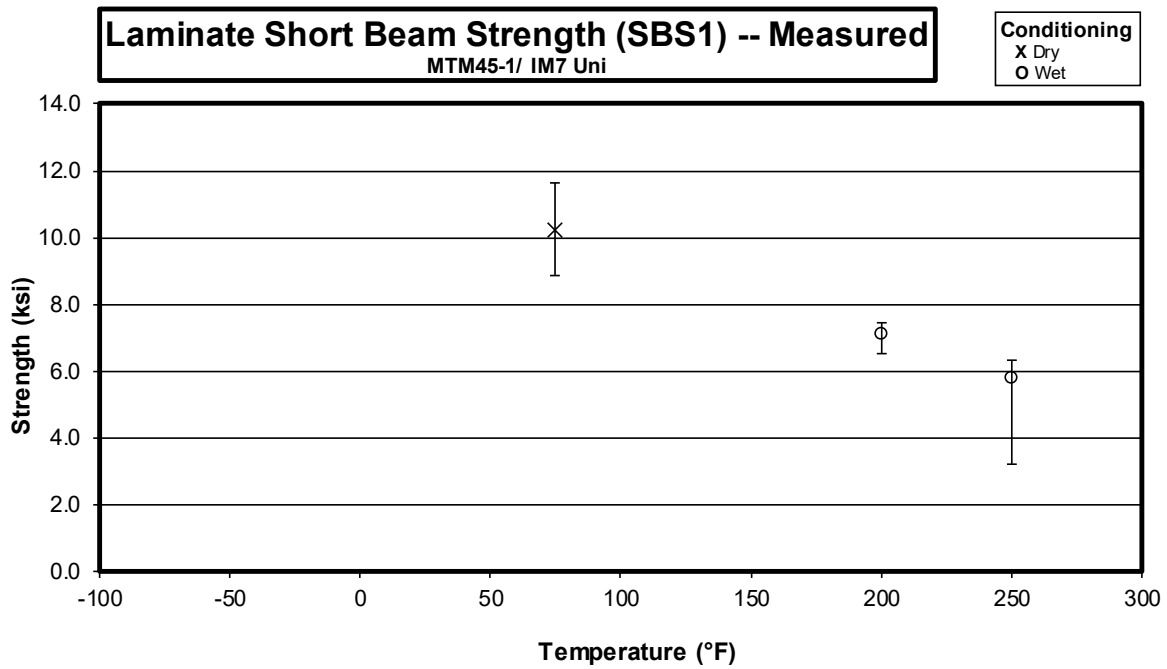
3.13 “50/40/10” Unnotched Compression 3 Properties (UNC3)



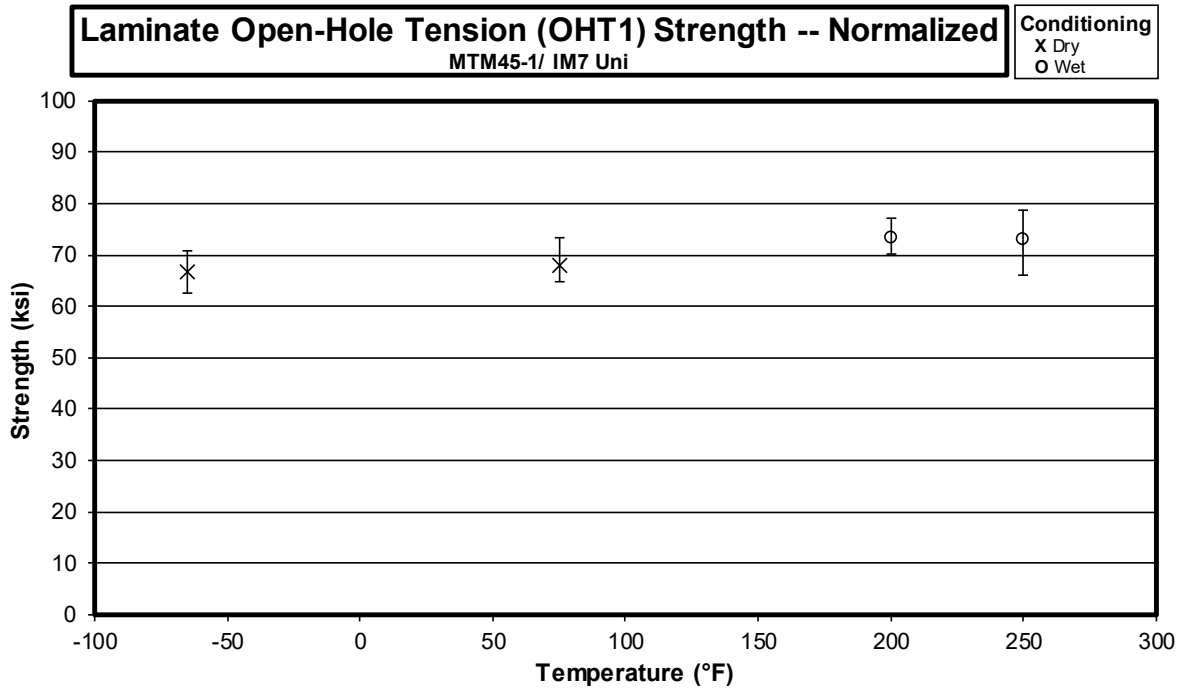
3.14 Lamina Short Beam Strength Properties (SBS)



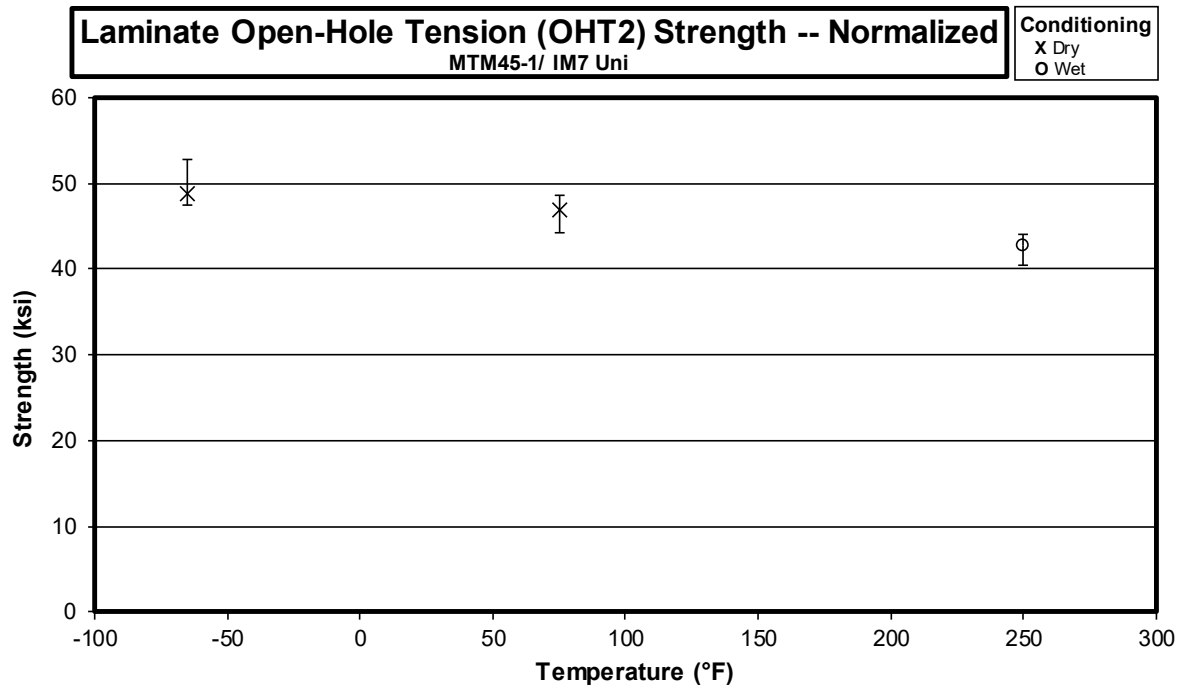
3.15 Laminate Short Beam Strength Properties (SBS1)



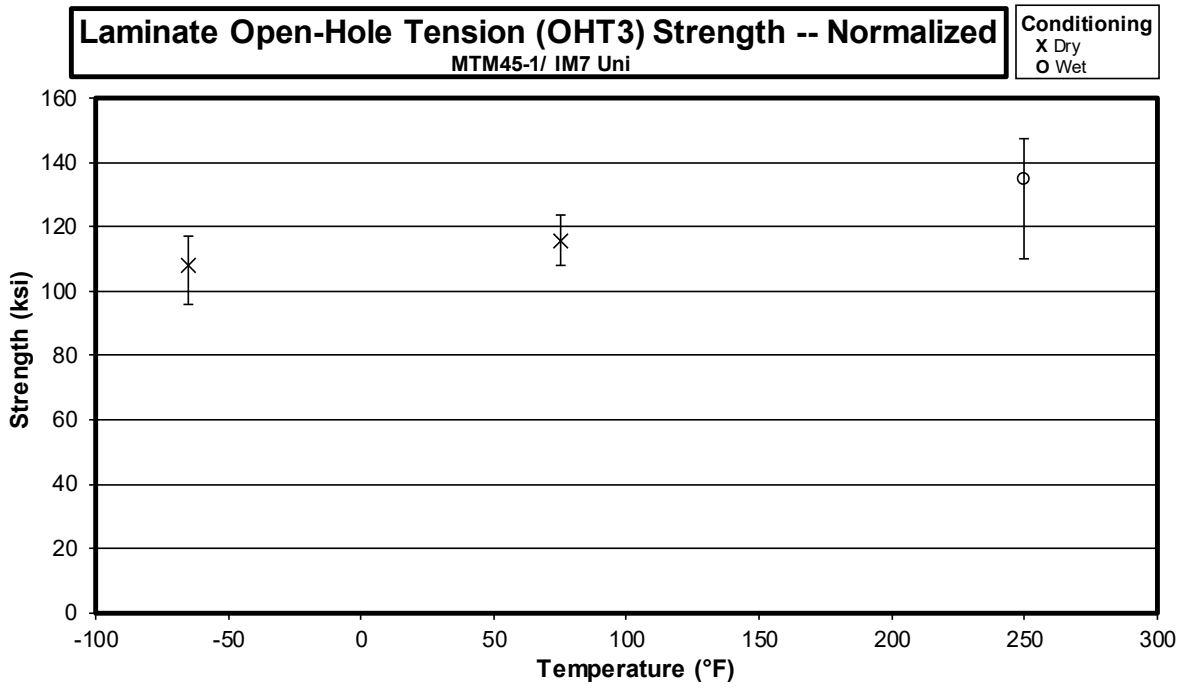
3.16 “25/50/25” Open-Hole Tension 1 Properties (OHT1)



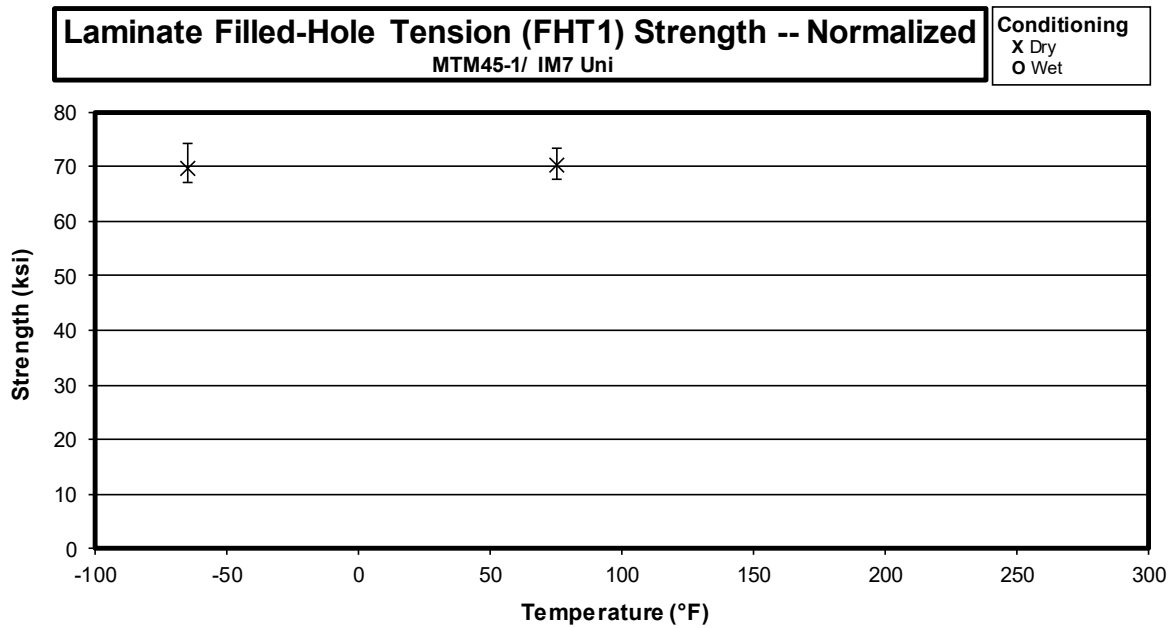
3.17 “10/80/10” Open-Hole Tension 2 Properties (OHT2)



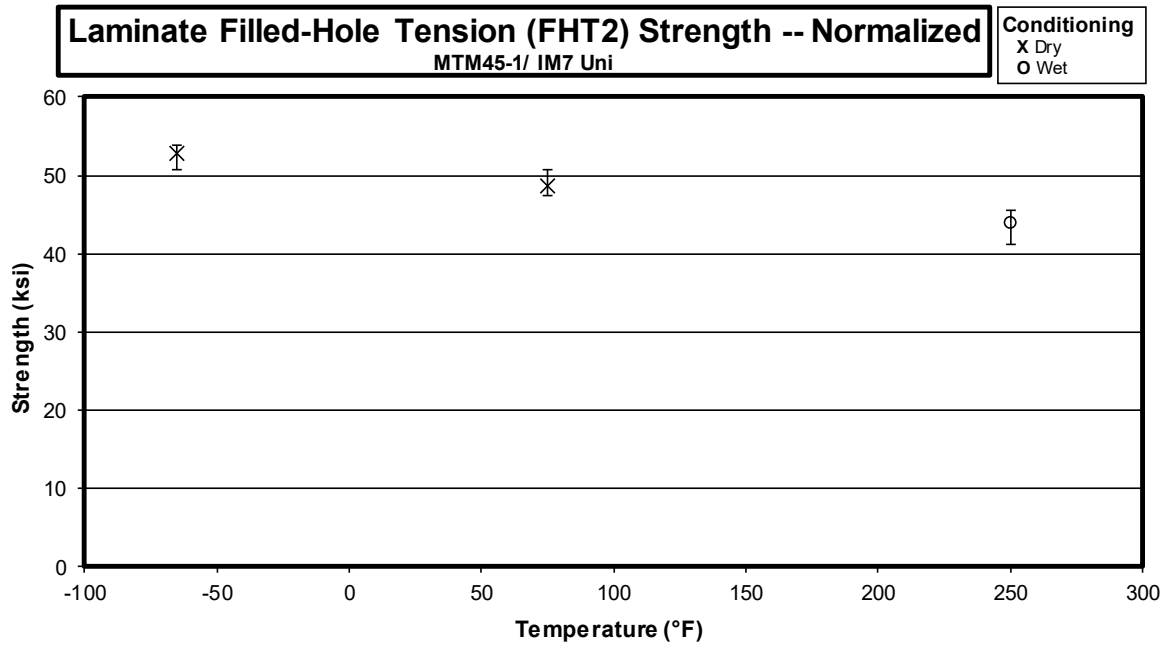
3.18 “50/40/10” Open-Hole Tension 3 Properties (OHT3)



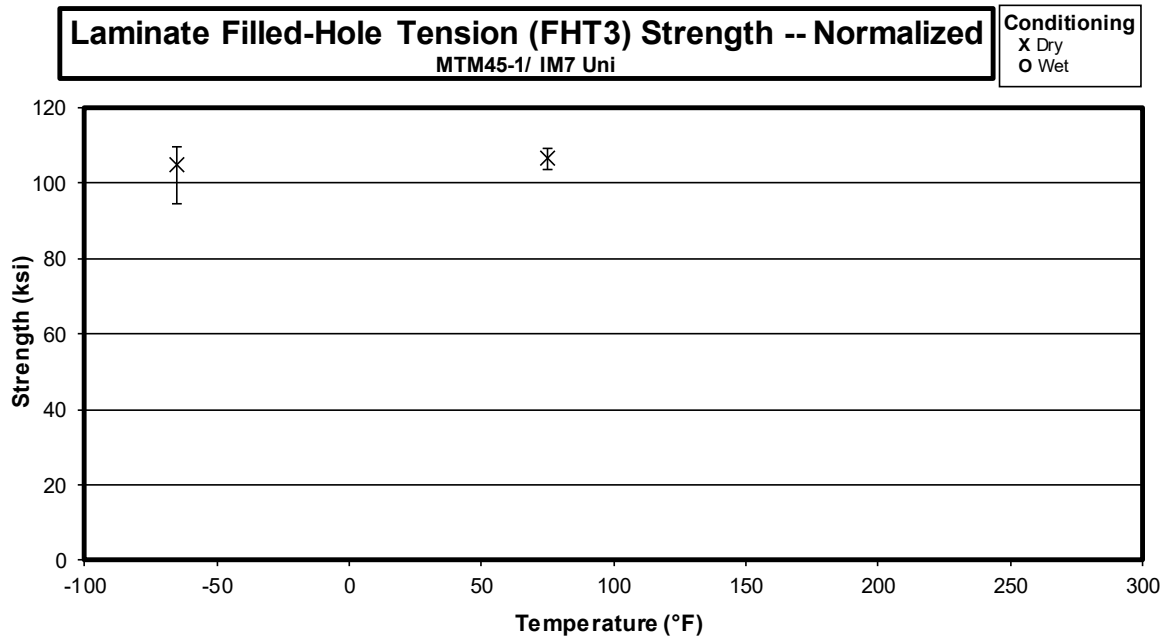
3.19 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)



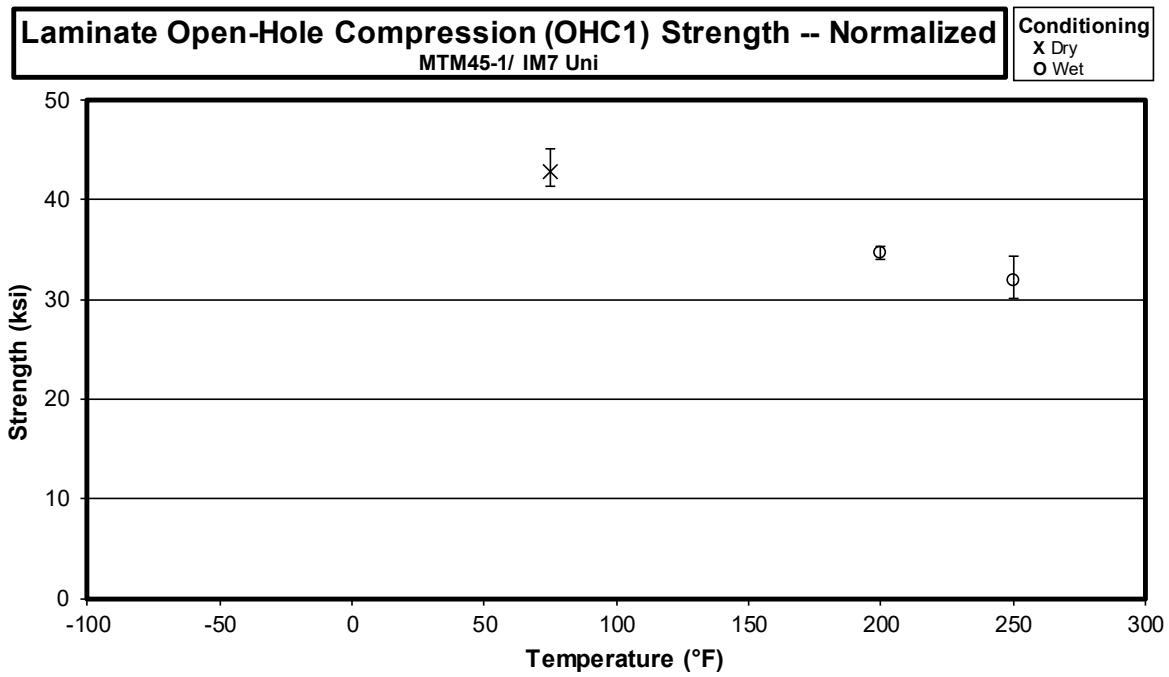
3.20 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)



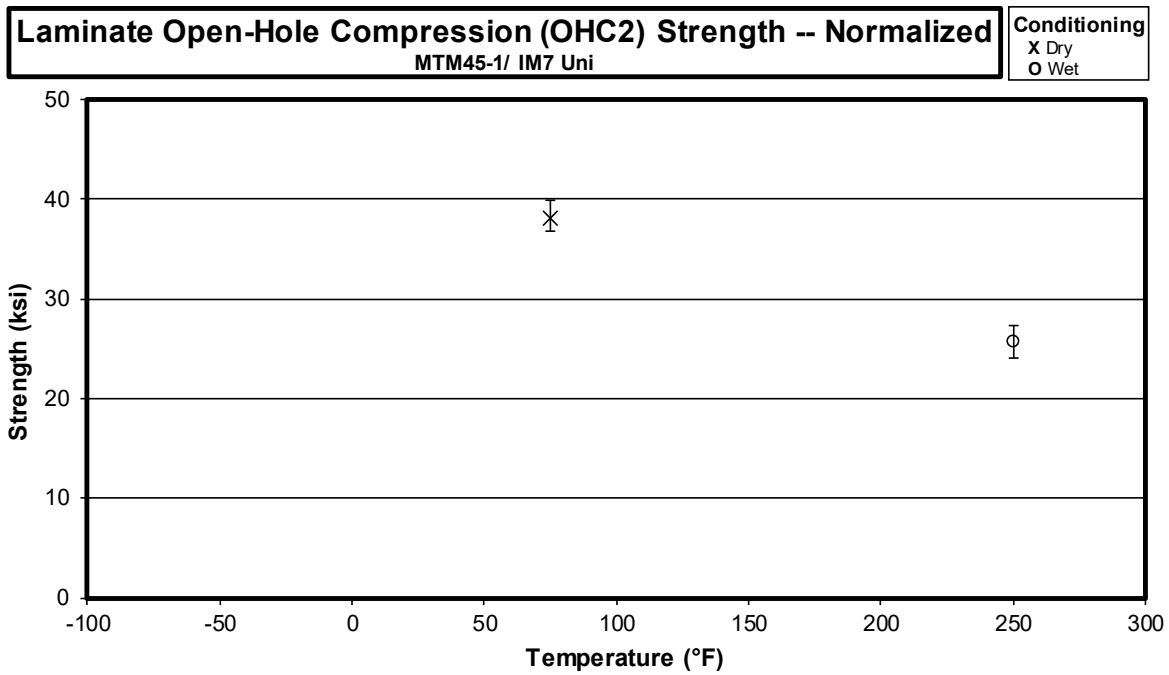
3.21 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)



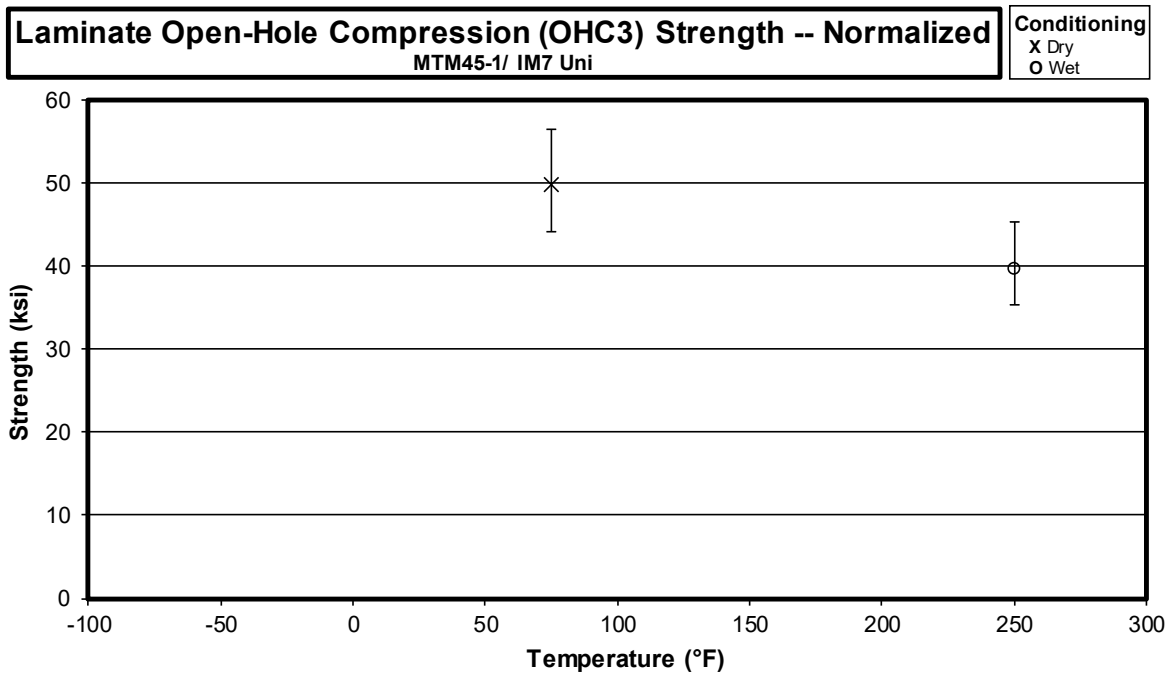
3.22 “25/50/25” Open-Hole Compression 1 Properties (OHC1)



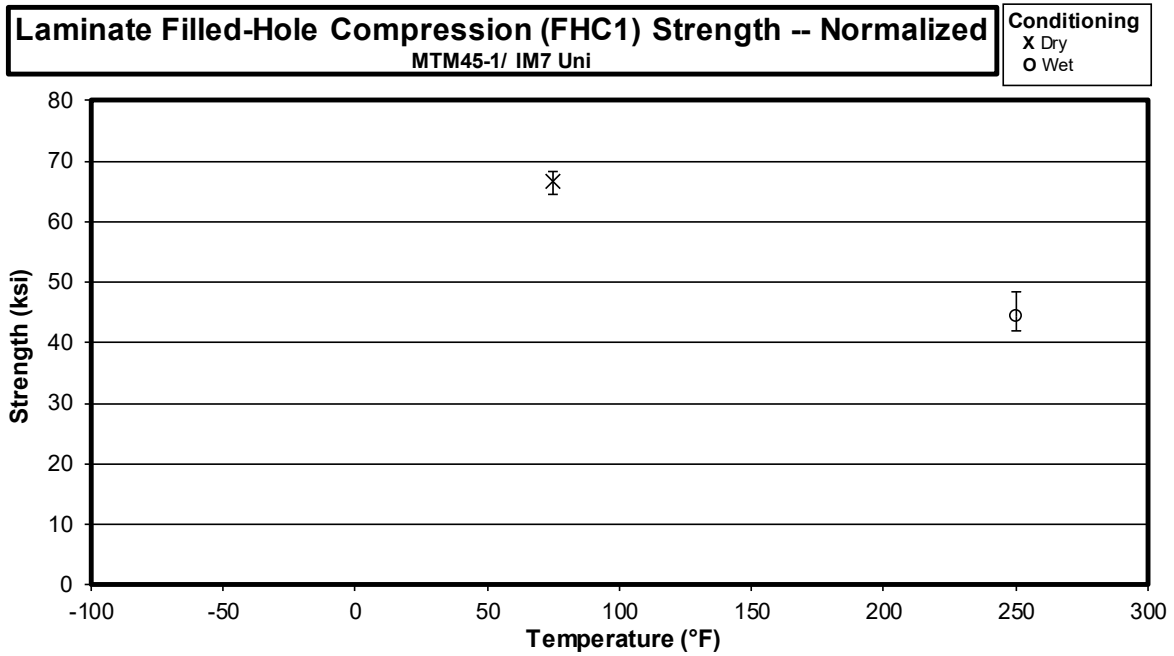
3.23 “10/80/10” Open-Hole Compression 2 Properties (OHC2)



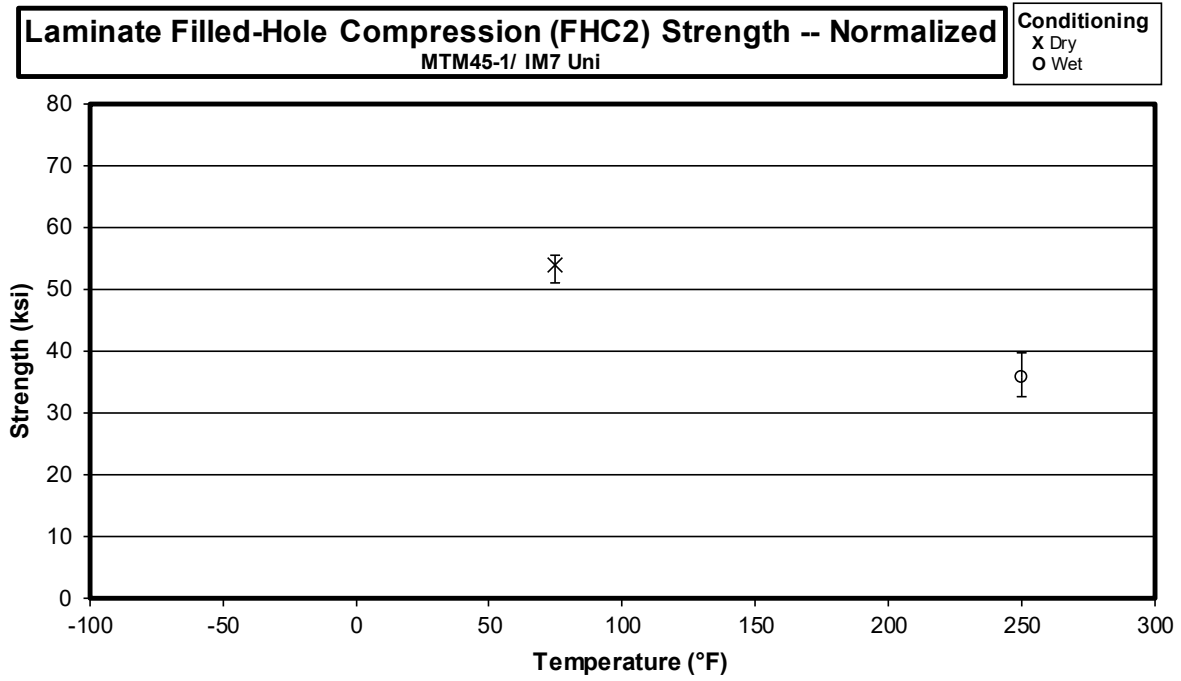
3.24 “50/40/10” Open-Hole Compression 3 Properties (OHC3)



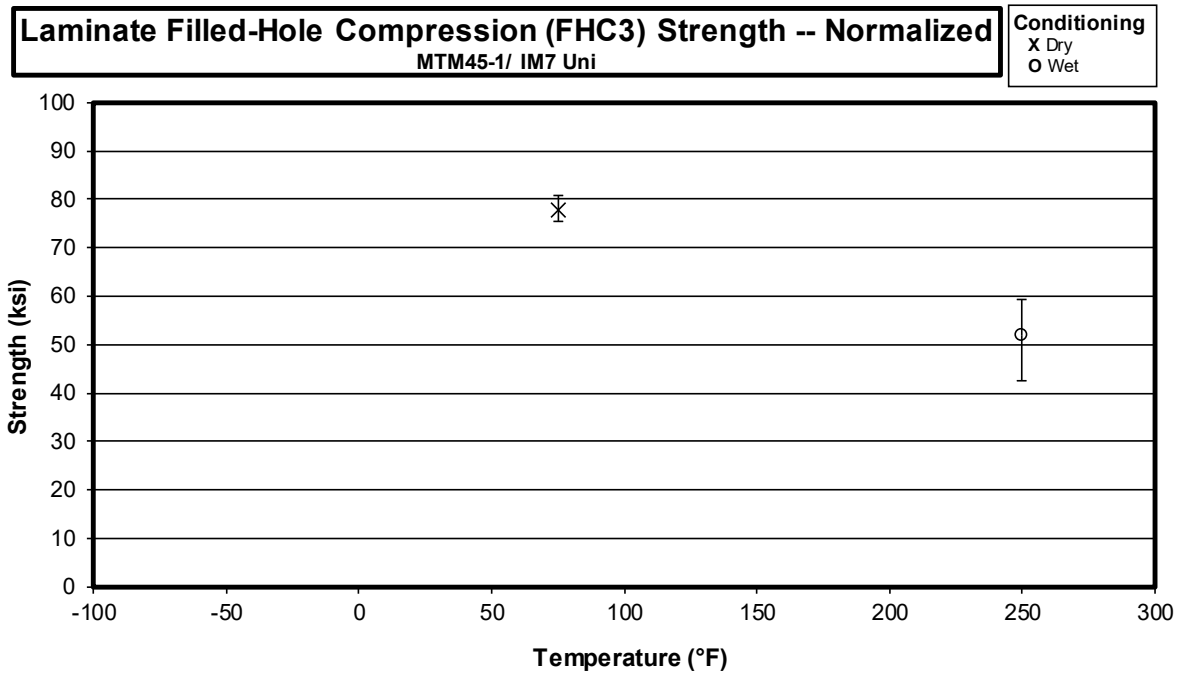
3.25 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)



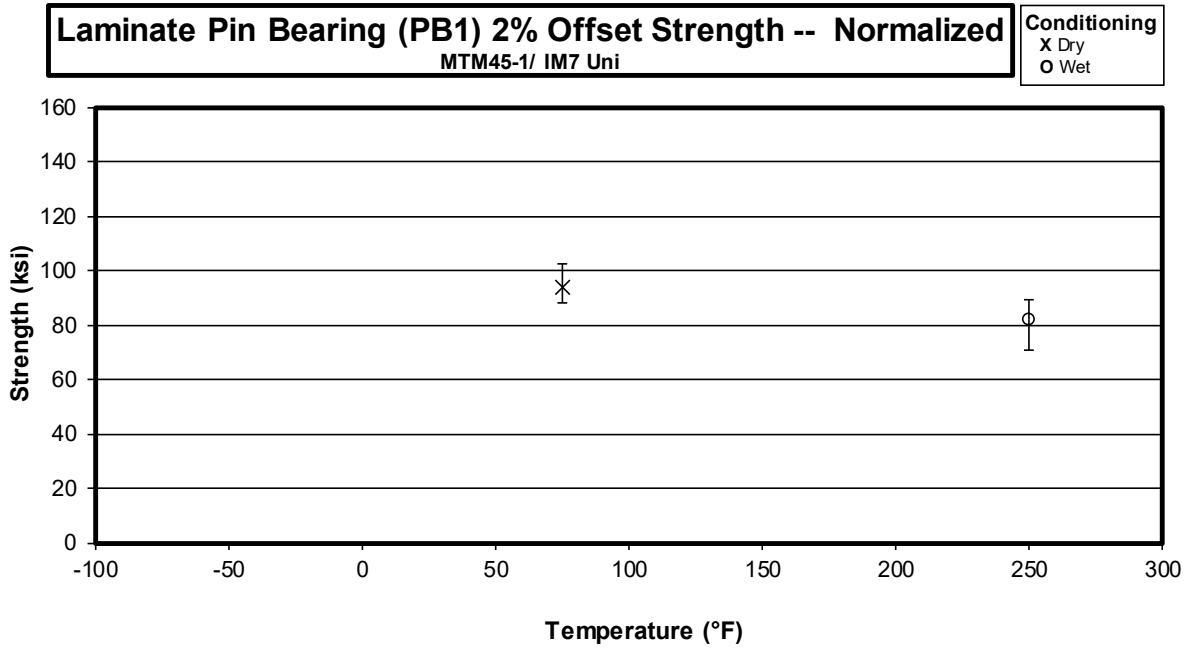
3.26 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)



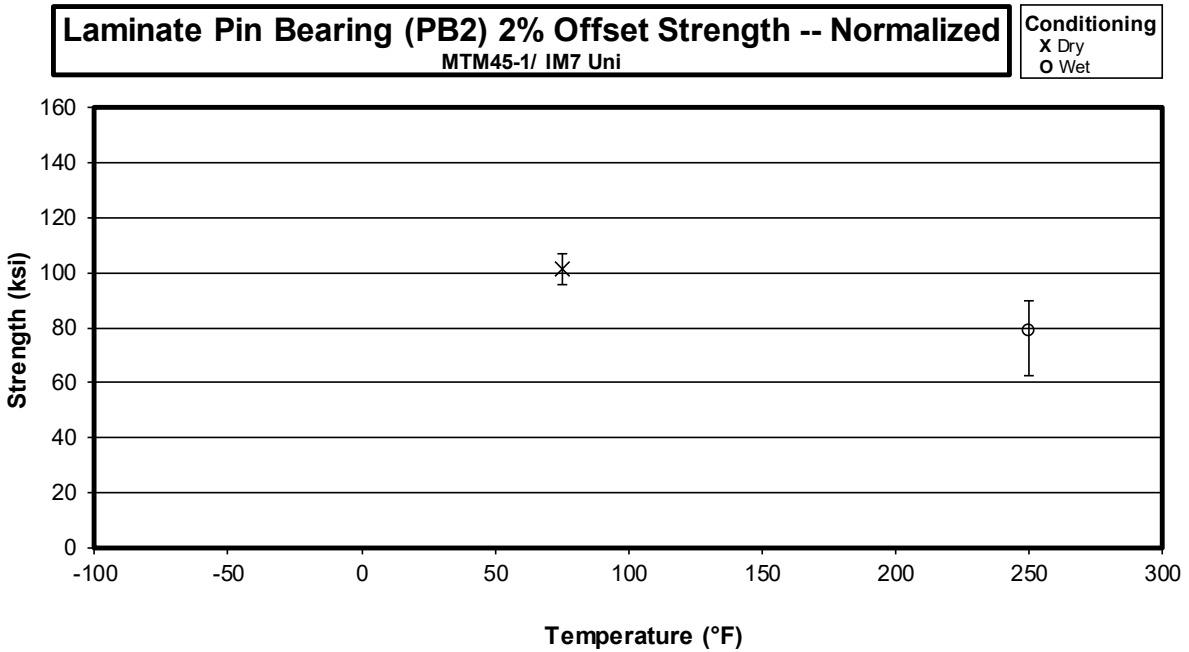
3.27 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)



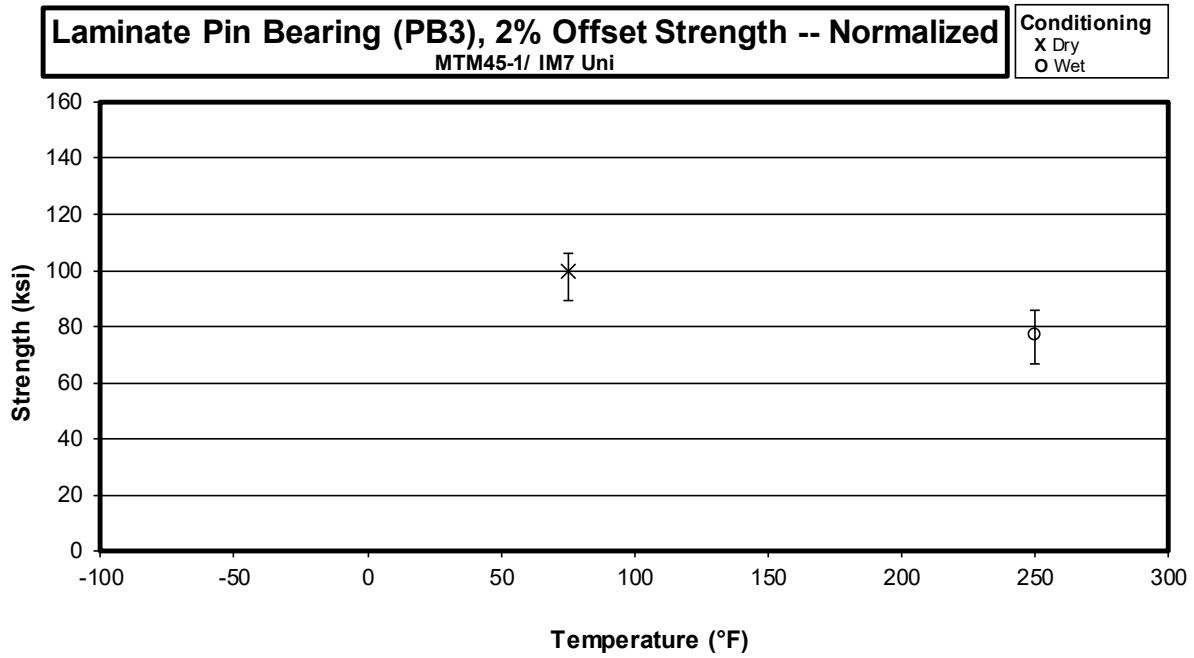
3.28 “25/50/25” Pin Bearing 1 Properties (PB1)



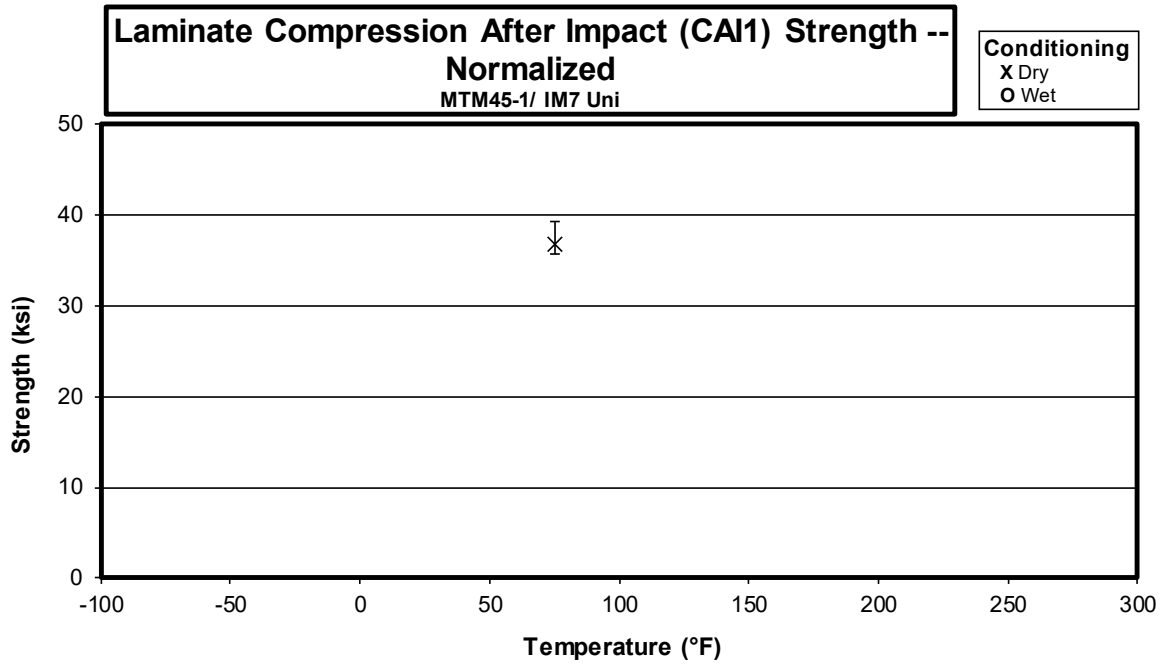
3.29 “10/80/10” Pin Bearing 2 Properties (PB2)



3.30 “50/40/10” Pin Bearing 3 Properties (PB3)



3.31 “25/50/25” Compression After Impact 1 Properties (CAI1)



4. Raw Data

4.1 Longitudinal Tension Properties (LT)

**Longitudinal Tension Properties (LT) -- (CTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

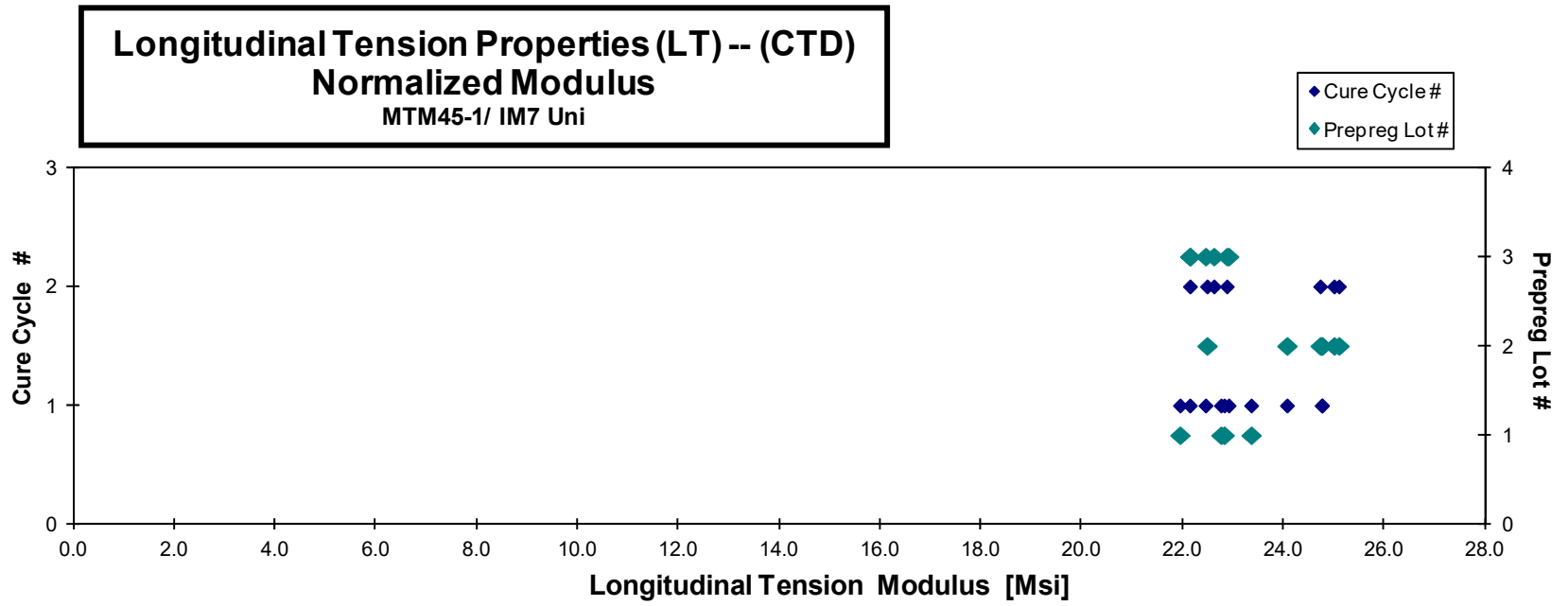
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
IMU-LT-A-MH1-CTD-1	AFJA111B	A	MH1	1	1	21.617	0.089	16	SGM	0.0056	21.961
IMU-LT-A-MH1-CTD-2	AFJA112B	A	MH1	1	1	22.357	0.092	16	SGM	0.0058	23.373
IMU-LT-A-MH1-CTD-3	AFJA113B	A	MH1	1	1	22.023	0.091	16	SGM	0.0057	22.774
IMU-LT-A-MH1-CTD-4	AFJA114B	A	MH1	1	1	22.158	0.091	16	SGM	0.0057	22.838
IMU-LT-B-MH1-CTD-1	AFJB111B	B	MH1	2	1	21.962	0.097	16	XGM	0.0060	24.083
IMU-LT-B-MH1-CTD-2	AFJB112B	B	MH1	2	1	22.616	0.096	16	XGM	0.0060	24.775
IMU-LT-B-MH1-CTD-3	AFJB113B	B	MH1	2	1	22.548	0.097	16	XGM	0.0060	24.777
IMU-LT-B-MH2-CTD-1	AFJB211B	B	MH2	2	2	21.220	0.093	16	XGM	0.0058	22.498
IMU-LT-B-MH2-CTD-2	AFJB212B	B	MH2	2	2	22.691	0.097	16	XGM	0.0061	25.115
IMU-LT-B-MH2-CTD-3	AFJB213B	B	MH2	2	2	22.933	0.096	16	XGM	0.0060	25.018
IMU-LT-B-MH2-CTD-4	AFJB214B	B	MH2	2	2	22.992	0.095	16	XGM	0.0059	24.743
IMU-LT-C-MH1-CTD-2	AFJC112B	C	MH1	3	1	22.182	0.088	16	XGM	0.0055	22.157
IMU-LT-C-MH1-CTD-3	AFJC113B	C	MH1	3	1	22.953	0.088	16	XGM	0.0055	22.927
IMU-LT-C-MH1-CTD-4	AFJC114B	C	MH1	3	1	22.367	0.088	16	XGM	0.0055	22.469
IMU-LT-C-MH2-CTD-2	AFJC212B	C	MH2	3	2	22.582	0.088	16	XGM	0.0055	22.633
IMU-LT-C-MH2-CTD-3	AFJC213B	C	MH2	3	2	21.837	0.089	16	XGM	0.0056	22.160
IMU-LT-C-MH2-CTD-4	AFJC214B	C	MH2	3	2	22.659	0.089	16	XGM	0.0056	22.891

* Batch A cure cycle 2: data is omitted due to wrong panel layout

Average 22.335
Standard Dev. 0.493
Coeff. of Var. [%] 2.207
Min. 21.220
Max. 22.992
Number of Spec. 17

Average_{norm} 0.0058 23.364
Standard Dev._{norm} 1.124
Coeff. of Var. [%]_{norm} 4.810
Min. 0.0055 21.961
Max. 0.0061 25.115
Number of Spec. 17



**Longitudinal Tension Properties (LT) -- (RTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

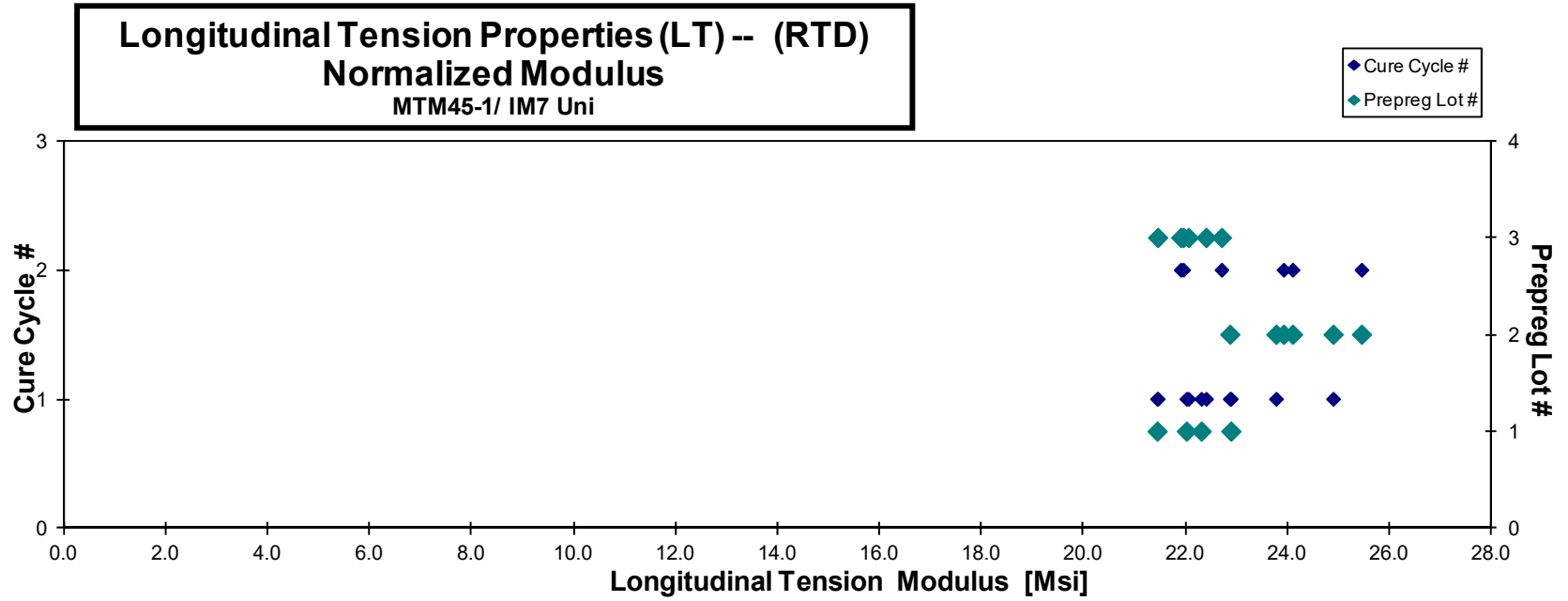
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
IMU-LT-A-MH1-RTD-1	AFJA111A	A	MH1	1	1	22.052	0.091	16	LAT	0.0057	22.904
IMU-LT-A-MH1-RTD-2	AFJA112A	A	MH1	1	1	21.706	0.091	16	SGM	0.0057	22.323
IMU-LT-A-MH1-RTD-3	AFJA113A	A	MH1	1	1	21.353	0.091	16	SGM	0.0057	22.032
IMU-LT-A-MH1-RTD-4	AFJA114A	A	MH1	1	1	21.099	0.090	16	LAB	0.0056	21.459
IMU-LT-B-MH1-RTD-1	AFJB111A	B	MH1	2	1	21.515	0.094	16	XGM	0.0059	22.884
IMU-LT-B-MH1-RTD-2	AFJB112A	B	MH1	2	1	21.875	0.096	16	XGM	0.0060	23.789
IMU-LT-B-MH1-RTD-4	AFJB113A	B	MH1	2	1	22.645	0.097	16	XGM	0.0061	24.910
IMU-LT-B-MH2-RTD-1	AFJB211A	B	MH2	2	2	22.385	0.095	16	XGM	0.0059	24.115
IMU-LT-B-MH2-RTD-3	AFJB213A	B	MH2	2	2	22.385	0.094	16	XGM	0.0059	23.937
IMU-LT-B-MH2-RTD-4	AFJB214A	B	MH2	2	2	22.500	0.100	16	XGM	0.0062	25.466
IMU-LT-C-MH1-RTD-1	AFJC111A	C	MH1	3	1	22.469	0.088	16	XGM	0.0055	22.418
IMU-LT-C-MH1-RTD-2	AFJC112A	C	MH1	3	1	21.469	0.088	16	XGM	0.0055	21.469
IMU-LT-C-MH1-RTD-3	AFJC113A	C	MH1	3	1	22.022	0.088	16	XGM	0.0055	22.072
IMU-LT-C-MH2-RTD-1	AFJC211A	C	MH2	3	2	21.896	0.088	16	XGM	0.0055	21.921
IMU-LT-C-MH2-RTD-2	AFJC212A	C	MH2	3	2	21.896	0.088	16	XGM	0.0055	21.971
IMU-LT-C-MH2-RTD-3	AFJC213A	C	MH2	3	2	22.747	0.088	16	XGM	0.0055	22.721

* Batch A cure cycle 2: data is omitted due to wrong panel layup

Average 22.001
Standard Dev. 0.491
Coeff. of Var. [%] 2.231
Min. 21.099
Max. 22.747
Number of Spec. 16

Average_{norm} 0.0057 22.899
Standard Dev._{norm} 1.210
Coeff. of Var. [%]_{norm} 5.282
Min. 0.0055 21.459
Max. 0.0062 25.466
Number of Spec. 16



**Longitudinal Tension Properties (LT) -- (ETW)
Strength & Modulus
MTM45-1/ IM7 Uni**

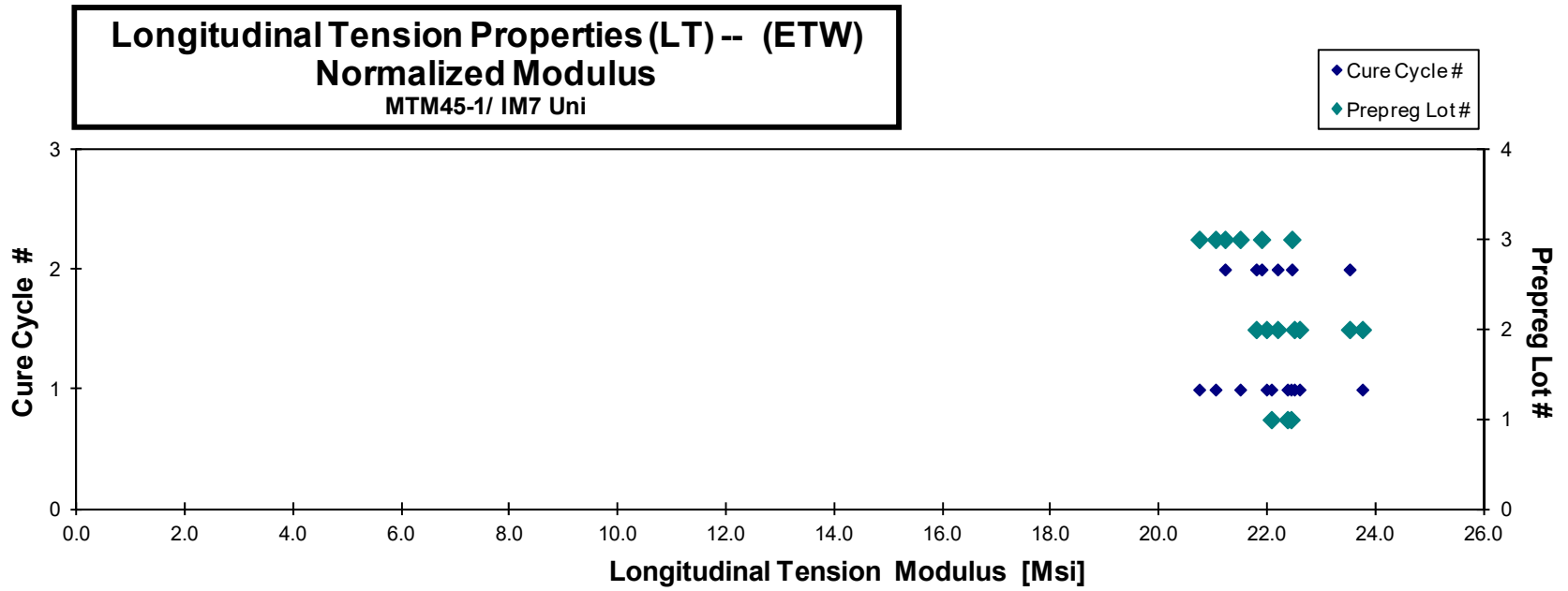
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
IMU-LT-A-MH1-ETW-2	AFJA112N	A	MH1	1	1	21.651	0.091	16	NR	0.0057	22.426
IMU-LT-A-MH1-ETW-3	AFJA113N	A	MH1	1	1	21.441	0.091	16	NR	0.0057	22.062
IMU-LT-A-MH1-ETW-4	AFJA114N	A	MH1	1	1	22.096	0.089	16	NR	0.0056	22.360
IMU-LT-B-MH1-ETW-1	AFJB111N	B	MH1	2	1	21.120	0.094	16	NR	0.0059	22.584
IMU-LT-B-MH1-ETW-2	AFJB112N	B	MH1	2	1	20.400	0.095	16	NR	0.0059	21.973
IMU-LT-B-MH1-ETW-3	AFJB113N	B	MH1	2	1	22.336	0.094	16	NR	0.0058	23.745
IMU-LT-B-MH1-ETW-4	AFJB114N	B	MH1	2	1	21.160	0.094	16	NR	0.0058	22.487
IMU-LT-B-MH2-ETW-1	AFJB211N	B	MH2	2	2	20.360	0.094	16	NR	0.0059	21.783
IMU-LT-B-MH2-ETW-3	AFJB213N	B	MH2	2	2	20.656	0.094	16	NR	0.0059	22.178
IMU-LT-B-MH2-ETW-4	AFJB214N	B	MH2	2	2	22.122	0.094	16	NR	0.0058	23.509
IMU-LT-C-MH1-ETW-2	AFJC112N	C	MH1	3	1	21.371	0.087	16	NR	0.0054	21.031
IMU-LT-C-MH1-ETW-3	AFJC113N	C	MH1	3	1	21.245	0.089	16	NR	0.0056	21.486
IMU-LT-C-MH1-ETW-4	AFJC114N	C	MH1	3	1	21.125	0.086	16	NR	0.0054	20.729
IMU-LT-C-MH2-ETW-2	AFJC212N	C	MH2	3	2	22.152	0.089	16	NR	0.0056	22.441
IMU-LT-C-MH2-ETW-3	AFJC213N	C	MH2	3	2	20.897	0.089	16	NR	0.0056	21.206
IMU-LT-C-MH2-ETW-4	AFJC214N	C	MH2	3	2	21.770	0.088	16	NR	0.0055	21.881

NR: Not recorded. Tests were stopped once 4000 microstrain was reached, so max load was not recorded.

* Batch A cure cycle 2: data is omitted due to wrong panel layup

Average	21.369	Average _{norm}	0.0057	22.118
Standard Dev.	0.620	Standard Dev. _{norm}		0.805
Coeff. of Var. [%]	2.899	Coeff. of Var. [%] _{norm}		3.641
Min.	20.360	Min.	0.0054	20.729
Max.	22.336	Max.	0.0059	23.745
Number of Spec.	16	Number of Spec.		16



**Longitudinal Tension Properties (LT) -- (ETW2)
Strength & Modulus
MTM45-1/ IM7 Uni**

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode
IMU-LT-A-MH1-ETW2-2	AFJA112D	A	MH1	1	1	22.471	0.091	16	NR
IMU-LT-A-MH1-ETW2-3	AFJA113D	A	MH1	1	1	21.977	0.091	16	NR
IMU-LT-A-MH1-ETW2-4	AFJA114D	A	MH1	1	1	23.288	0.090	16	NR
IMU-LT-B-MH1-ETW2-2	AFJB112D	B	MH1	2	1	21.562	0.093	16	NR
IMU-LT-B-MH1-ETW2-3	AFJB113D	B	MH1	2	1	22.076	0.092	16	NR
IMU-LT-B-MH1-ETW2-4	AFJB114D	B	MH1	2	1	22.192	0.094	16	NR
IMU-LT-B-MH2-ETW2-2	AFJB212D	B	MH2	2	2	23.811	0.093	16	NR
IMU-LT-B-MH2-ETW2-3	AFJB213D	B	MH2	2	2	22.908	0.092	16	NR
IMU-LT-B-MH2-ETW2-4	AFJB214D	B	MH2	2	2	23.011	0.093	16	NR
IMU-LT-C-MH1-ETW2-2	AFJC112D	C	MH1	3	1	23.738	0.088	16	NR
IMU-LT-C-MH1-ETW2-3	AFJC113D	C	MH1	3	1	23.979	0.088	16	NR
IMU-LT-C-MH1-ETW2-4	AFJC114D	C	MH1	3	1	25.069	0.089	16	NR
IMU-LT-C-MH2-ETW2-2	AFJC212D	C	MH2	3	2	23.425	0.087	16	NR
IMU-LT-C-MH2-ETW2-3	AFJC213D	C	MH2	3	2	24.379	0.087	16	NR
IMU-LT-C-MH2-ETW2-4	AFJC214D	C	MH2	3	2	24.666	0.087	16	NR

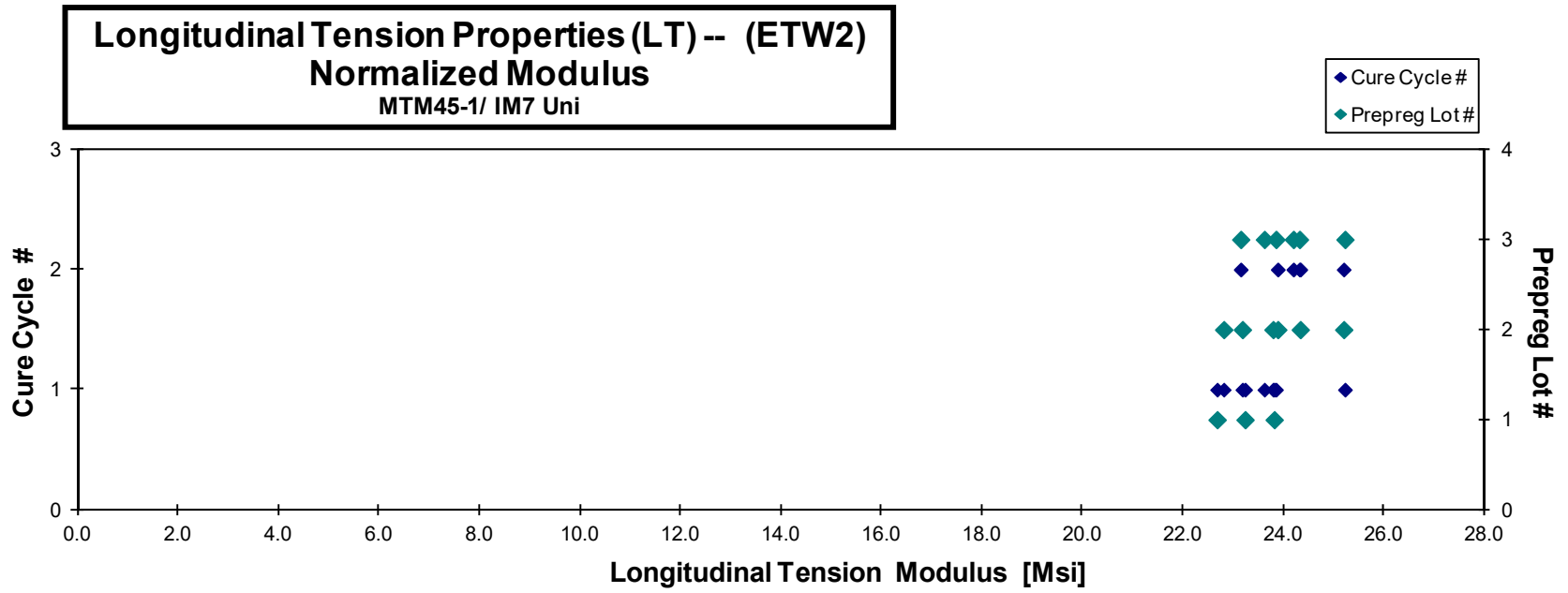
Avg. t_{ply} [in]	Modulus _{norm} [Msi]
0.0057	23.237
0.0057	22.680
0.0056	23.817
0.0058	22.812
0.0058	23.184
0.0059	23.793
0.0058	25.200
0.0057	23.889
0.0058	24.336
0.0055	23.621
0.0055	23.852
0.0055	25.226
0.0054	23.150
0.0055	24.199
0.0054	24.320

NR: Not recorded. Tests were stopped once 4000 microstrain was reached, so max load was not recorded.

* Batch A cure cycle 2: data is omitted due to wrong panel layup

Average 23.237
Standard Dev. 1.051
Coeff. of Var. [%] 4.521
Min. 21.562
Max. 25.069
Number of Spec. 15

Average_{norm} 0.0056 23.821
Standard Dev._{norm} 0.760
Coeff. of Var. [%]_{norm} 3.192
Min. 0.0054 22.680
Max. 0.0059 25.226
Number of Spec. 15



4.2 Transverse Tension Properties (TT)

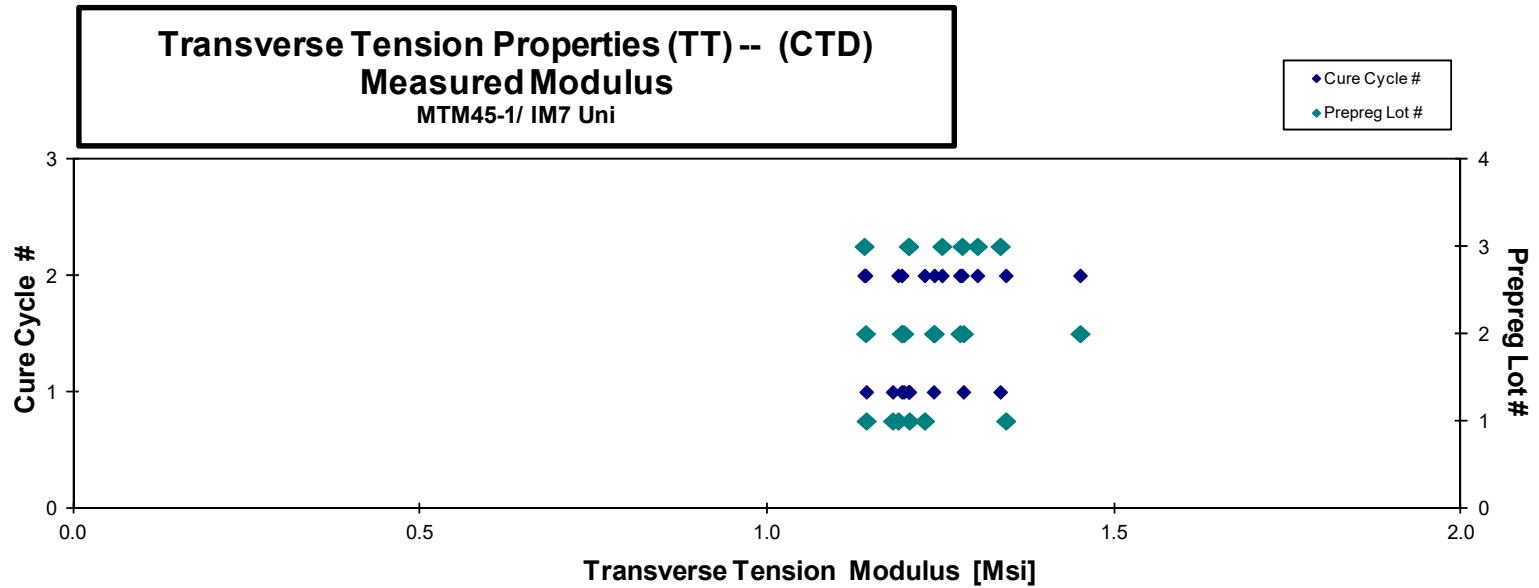
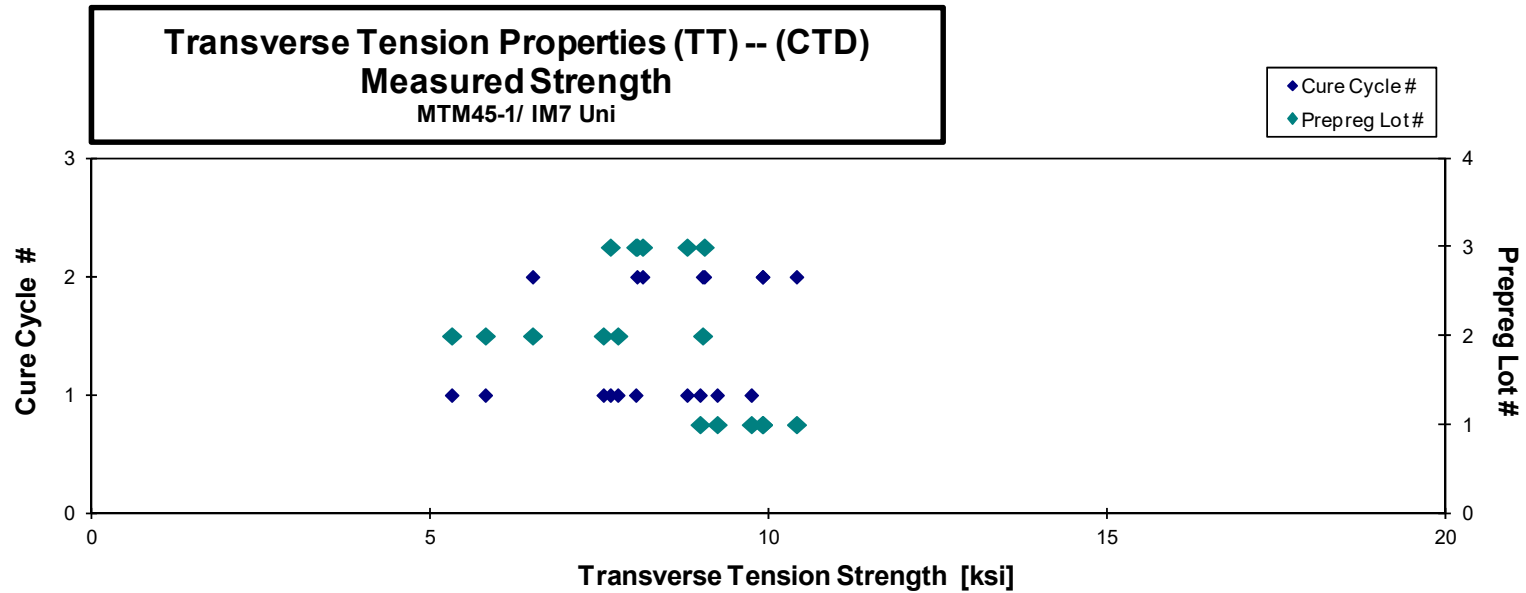
Transverse Tension Properties (TT) -- (CTD) Strength & Modulus MTM45-1/ IM7 Uni

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
IMU-TT-A-MH1-CTD-2	AFUA112B	A	MH1	1	1	9.754	1.181	0.094	16	0.0059	LGM
IMU-TT-A-MH1-CTD-3	AFUA113B	A	MH1	1	1	9.250	1.205	0.093	16	0.0058	LWB
IMU-TT-A-MH1-CTD-4	AFUA114B	A	MH1	1	1	8.997	1.143	0.093	16	0.0058	LAT
IMU-TT-A-MH2-CTD-2	AFUA212B	A	MH2	1	2	9.920	1.344	0.090	16	0.0057	LAB
IMU-TT-A-MH2-CTD-3	AFUA213B	A	MH2	1	2	9.920	1.189	0.092	16	0.0058	LAT
IMU-TT-A-MH2-CTD-4	AFUA214B	A	MH2	1	2	10.422	1.227	0.092	16	0.0057	LAB
IMU-TT-B-MH1-CTD-1	AFUB111B	B	MH1	2	1	7.782	1.283	0.093	16	0.0058	LGM
IMU-TT-B-MH1-CTD-2	AFUB112B	B	MH1	2	1	5.328	1.240	0.096	16	0.0060	LWB
IMU-TT-B-MH1-CTD-3	AFUB113B	B	MH1	2	1	5.826	1.194	0.095	16	0.0059	LWB
IMU-TT-B-MH1-CTD-4	AFUB114B	B	MH1	2	1	7.568	1.197	0.096	16	0.0060	LGM
IMU-TT-B-MH2-CTD-1*	AFUB211B	B	MH2	2	2		1.451	0.089	16	0.0056	LGM
IMU-TT-B-MH2-CTD-2*	AFUB212B	B	MH2	2	2		1.142	0.090	16	0.0056	LWB
IMU-TT-B-MH2-CTD-3	AFUB213B	B	MH2	2	2	9.035	1.194	0.087	16	0.0054	LGM
IMU-TT-B-MH2-CTD-4**	AFUB214B	B	MH2	2	2		1.278	0.087	16	0.0055	LIT
IMU-TT-B-MH2-CTD-R1(IMU-TT-B-MH2-ETW2-2)	AFUB231B	B	MH2	2	2	6.523	1.241	0.087	16	0.0055	LAT
IMU-TT-C-MH1-CTD-1	AFUC111B	C	MH1	3	1	7.672	1.204	0.085	16	0.0053	LAB
IMU-TT-C-MH1-CTD-2	AFUC112B	C	MH1	3	1	8.805	1.204	0.088	16	0.0055	LWT
IMU-TT-C-MH1-CTD-3	AFUC113B	C	MH1	3	1	8.048	1.336	0.084	16	0.0052	LGM
IMU-TT-C-MH2-CTD-1**	AFUC211B	C	MH2	3	2		1.252	0.089	16	0.0056	LIT
IMU-TT-C-MH2-CTD-2	AFUC212B	C	MH2	3	2	8.066	1.281	0.089	16	0.0056	LGM
IMU-TT-C-MH2-CTD-3	AFUC213B	C	MH2	3	2	9.060	1.140	0.089	16	0.0056	LAT
IMU-TT-C-MH2-CTD-4	AFUC214B	C	MH2	3	2	8.148	1.303	0.090	16	0.0056	LGM

* Tensile strength is not reported due to the load recorded on the specimen is too low.

** Tensile strength is omitted due to unacceptable failure mode.

Average	8.340	1.238	Average	0.0056
Standard Dev.	1.415	0.075		
Coeff. of Var. [%]	16.970	6.074		
Min.	5.328	1.140	Min.	0.0052
Max.	10.422	1.451	Max.	0.0060
Number of Spec.	18	22	Number of Spec.	22

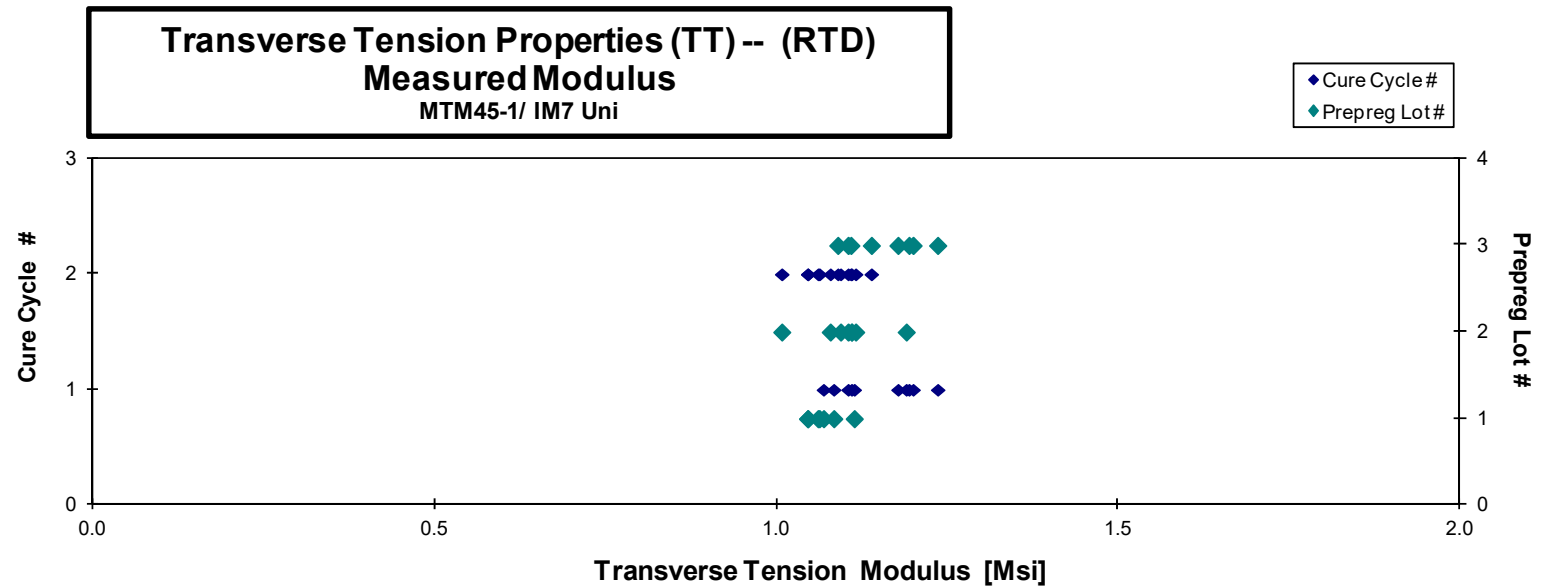
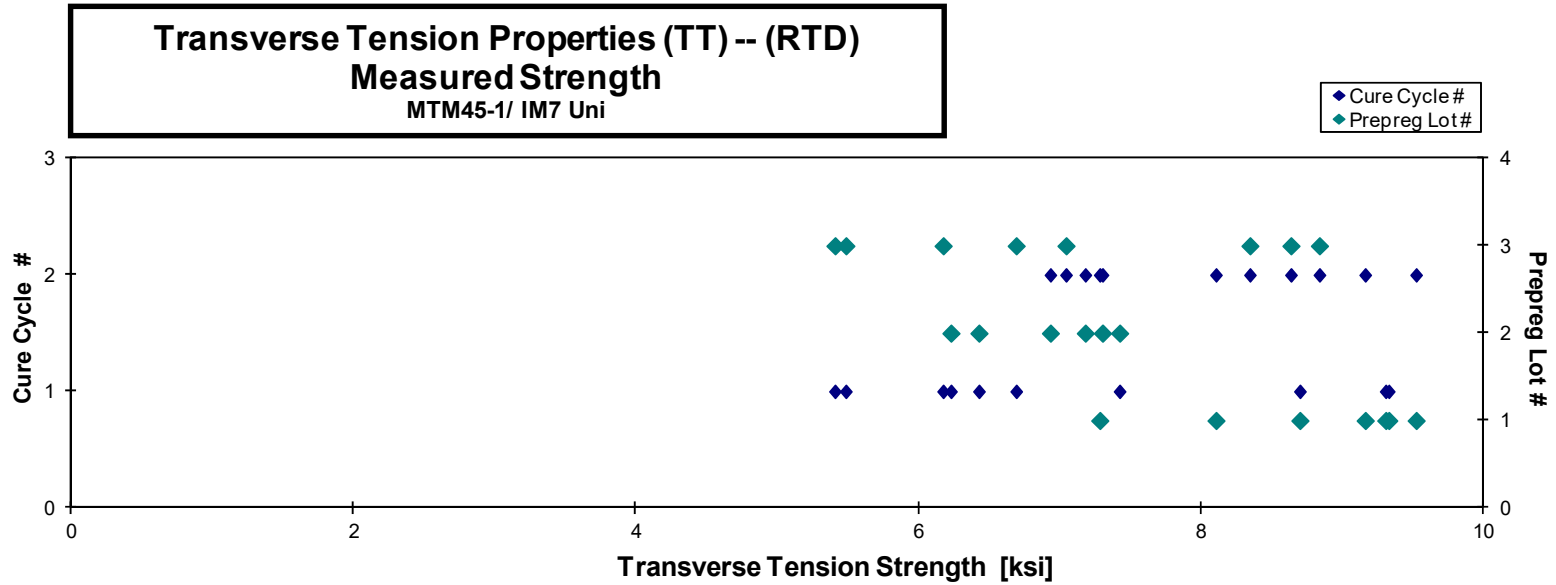


**Transverse Tension Properties (TT) -- (RTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-TT-A-MH1-RTD-2	AFUA112A	A	MH1	1	1	8.698	1.114	0.092	16	0.0058	LGM
IMU-TT-A-MH1-RTD-3	AFUA113A	A	MH1	1	1	9.306	1.069	0.093	16	0.0058	LAT
IMU-TT-A-MH1-RTD-4	AFUA114A	A	MH1	1	1	9.328	1.084	0.093	16	0.0058	LGM
IMU-TT-A-MH2-RTD-1	AUFA211A	A	MH2	1	2	9.521	1.046	0.091	16	0.0057	LAT
IMU-TT-A-MH2-RTD-2	AUFA212A	A	MH2	1	2	9.161	1.046	0.091	16	0.0057	LAB
IMU-TT-A-MH2-RTD-3	AUFA213A	A	MH2	1	2	8.104	1.063	0.091	16	0.0057	LGM
IMU-TT-A-MH2-RTD-4	AUFA214A	A	MH2	1	2	7.281	1.061	0.091	16	0.0057	LGM
IMU-TT-B-MH1-RTD-2	AFUB112A	B	MH1	2	1	7.421	1.190	0.093	16	0.0058	LAB
IMU-TT-B-MH1-RTD-3	AFUB113A	B	MH1	2	1	6.227	1.110	0.096	16	0.0060	LGM
IMU-TT-B-MH1-RTD-4	AFUB114A	B	MH1	2	1	6.425	1.105	0.094	16	0.0059	LWB
IMU-TT-B-MH2-RTD-1*	AFUB211A	B	MH2	2	2		1.110	0.090	16	0.0056	LWB
IMU-TT-B-MH2-RTD-2	AFUB212A	B	MH2	2	2	7.300	1.079	0.089	16	0.0056	LGM
IMU-TT-B-MH2-RTD-3	AFUB213A	B	MH2	2	2	6.931	1.094	0.090	16	0.0056	LGM
IMU-TT-B-MH2-RTD-4*	AFUB214A	B	MH2	2	2		1.008	0.090	16	0.0056	LGM
IMU-TT-B-MH2-RTD-R1(IMU-TT-B-MH2-ETW-1)	AFUB221A	B	MH2	2	2	7.178	1.116	0.087	16	0.0054	LGM
IMU-TT-C-MH1-RTD-1	AFUC111A	C	MH1	3	1	5.405	1.178	0.087	16	0.0055	LWT
IMU-TT-C-MH1-RTD-2	AFUC112A	C	MH1	3	1	5.482	1.194	0.088	16	0.0055	LWB
IMU-TT-C-MH1-RTD-3	AFUC113A	C	MH1	3	1	6.689	1.200	0.088	16	0.0055	LWT
IMU-TT-C-MH1-RTD-4	AFUC114A	C	MH1	3	1	6.171	1.236	0.088	16	0.0055	LGM
IMU-TT-C-MH2-RTD-1	AFUC211A	C	MH2	3	2	7.042	1.105	0.089	16	0.0056	LWB
IMU-TT-C-MH2-RTD-2	AFUC212A	C	MH2	3	2	8.836	1.109	0.089	16	0.0056	LGM
IMU-TT-C-MH2-RTD-3	AFUC213A	C	MH2	3	2	8.344	1.090	0.090	16	0.0056	LGM
IMU-TT-C-MH2-RTD-4	AFUC214A	C	MH2	3	2	8.635	1.139	0.089	16	0.0056	LGM

* Tensile strength is not reported due to the load recorded on the specimen is too low.

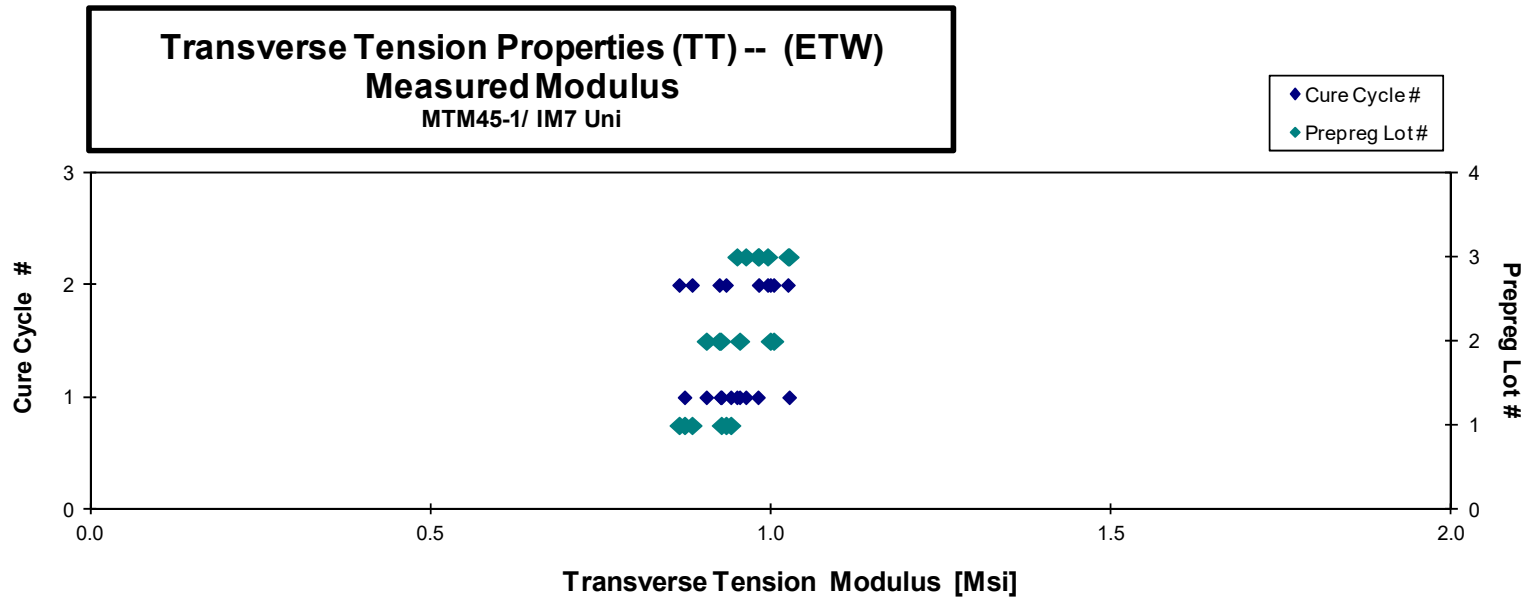
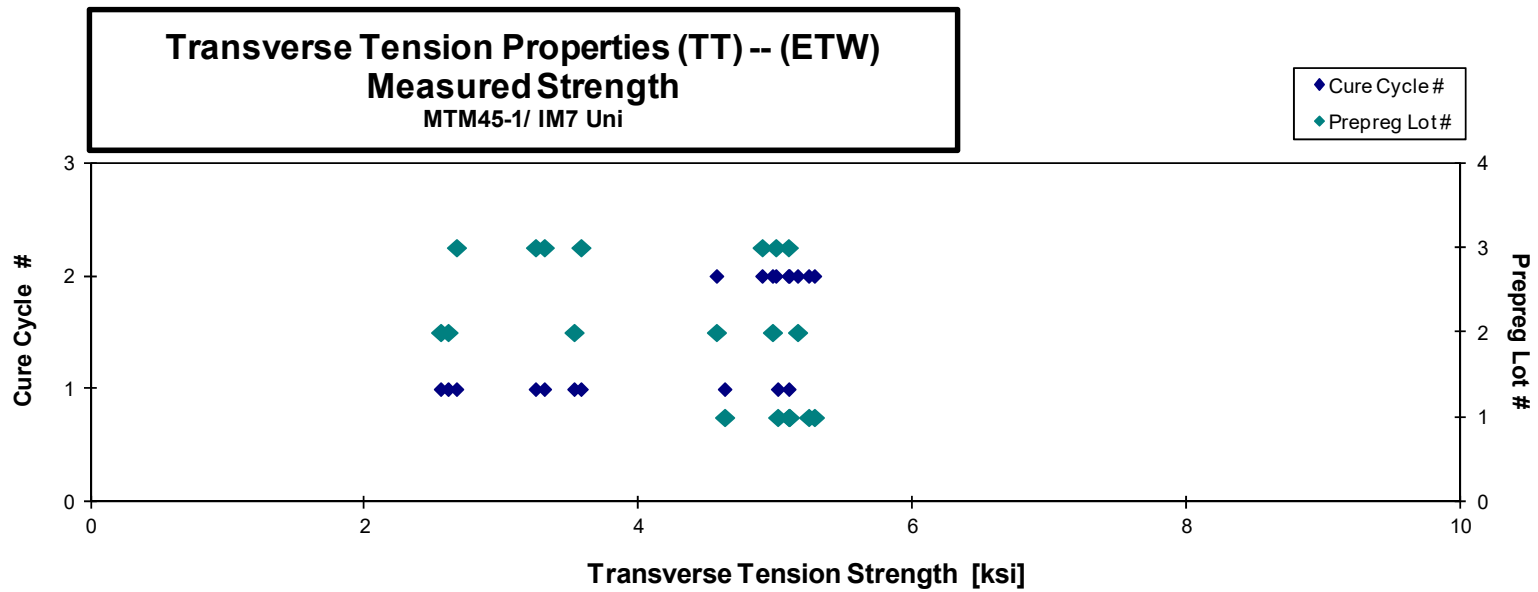
Average	7.595	1.111	Average	0.0057
Standard Dev.	1.289	0.056		
Coeff. of Var. [%]	16.975	5.085		
Min.	5.405	1.008	Min.	0.0054
Max.	9.521	1.236	Max.	0.0060
Number of Spec.	21	23	Number of Spec.	23



**Transverse Tension Properties (TT) -- (ETW)
Strength & Modulus
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-TT-A-MH1-ETW-2	AFUA112N	A	MH1	1	1	5.102	0.874	0.092	16	0.0058	LWB
IMU-TT-A-MH1-ETW-3	AFUA113N	A	MH1	1	1	5.021	0.928	0.091	16	0.0057	LGM
IMU-TT-A-MH1-ETW-4	AFUA114N	A	MH1	1	1	4.633	0.942	0.091	16	0.0057	LAB
IMU-TT-A-MH2-ETW-1	AFUA211N	A	MH2	1	2	5.105	0.866	0.092	16	0.0057	LAT
IMU-TT-A-MH2-ETW-2	AFUA212N	A	MH2	1	2	5.288	0.935	0.091	16	0.0057	LAB
IMU-TT-A-MH2-ETW-3	AFUA213N	A	MH2	1	2	5.247	0.885	0.091	16	0.0057	LGM
IMU-TT-B-MH1-ETW-2	AFUB112N	B	MH1	2	1	2.559	0.955	0.094	16	0.0059	LGM
IMU-TT-B-MH1-ETW-3	AFUB113N	B	MH1	2	1	3.533	0.906	0.095	16	0.0059	LGM
IMU-TT-B-MH1-ETW-4	AFUB114N	B	MH1	2	1	2.614	0.927	0.093	16	0.0058	LGM
IMU-TT-B-MH2-ETW-1	AFUB211N	B	MH2	2	2	5.166	1.005	0.088	16	0.0055	LWB
IMU-TT-B-MH2-ETW-2	AFUB212N	B	MH2	2	2	4.983	1.000	0.088	16	0.0055	LAT
IMU-TT-B-MH2-ETW-4	AFUB214N	B	MH2	2	2	4.573	0.925	0.087	16	0.0055	LAB
IMU-TT-C-MH1-ETW-1	AFUC111N	C	MH1	3	1	3.317	0.951	0.086	16	0.0054	LWT
IMU-TT-C-MH1-ETW-2	AFUC112N	C	MH1	3	1	3.252	0.982	0.087	16	0.0055	LGM
IMU-TT-C-MH1-ETW-3	AFUC113N	C	MH1	3	1	3.584	0.964	0.087	16	0.0055	LGM
IMU-TT-C-MH1-ETW-4	AFUC114N	C	MH1	3	1	2.675	1.028	0.087	16	0.0054	LGM
IMU-TT-C-MH2-ETW-2	AFUC212N	C	MH2	3	2	4.907	1.026	0.087	16	0.0054	LWT
IMU-TT-C-MH2-ETW-3	AFUC213N	C	MH2	3	2	5.099	0.996	0.087	16	0.0054	LGM
IMU-TT-C-MH2-ETW-4	AFUC214N	C	MH2	3	2	5.007	0.983	0.087	16	0.0054	AGM

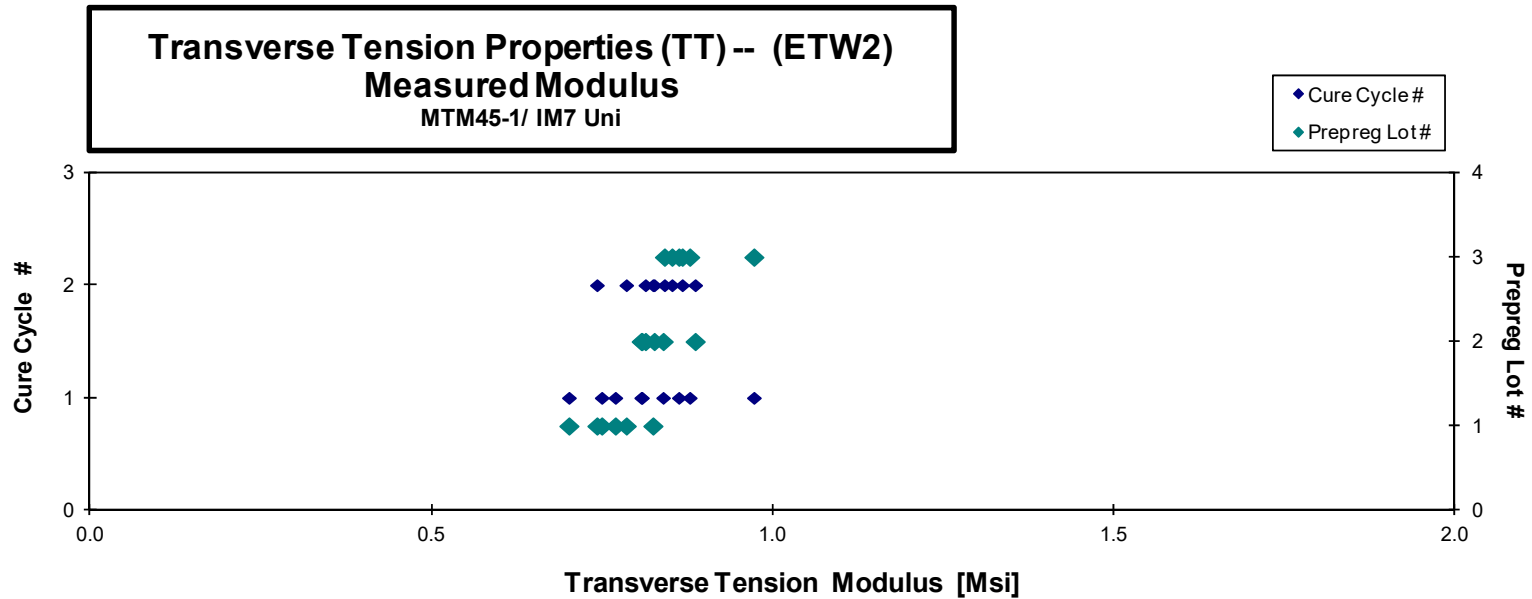
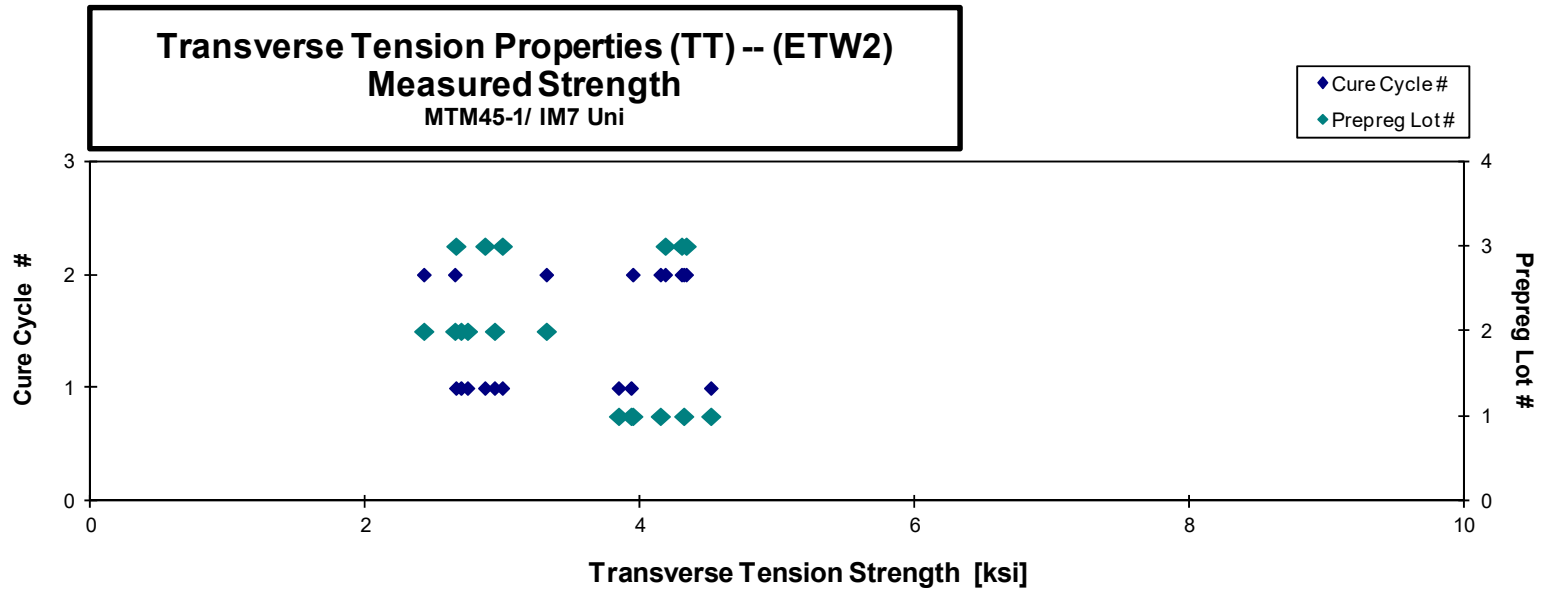
Average	4.298	0.951	Average	0.0056
Standard Dev.	1.007	0.049		
Coeff. of Var. [%]	23.440	5.117		
Min.	2.559	0.866	Min.	0.0054
Max.	5.288	1.028	Max.	0.0059
Number of Spec.	19	19	Number of Spec.	19



Transverse Tension Properties (TT) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-TT-A-MH1-ETW2-1	AFUA111D	A	MH1	1	1	4.519	0.770	0.092	16	0.0057	LGM
IMU-TT-A-MH1-ETW2-3	AFUA113D	A	MH1	1	1	3.846	0.702	0.093	16	0.0058	LGM
IMU-TT-A-MH1-ETW2-4	AFUA114D	A	MH1	1	1	3.937	0.750	0.092	16	0.0057	LGM
IMU-TT-A-MH2-ETW2-2	AFUA212D	A	MH2	1	2	3.950	0.825	0.091	16	0.0057	LWB
IMU-TT-A-MH2-ETW2-3	AFUA213D	A	MH2	1	2	4.321	0.743	0.092	16	0.0057	LGM
IMU-TT-A-MH2-ETW2-4	AFUA214D	A	MH2	1	2	4.151	0.786	0.091	16	0.0057	LGM
IMU-TT-B-MH1-ETW2-2	AFUB112D	B	MH1	2	1	2.698	0.840	0.095	16	0.0059	LGM
IMU-TT-B-MH1-ETW2-3	AFUB113D	B	MH1	2	1	2.746	0.809	0.095	16	0.0059	LGM
IMU-TT-B-MH1-ETW2-4	AFUB114D	B	MH1	2	1	2.943	0.808	0.094	16	0.0059	LGM
IMU-TT-B-MH2-ETW2-1	AFUB211D	B	MH2	2	2	2.654	0.814	0.088	16	0.0055	LGM
IMU-TT-B-MH2-ETW2-3	AFUB213D	B	MH2	2	2	2.428	0.887	0.088	16	0.0055	LGM
IMU-TT-B-MH2-ETW2-4	AFUB214D	B	MH2	2	2	3.320	0.827	0.088	16	0.0055	LGM
IMU-TT-C-MH1-ETW2-2	AFUC112D	C	MH1	3	1	3.000	0.973	0.086	16	0.0054	LGM
IMU-TT-C-MH1-ETW2-3	AFUC113D	C	MH1	3	1	2.661	0.863	0.086	16	0.0054	LGM
IMU-TT-C-MH1-ETW2-4	AFUC114D	C	MH1	3	1	2.873	0.879	0.087	16	0.0054	LGM
IMU-TT-C-MH2-ETW2-2	AFUC212D	C	MH2	3	2	4.306	0.868	0.087	16	0.0054	LGM
IMU-TT-C-MH2-ETW2-3	AFUC213D	C	MH2	3	2	4.186	0.853	0.087	16	0.0054	LGM
IMU-TT-C-MH2-ETW2-4	AFUC214D	C	MH2	3	2	4.339	0.842	0.086	16	0.0054	LGM

Average	3.493	0.824	Average	0.0056
Standard Dev.	0.737	0.062		
Coeff. of Var. [%]	21.103	7.555		
Min.	2.428	0.702	Min.	0.0054
Max.	4.519	0.973	Max.	0.0059
Number of Spec.	18	18	Number of Spec.	18



4.3 Longitudinal Compression Properties (LC)

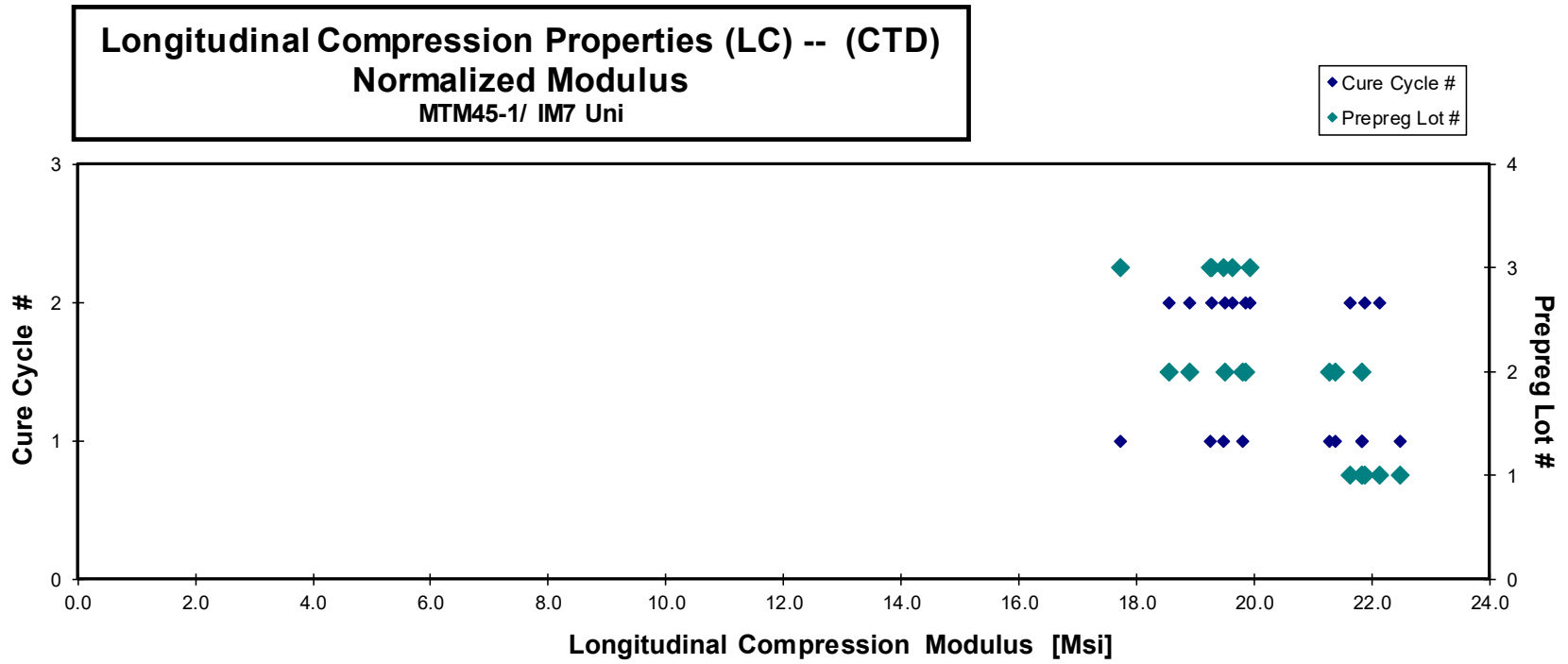
Longitudinal Compression Properties (LC) -- (CTD)
Modulus
MTM45-1/ IM7 Uni

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
IMU-LC-A-MH1-CTD-2	AFLA112B	A	MH1	1	1	21.562	0.323	0.092	16	0.0057	22.493
IMU-LC-A-MH1-CTD-3	AFLA113B	A	MH1	1	1	21.177	0.345	0.091	16	0.0057	21.827
IMU-LC-A-MH1-CTD-4	AFLA114B	A	MH1	1	1	21.602	0.337	0.089	16	0.0056	21.823
IMU-LC-A-MH2-CTD-2	AFLA212B	A	MH2	1	2	21.082	0.346	0.091	16	0.0057	21.873
IMU-LC-A-MH2-CTD-3	AFLA213B	A	MH2	1	2	21.019	0.371	0.091	16	0.0057	21.640
IMU-LC-A-MH2-CTD-4	AFLA214B	A	MH2	1	2	21.396	0.367	0.091	16	0.0057	22.125
IMU-LC-B-MH1-CTD-2	AFLB112B	B	MH1	2	1	19.617	0.403	0.096	16	0.0060	21.289
IMU-LC-B-MH1-CTD-3	AFLB113B	B	MH1	2	1	20.038	0.387	0.094	16	0.0059	21.381
IMU-LC-B-MH1-CTD-4	AFLB114B	B	MH1	2	1	18.688	0.308	0.093	16	0.0058	19.814
IMU-LC-B-MH1-CTD-R2	AFLB122B	B	MH1	2	1	20.278	0.409	0.095	16	0.0059	21.830
IMU-LC-B-MH2-CTD-2	AFLB212B	B	MH2	2	2	19.756	0.460	0.088	16	0.0055	19.846
IMU-LC-B-MH2-CTD-3	AFLB213B	B	MH2	2	2	*	0.408	0.089	16	0.0056	
IMU-LC-B-MH2-CTD-4	AFLB214B	B	MH2	2	2	18.465	0.314	0.088	16	0.0055	18.549
IMU-LC-B-MH2-CTD-R2	AFLB222B	B	MH2	2	2	19.089	0.260	0.087	16	0.0054	18.897
IMU-LC-B-MH2-CTD-R3	AFLB223B	B	MH2	2	2	19.089	0.314	0.090	16	0.0056	19.504
IMU-LC-C-MH1-CTD-2	AFLC112B	C	MH1	3	1	18.361	0.349	0.085	16	0.0053	17.714
IMU-LC-C-MH1-CTD-3	AFLC113B	C	MH1	3	1	19.387	0.279	0.087	16	0.0055	19.255
IMU-LC-C-MH1-CTD-4	AFLC114B	C	MH1	3	1	19.696	0.353	0.087	16	0.0054	19.472
IMU-LC-C-MH2-CTD-2	AFLC212B	C	MH2	3	2	19.804	0.287	0.089	16	0.0055	19.939
IMU-LC-C-MH2-CTD-3	AFLC213B	C	MH2	3	2	19.403	0.317	0.087	16	0.0055	19.271
IMU-LC-C-MH2-CTD-4	AFLC214B	C	MH2	3	2	19.592	0.340	0.088	16	0.0055	19.637

* Modulus is omitted due to strain gage malfunction and recommended by CMH-17 data review working group.

Average	19.955	0.346	Average _{norm}	0.0056	20.409
Standard Dev.	1.032	0.049	Standard Dev. _{norm}		1.405
Coeff. of Var. [%]	5.173	14.030	Coeff. of Var. [%] _{norm}		6.885
Min.	18.361	0.260	Min.	0.0053	17.714
Max.	21.602	0.460	Max.	0.0060	22.493
Number of Spec.	20	21	Number of Spec.		20



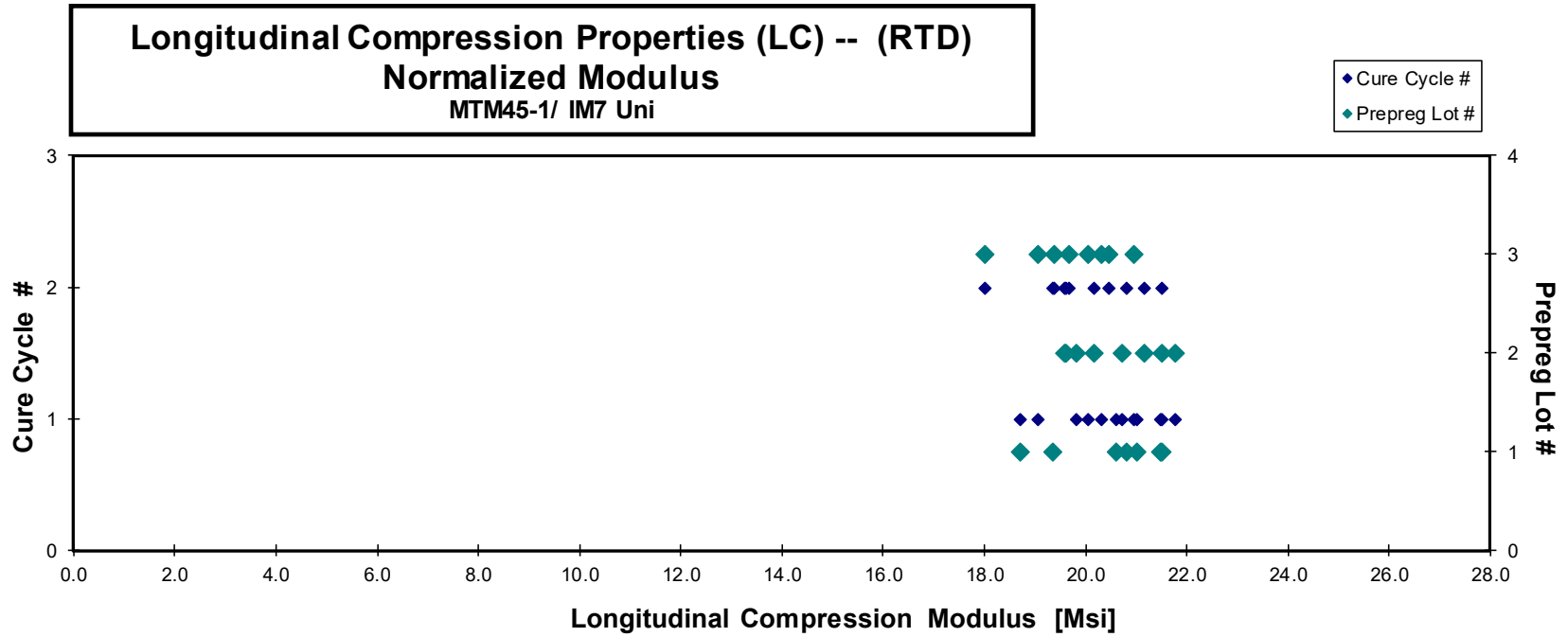
**Longitudinal Compression Properties (LC) -- (RTD)
Modulus
MTM45-1/ IM7 Uni**

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Ms]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Ms]
IMU-LC-A-MH1-RTD-2	AFLA112A	A	MH1	1	1	20.526	0.334	0.090	16	0.0056	20.993
IMU-LC-A-MH1-RTD-3	AFLA113A	A	MH1	1	1	19.100	0.452	0.086	16	0.0054	18.688
IMU-LC-A-MH1-RTD-4	AFLA114A	A	MH1	1	1	20.235	0.365	0.090	16	0.0056	20.603
IMU-LC-A-MH1-RTD-R3	AFLA123A	A	MH1	1	1	21.032	0.420	0.090	16	0.0056	21.466
IMU-LC-A-MH2-RTD-2	AFLA212A	A	MH2	1	2	20.112	0.334	0.091	16	0.0057	20.798
IMU-LC-A-MH2-RTD-3	AFLA213A	A	MH2	1	2	20.621	0.330	0.092	16	0.0057	21.488
IMU-LC-A-MH2-RTD-4	AFLA214A	A	MH2	1	2	18.988	0.327	0.090	16	0.0056	19.333
IMU-LC-B-MH1-RTD-1	AFLB111A	B	MH1	2	1	20.041	*	0.094	16	0.0059	21.499
IMU-LC-B-MH1-RTD-2	AFLB112A	B	MH1	2	1	19.118	0.292	0.095	16	0.0060	20.704
IMU-LC-B-MH1-RTD-3	AFLB113A	B	MH1	2	1	19.918	0.381	0.096	16	0.0060	21.751
IMU-LC-B-MH1-RTD-4	AFLB114A	B	MH1	2	1	18.253	0.322	0.096	16	0.0060	19.809
IMU-LC-B-MH2-RTD-1	AFLB211A	B	MH2	2	2	18.921	0.284	0.091	16	0.0057	19.566
IMU-LC-B-MH2-RTD-2	AFLB212A	B	MH2	2	2	19.730	0.357	0.088	16	0.0055	19.618
IMU-LC-B-MH2-RTD-3	AFLB213A	B	MH2	2	2	20.524	0.349	0.091	16	0.0057	21.154
IMU-LC-B-MH2-RTD-4	AFLB214A	B	MH2	2	2	20.192	0.365	0.088	16	0.0055	20.146
IMU-LC-C-MH1-RTD-1	AFLC111A	C	MH1	3	1	20.269	0.350	0.088	16	0.0055	20.315
IMU-LC-C-MH1-RTD-2	AFLC112A	C	MH1	3	1	20.983	0.374	0.088	16	0.0055	20.935
IMU-LC-C-MH1-RTD-3	AFLC113A	C	MH1	3	1	19.421	0.391	0.086	16	0.0054	19.046
IMU-LC-C-MH1-RTD-4	AFLC114A	C	MH1	3	1	20.011	0.360	0.088	16	0.0055	20.034
IMU-LC-C-MH2-RTD-1	AFLC211A	C	MH2	3	2	19.768	0.404	0.088	16	0.0055	19.656
IMU-LC-C-MH2-RTD-2	AFLC212A	C	MH2	3	2	20.573	0.364	0.088	16	0.0055	20.456
IMU-LC-C-MH2-RTD-3	AFLC213A	C	MH2	3	2	19.334	0.394	0.088	16	0.0055	19.378
IMU-LC-C-MH2-RTD-4	AFLC214A	C	MH2	3	2	18.669	0.392	0.085	16	0.0053	18.011

* Poisson's ratio is not reported due to strain gauge failed prematurely.

Average	19.841	0.361	Average _{norm}	0.0056	20.237
Standard Dev.	0.751	0.040	Standard Dev. _{norm}		0.984
Coeff. of Var. [%]	3.785	11.011	Coeff. of Var. [%] _{norm}		4.864
Min.	18.253	0.284	Min.	0.0053	18.011
Max.	21.032	0.452	Max.	0.0060	21.751
Number of Spec.	23	22	Number of Spec.		23

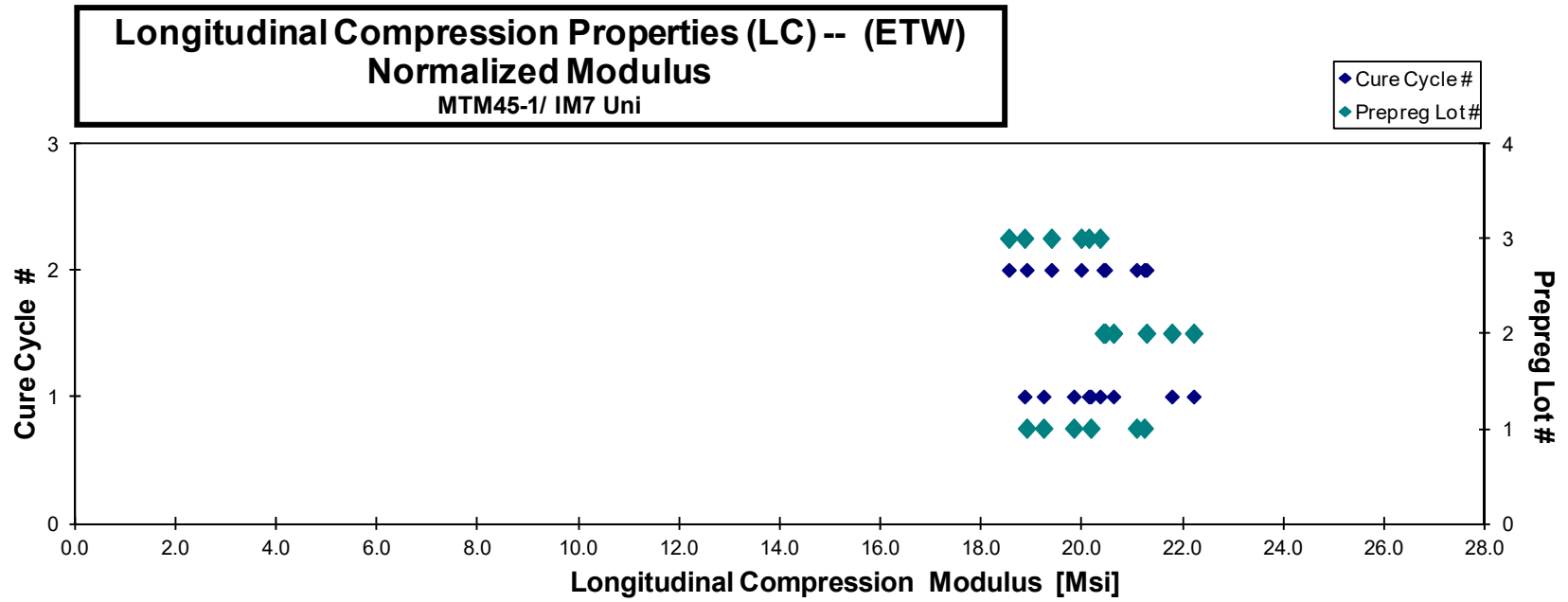


Longitudinal Compression Properties (LC) -- (ETW)
Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
IMU-LC-A-MH1-ETW-2	AFLA112N	A	MH1	1	1	19.138	0.390	0.091	16	0.0057	19.834
IMU-LC-A-MH1-ETW-3	AFLA113N	A	MH1	1	1	18.891	0.378	0.090	16	0.0056	19.234
IMU-LC-A-MH1-ETW-4	AFLA114N	A	MH1	1	1	20.051	0.337	0.089	16	0.0055	20.173
IMU-LC-A-MH2-ETW-1	AFLA211N	A	MH2	1	2	20.564	0.424	0.091	16	0.0057	21.234
IMU-LC-A-MH2-ETW-3	AFLA213N	A	MH2	1	2	20.431	0.340	0.091	16	0.0057	21.081
IMU-LC-A-MH2-ETW-4	AFLA214N	A	MH2	1	2	18.606	0.339	0.089	16	0.0056	18.898
IMU-LC-B-MH1-ETW-2	AFLB112N	B	MH1	2	1	20.629	0.354	0.095	16	0.0059	22.215
IMU-LC-B-MH1-ETW-3	AFLB113N	B	MH1	2	1	20.308	0.378	0.094	16	0.0059	21.781
IMU-LC-B-MH1-ETW-4	AFLB114N	B	MH1	2	1	19.506	0.392	0.093	16	0.0058	20.622
IMU-LC-B-MH2-ETW-2	AFLB212N	B	MH2	2	2	20.653	0.356	0.087	16	0.0054	20.457
IMU-LC-B-MH2-ETW-3	AFLB213N	B	MH2	2	2	21.335	0.370	0.088	16	0.0055	21.278
IMU-LC-B-MH2-ETW-4	AFLB214N	B	MH2	2	2	20.622	0.391	0.087	16	0.0054	20.423
IMU-LC-C-MH1-ETW-2	AFLC112N	C	MH1	3	1	20.881	0.390	0.086	16	0.0054	20.355
IMU-LC-C-MH1-ETW-3	AFLC113N	C	MH1	3	1	20.781	0.320	0.080	16	0.0050	18.856
IMU-LC-C-MH1-ETW-4	AFLC114N	C	MH1	3	1	20.544	0.401	0.086	16	0.0054	20.132
IMU-LC-C-MH2-ETW-2	AFLC212N	C	MH2	3	2	20.292	0.372	0.087	16	0.0054	19.981
IMU-LC-C-MH2-ETW-3	AFLC213N	C	MH2	3	2	19.564	0.415	0.087	16	0.0055	19.390
IMU-LC-C-MH2-ETW-4	AFLC214N	C	MH2	3	2	19.582	0.367	0.083	16	0.0052	18.544

Average	20.132	0.373	Average_{norm}	0.0055	20.249
Standard Dev.	0.750	0.028	Standard Dev._{norm}		1.025
Coeff. of Var. [%]	3.727	7.546	Coeff. of Var. [%]_{norm}		5.062
Min.	18.606	0.320	Min.	0.0050	18.544
Max.	21.335	0.424	Max.	0.0059	22.215
Number of Spec.	18	18	Number of Spec.		18



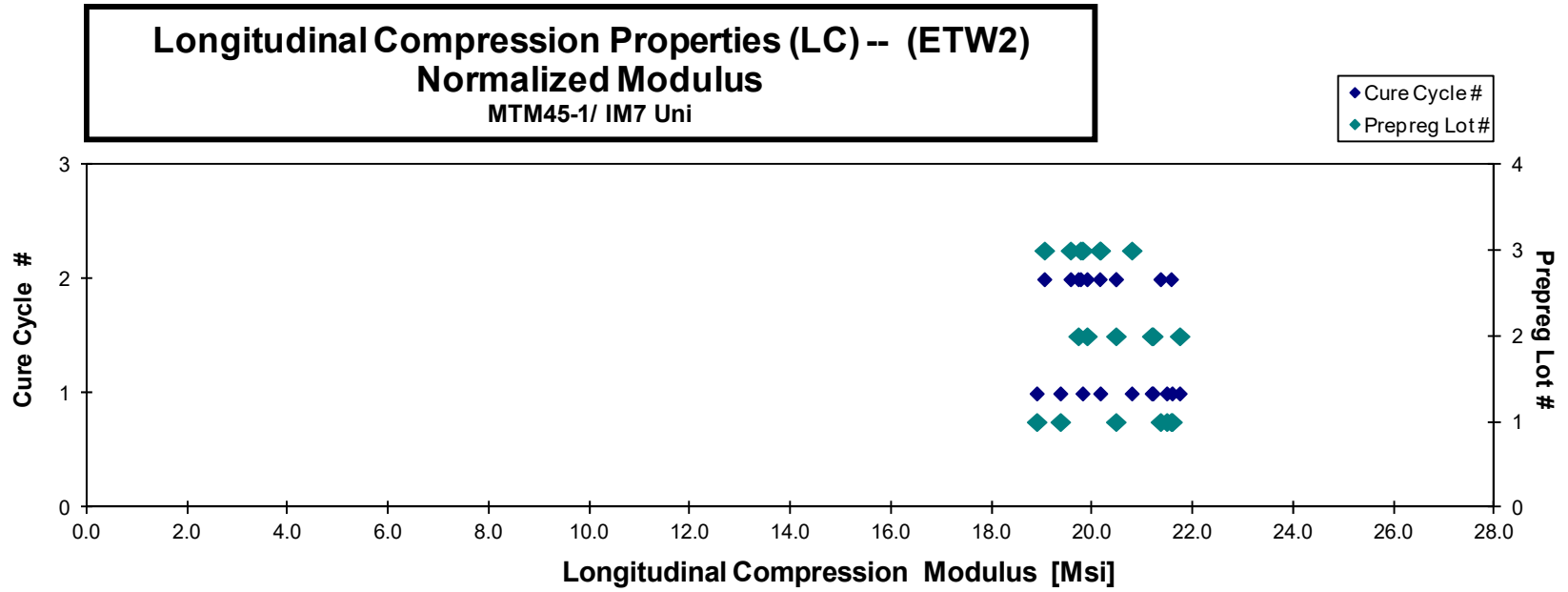
Longitudinal Compression Properties (LC) -- (ETW2)
Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Modulus _{norm} [Msi]
IMU-LC-A-MH1-ETW2-1	AFLA111D	A	MH1	1	1	21.448	0.365	0.089	16	0.0055	21.598
IMU-LC-A-MH1-ETW2-2	AFLA112D	A	MH1	1	1	20.929	0.368	0.090	16	0.0056	21.492
IMU-LC-A-MH1-ETW2-3	AFLA113D	A	MH1	1	1	18.820	0.370	0.091	16	0.0057	19.376
IMU-LC-A-MH1-ETW2-4	AFLA114D	A	MH1	1	1	20.041	0.358	0.083	16	0.0052	18.906
IMU-LC-A-MH2-ETW2-2	AFLA212D	A	MH2	1	2	20.055	0.365	0.090	16	0.0056	20.480
IMU-LC-A-MH2-ETW2-3	AFLA213D	A	MH2	1	2	21.201	0.379	0.090	16	0.0056	21.578
IMU-LC-A-MH2-ETW2-4	AFLA214D	A	MH2	1	2	20.310	0.458	0.093	16	0.0058	21.368
IMU-LC-B-MH1-ETW2-1	AFLB111D	B	MH1	2	1	19.993	0.432	0.093	16	0.0058	21.216
IMU-LC-B-MH1-ETW2-2	AFLB112D	B	MH1	2	1	19.927	0.408	0.094	16	0.0059	21.195
IMU-LC-B-MH1-ETW2-3	AFLB113D	B	MH1	2	1	20.122	0.448	0.095	16	0.0059	21.749
IMU-LC-B-MH2-ETW2-2	AFLB212D	B	MH2	2	2	19.642	0.399	0.089	16	0.0056	19.906
IMU-LC-B-MH2-ETW2-3	AFLB213D	B	MH2	2	2	20.043	0.444	0.087	16	0.0054	19.732
IMU-LC-B-MH2-ETW2-4	AFLB214D	B	MH2	2	2	20.489	0.375	0.088	16	0.0055	20.481
IMU-LC-C-MH1-ETW2-2	AFLC112D	C	MH1	3	1	21.145	0.377	0.087	16	0.0054	20.797
IMU-LC-C-MH1-ETW2-3	AFLC113D	C	MH1	3	1	20.385	0.386	0.086	16	0.0053	19.817
IMU-LC-C-MH1-ETW2-4	AFLC114D	C	MH1	3	1	20.568	0.357	0.086	16	0.0054	20.171
IMU-LC-C-MH2-ETW2-1	AFLC211D	C	MH2	3	2	20.076	0.394	0.088	16	0.0055	20.160
IMU-LC-C-MH2-ETW2-2	AFLC212D	C	MH2	3	2	19.792	0.366	0.087	16	0.0054	19.578
IMU-LC-C-MH2-ETW2-3	AFLC213D	C	MH2	3	2	19.829	0.370	0.088	16	0.0055	19.776
IMU-LC-C-MH2-ETW2-4	AFLC214D	C	MH2	3	2	19.292	0.358	0.087	16	0.0054	19.058

Average 20.205 0.389
 Standard Dev. 0.641 0.032
 Coeff. of Var. [%] 3.172 8.329
 Min. 18.820 0.357
 Max. 21.448 0.458
 Number of Spec. 20 20

Average_{norm} 0.0056 20.422
 Standard Dev._{norm} 0.904
 Coeff. of Var. [%]_{norm} 4.425
 Min. 0.0052 18.906
 Max. 0.0059 21.749
 Number of Spec. 20



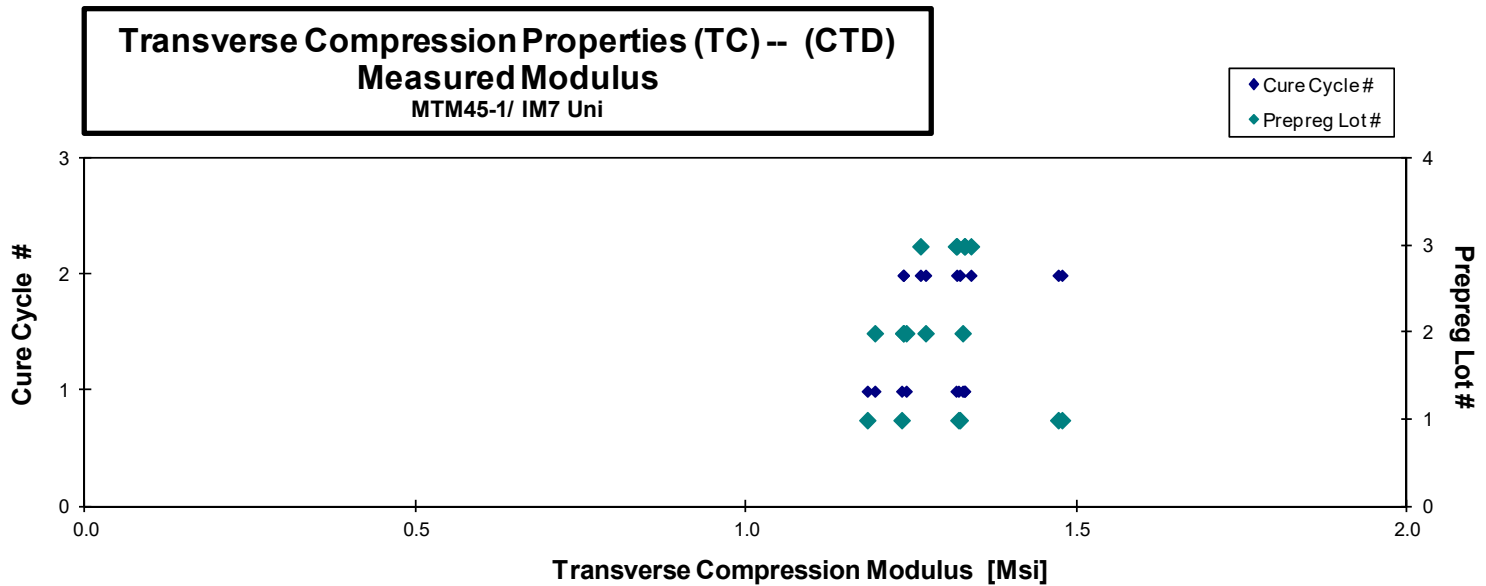
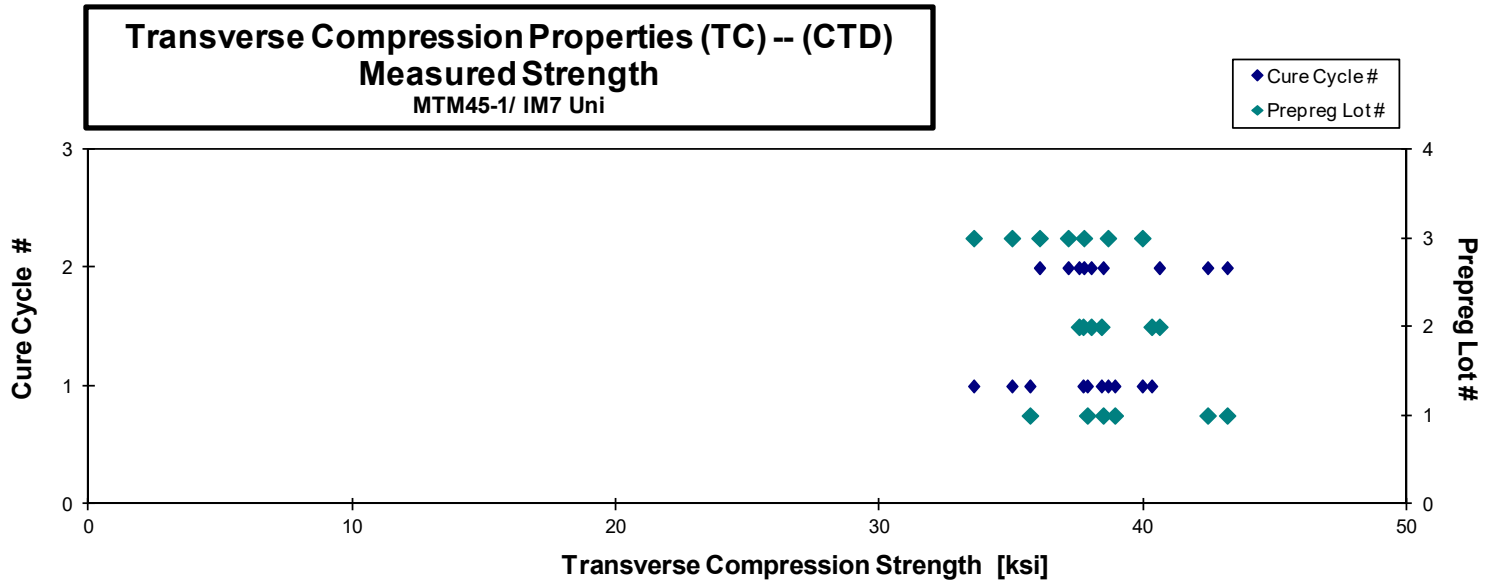
4.4 Transverse Compression Properties (TC)

**Transverse Compression Properties (TC) -- (CTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-TC-A-MH1-CTD-2	AFZA112B	A	MH1	1	1	35.676	1.182	0.026	0.092	16	0.0057	HAT
IMU-TC-A-MH1-CTD-3	AFZA113B	A	MH1	1	1	37.850	1.320	0.026	0.091	16	0.0057	HAT
IMU-TC-A-MH1-CTD-4	AFZA114B	A	MH1	1	1	38.895	1.234	0.025	0.092	16	0.0057	HAT
IMU-TC-A-MH2-CTD-2	AFZA212B	A	MH2	1	2	42.417	1.322	0.030	0.092	16	0.0058	HAT/HAB
IMU-TC-A-MH2-CTD-3	AFZA213B	A	MH2	1	2	43.159	1.477	0.025	0.092	16	0.0058	HAT/HAB
IMU-TC-A-MH2-CTD-4	AFZA214B	A	MH2	1	2	38.455	1.471	0.029	0.092	16	0.0057	HAT
IMU-TC-B-MH1-CTD-1	AFZB111B	B	MH1	2	1	38.387	1.327	0.027	0.095	16	0.0059	HAB
IMU-TC-B-MH1-CTD-2	AFZB112B	B	MH1	2	1	40.292	1.194	0.023	0.095	16	0.0059	HAB/HAT
IMU-TC-B-MH1-CTD-4	AFZB114B	B	MH1	2	1	37.692	1.241	0.023	0.094	16	0.0059	HGM
IMU-TC-B-MH2-CTD-1	AFZB211B	B	MH2	2	2	37.539	1.237	0.021	0.091	16	0.0057	HAB
IMU-TC-B-MH2-CTD-2	AFZB212B	B	MH2	2	2	38.000	1.237	0.028	0.087	16	0.0055	HAB
IMU-TC-B-MH2-CTD-3	AFZB213B	B	MH2	2	2	40.587	1.271	0.029	0.090	16	0.0056	HAT/HAB
IMU-TC-C-MH1-CTD-1*	AFZC111B	C	MH1	3	1	33.544			0.088	16	0.0055	HAT
IMU-TC-C-MH1-CTD-2	AFZC112B	C	MH1	3	1	38.637	1.330	0.032	0.088	16	0.0055	HAT
IMU-TC-C-MH1-CTD-3	AFZC113B	C	MH1	3	1	34.993	1.329	0.034	0.088	16	0.0055	HGM
IMU-TC-C-MH1-CTD-4	AFZC114B	C	MH1	3	1	39.939	1.317	0.026	0.089	16	0.0055	HGM
IMU-TC-C-MH2-CTD-1	AFZC211B	C	MH2	3	2	36.040	1.318	0.031	0.087	16	0.0054	HAT/HAB
IMU-TC-C-MH2-CTD-2	AFZC212B	C	MH2	3	2	37.126	1.263	0.029	0.087	16	0.0055	HAT
IMU-TC-C-MH2-CTD-3	AFZC213B	C	MH2	3	2	37.722	1.339	0.029	0.087	16	0.0055	HAB

*Compressive modulus and poisson's ratio values not reported due to strain gauge failed prematurely.

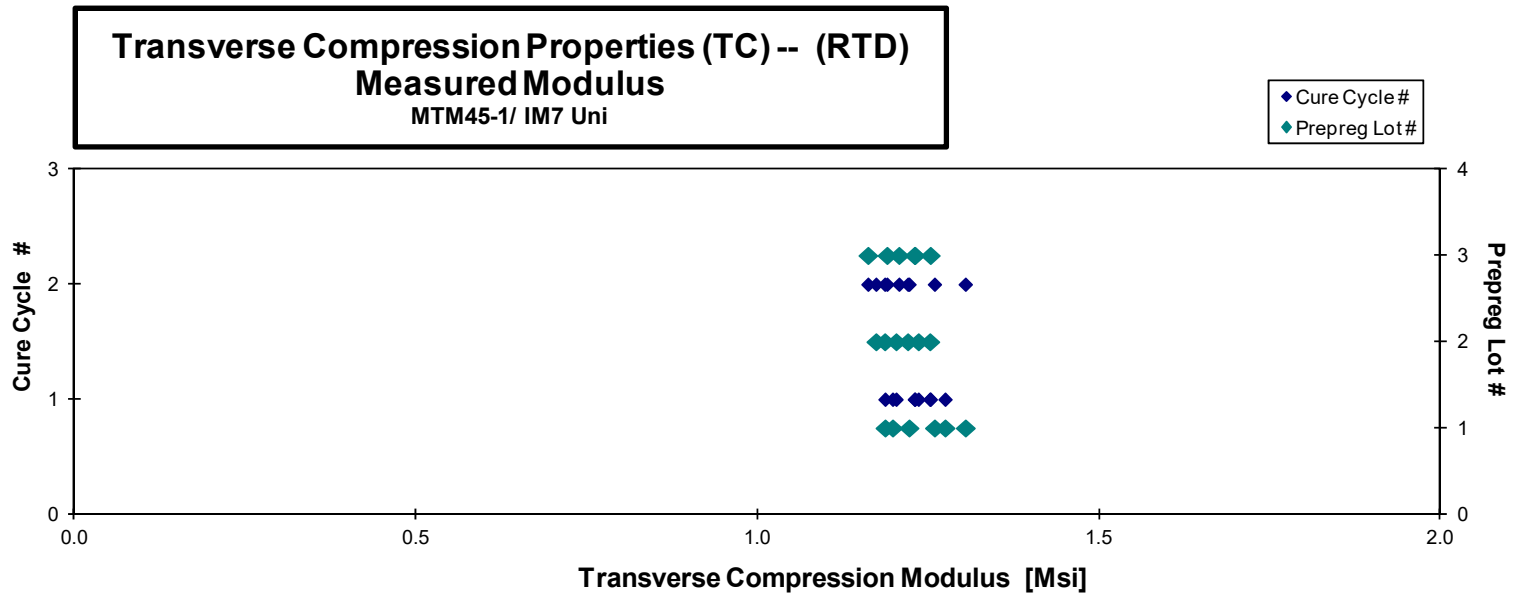
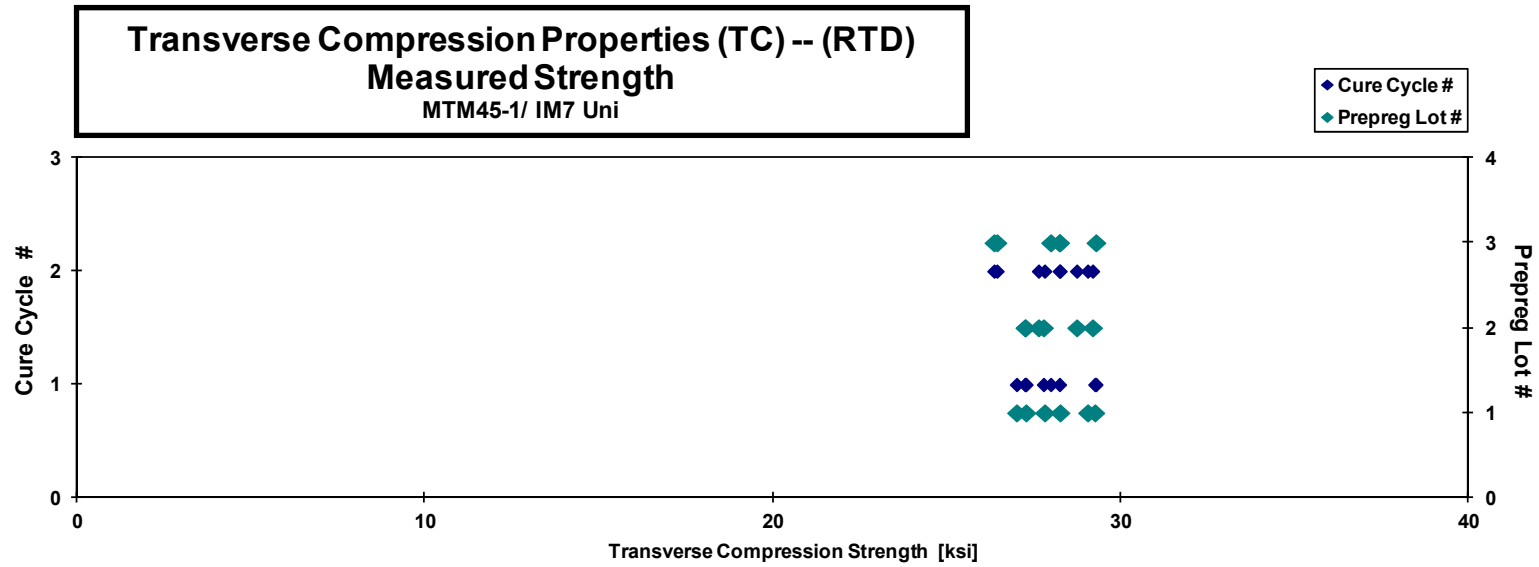
Average	38.260	1.301	0.027	Average	0.0056
Standard Dev.	2.374	0.080	0.003		
Coeff. of Var. [%]	6.204	6.164	12.215		
Min.	33.544	1.182	0.021	Min.	0.0054
Max.	43.159	1.477	0.034	Max.	0.0059
Number of Spec.	19	18	18	Number of Spec.	19



**Transverse Compression Properties (TC) -- (RTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-TC-A-MH1-RTD-2	AFZA112A	A	MH1	1	1	29.270	1.275	0.028	0.091	16	0.0057	HAB
IMU-TC-A-MH1-RTD-3	AFZA113A	A	MH1	1	1	27.017	1.187	0.023	0.092	16	0.0058	HAB
IMU-TC-A-MH1-RTD-4	AFZA114A	A	MH1	1	1	27.288	1.198	0.026	0.092	16	0.0058	HAT
IMU-TC-A-MH2-RTD-2	AFZA212A	A	MH2	1	2	28.267	1.222	0.027	0.091	16	0.0057	HAT
IMU-TC-A-MH2-RTD-3	AFZA213A	A	MH2	1	2	29.062	1.305	0.029	0.091	16	0.0057	HGM
IMU-TC-A-MH2-RTD-4	AFZA214A	A	MH2	1	2	27.825	1.259	0.026	0.091	16	0.0057	HAT/HAB
IMU-TC-B-MH1-RTD-1	AFZB111A	B	MH1	2	1	27.258	1.203	0.025	0.095	16	0.0059	HGM
IMU-TC-B-MH1-RTD-2	AFZB112A	B	MH1	2	1	27.270	1.236	0.028	0.094	16	0.0059	HGM
IMU-TC-B-MH1-RTD-3	AFZB113A	B	MH1	2	1	27.792	1.253	0.028	0.095	16	0.0059	HGM
IMU-TC-B-MH2-RTD-1	AFZB211A	B	MH2	2	2	29.202	1.220	0.026	0.089	16	0.0056	HGM
IMU-TC-B-MH2-RTD-2	AFZB212A	B	MH2	2	2	27.649	1.187	0.024	0.089	16	0.0056	HAB
IMU-TC-B-MH2-RTD-3	AFZB213A	B	MH2	2	2	28.747	1.174	0.027	0.089	16	0.0056	HGM
IMU-TC-C-MH1-RTD-2	AFZC112A	C	MH1	3	1	29.299	1.230	0.026	0.087	16	0.0055	HGM
IMU-TC-C-MH1-RTD-3	AFZC113A	C	MH1	3	1	27.997	1.253	0.026	0.088	16	0.0055	HGM
IMU-TC-C-MH1-RTD-4	AFZC114A	C	MH1	3	1	28.252	1.231	0.027	0.088	16	0.0055	HGM
IMU-TC-C-MH2-RTD-1	AFZC211A	C	MH2	3	2	28.250	1.190	0.029	0.087	16	0.0054	HGM
IMU-TC-C-MH2-RTD-2	AFZC212A	C	MH2	3	2	26.368	1.162	0.025	0.087	16	0.0054	HGM
IMU-TC-C-MH2-RTD-3	AFZC213A	C	MH2	3	2	26.455	1.207	0.024	0.088	16	0.0055	HGM

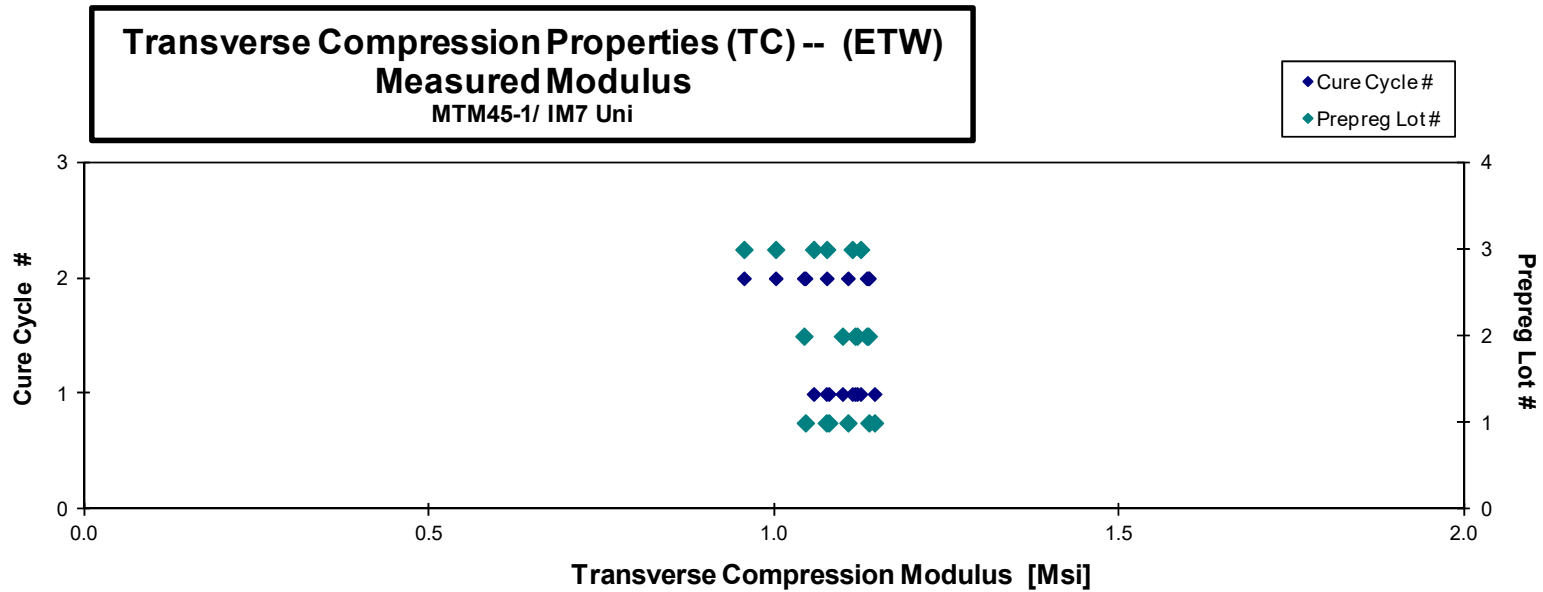
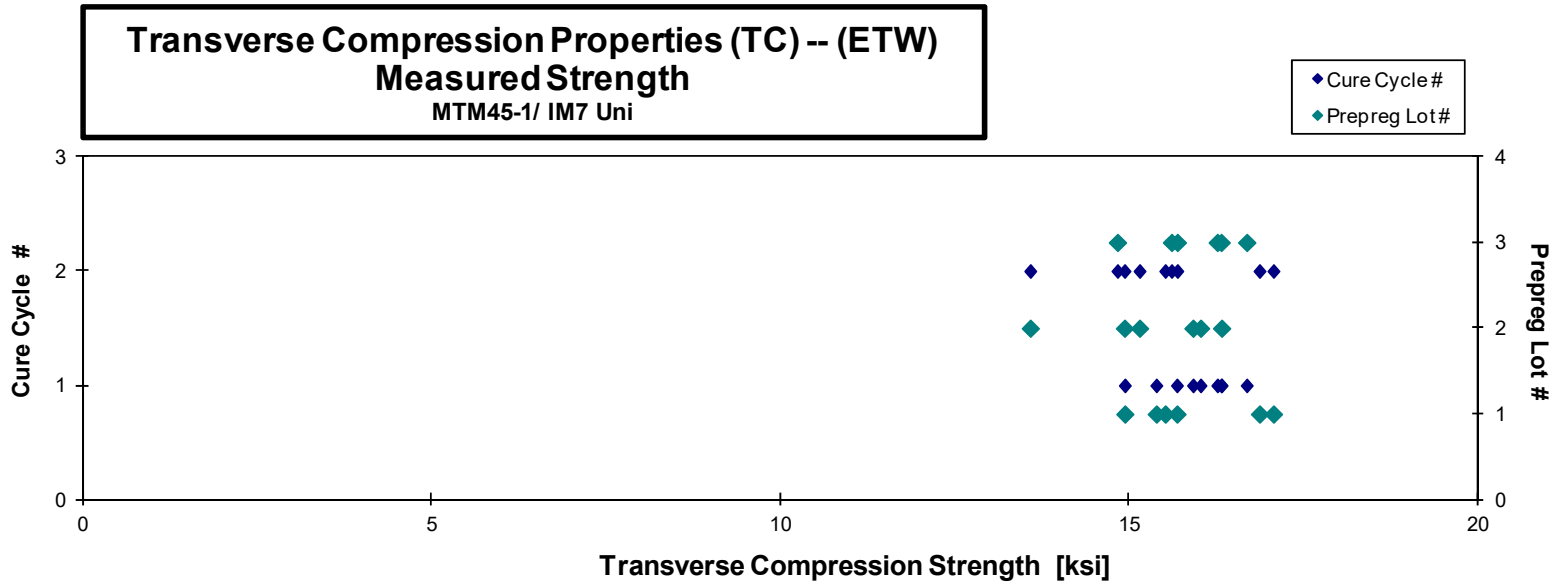
Average	27.959	1.222	0.026	Average	0.0056
Standard Dev.	0.920	0.037	0.002		
Coeff. of Var. [%]	3.292	3.066	6.085		
Min.	26.368	1.162	0.023	Min.	0.0054
Max.	29.299	1.305	0.029	Max.	0.0059
Number of Spec.	18	18	18	Number of Spec.	18



Transverse Compression Properties (TC) -- (ETW)
Strength & Modulus
 MTM45-1/ IM7 Uni

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-TC-A-MH1-ETW-2	AFZA112N	A	MH1	1	1	14.935	1.076	0.020	0.091	16	0.0057	HGM
IMU-TC-A-MH1-ETW-3	AFZA113N	A	MH1	1	1	15.386	1.145	0.022	0.090	16	0.0056	HGM
IMU-TC-A-MH1-ETW-4	AFZA114N	A	MH1	1	1	15.681	1.079	0.017	0.091	16	0.0057	HGM
IMU-TC-A-MH2-ETW-2	AFZA212N	A	MH2	1	2	15.513	1.045	0.020	0.090	16	0.0057	HAB
IMU-TC-A-MH2-ETW-3	AFZA213N	A	MH2	1	2	17.065	1.137	0.021	0.091	16	0.0057	HGM
IMU-TC-A-MH2-ETW-4	AFZA214N	A	MH2	1	2	16.865	1.107	0.023	0.090	16	0.0056	BGM
IMU-TC-B-MH1-ETW-1	AFZB111N	B	MH1	2	1	15.912	1.117	0.022	0.094	16	0.0059	HAT/HGM
IMU-TC-B-MH1-ETW-2	AFZB112N	B	MH1	2	1	16.020	1.099	0.023	0.093	16	0.0058	HGM
IMU-TC-B-MH1-ETW-3	AFZB113N	B	MH1	2	1	16.322	1.120	0.024	0.092	16	0.0058	HAT/HGM
IMU-TC-B-MH2-ETW-1	AFZB211N	B	MH2	2	2	14.930	1.043	0.021	0.088	16	0.0055	HGM
IMU-TC-B-MH2-ETW-2	AFZB212N	B	MH2	2	2	15.146	1.134	0.024	0.087	16	0.0055	HAT
IMU-TC-B-MH2-ETW-3	AFZB213N	B	MH2	2	2	13.579	1.136	0.022	0.088	16	0.0055	HGM
IMU-TC-C-MH1-ETW-2	AFZC112N	C	MH1	3	1	16.681	1.113	0.022	0.086	16	0.0054	HGM/HAT
IMU-TC-C-MH1-ETW-3	AFZC113N	C	MH1	3	1	16.260	1.125	0.022	0.086	16	0.0054	HGM
IMU-TC-C-MH1-ETW-4	AFZC114N	C	MH1	3	1	16.315	1.057	0.022	0.086	16	0.0054	HGM
IMU-TC-C-MH2-ETW-2	AFZC212N	C	MH2	3	2	15.604	1.002	0.022	0.086	16	0.0054	HAT/HAB
IMU-TC-C-MH2-ETW-3	AFZC213N	C	MH2	3	2	14.828	0.956	0.020	0.087	16	0.0054	HGM
IMU-TC-C-MH2-ETW-4	AFZC214N	C	MH2	3	2	15.687	1.076	0.018	0.086	16	0.0054	HGM

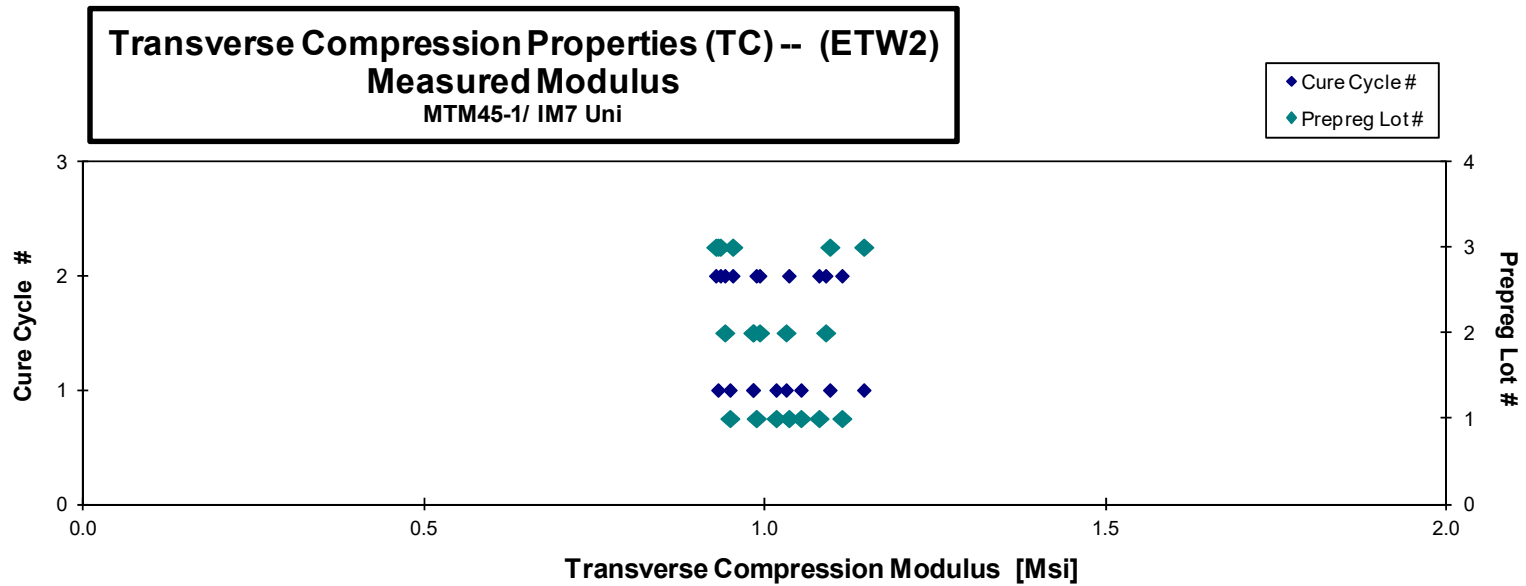
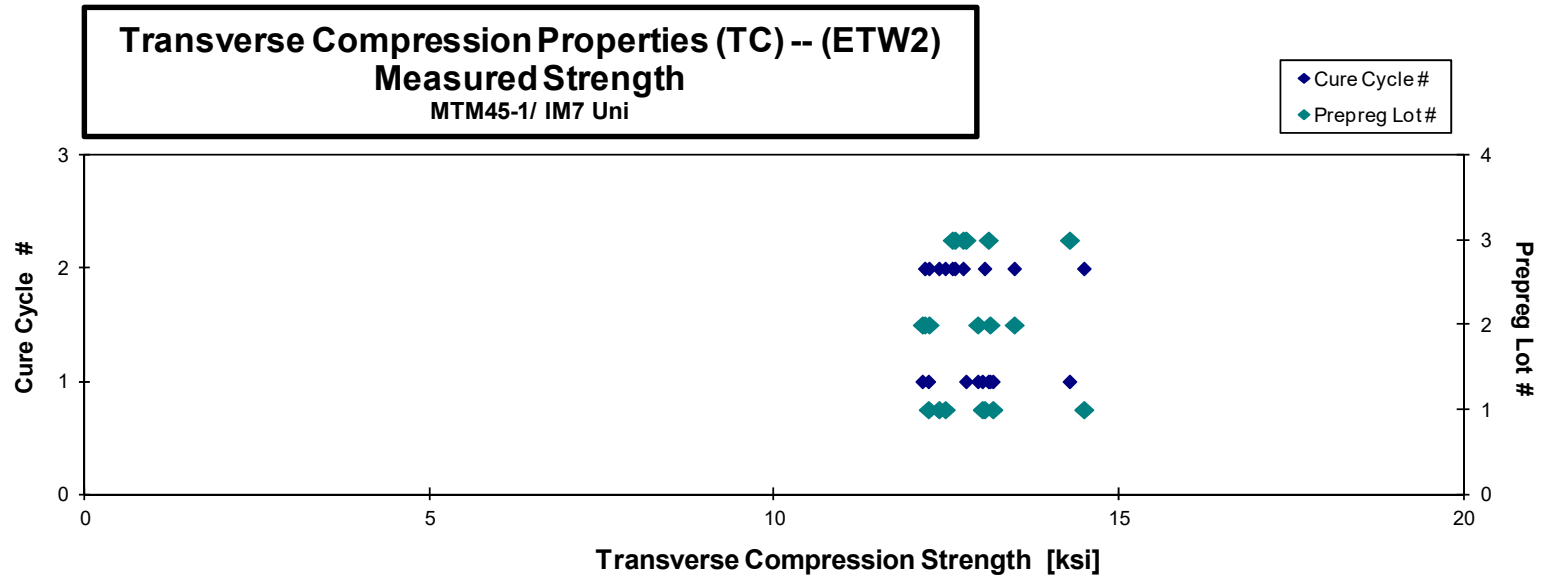
Average	15.707	1.087	0.021	Average	0.0056
Standard Dev.	0.850	0.051	0.002		
Coeff. of Var. [%]	5.414	4.705	8.555		
Min.	13.579	0.956	0.017	Min.	0.0054
Max.	17.065	1.145	0.024	Max.	0.0059
Number of Spec.	18	18	18	Number of Spec.	18



Transverse Compression Properties (TC) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-TC-A-MH1-ETW2-2	AFZA112D	A	MH1	1	1	12.246	0.950	0.021	0.091	16	0.0057	HGM
IMU-TC-A-MH1-ETW2-3	AFZA113D	A	MH1	1	1	13.182	1.017	0.018	0.091	16	0.0057	HGM
IMU-TC-A-MH1-ETW2-4	AFZA114D	A	MH1	1	1	13.029	1.054	0.024	0.091	16	0.0057	HGM
IMU-TC-A-MH2-ETW2-1	AFZA211D	A	MH2	1	2	12.492	0.988	0.021	0.090	16	0.0056	HGM
IMU-TC-A-MH2-ETW2-2	AFZA212D	A	MH2	1	2	14.503	1.036	0.018	0.090	16	0.0056	HGM
IMU-TC-A-MH2-ETW2-3	AFZA213D	A	MH2	1	2	13.062	1.114	0.024	0.091	16	0.0057	HGM
IMU-TC-A-MH2-ETW2-4	AFZA214D	A	MH2	1	2	12.401	1.080	0.025	0.091	16	0.0057	HGM
IMU-TC-B-MH1-ETW2-1	AFZB111D	B	MH1	2	1	13.141	0.983	0.011	0.091	16	0.0057	BAB
IMU-TC-B-MH1-ETW2-2	AFZB112D	B	MH1	2	1	12.963	1.032	0.027	0.093	16	0.0058	BAT
IMU-TC-B-MH1-ETW2-3	AFZB113D	B	MH1	2	1	12.159	0.984	0.024	0.094	16	0.0059	BGM
IMU-TC-B-MH2-ETW2-1	AFZB211D	B	MH2	2	2	13.492	1.090	0.024	0.086	16	0.0054	HGM
IMU-TC-B-MH2-ETW2-2	AFZB212D	B	MH2	2	2	12.195	0.993	0.022	0.088	16	0.0055	HGM
IMU-TC-B-MH2-ETW2-3	AFZB213D	B	MH2	2	2	12.257	0.942	0.026	0.088	16	0.0055	HGM
IMU-TC-C-MH1-ETW2-2	AFZC112D	C	MH1	3	1	14.294	1.146	0.029	0.086	16	0.0054	HGM
IMU-TC-C-MH1-ETW2-3	AFZC113D	C	MH1	3	1	13.117	0.932	0.022	0.087	16	0.0054	HGM
IMU-TC-C-MH1-ETW2-4	AFZC114D	C	MH1	3	1	12.792	1.096	0.031	0.087	16	0.0054	HGM
IMU-TC-C-MH2-ETW2-2	AFZC212D	C	MH2	3	2	12.750	0.935	0.019	0.086	16	0.0054	HGM
IMU-TC-C-MH2-ETW2-3	AFZC213D	C	MH2	3	2	12.594	0.954	0.021	0.086	16	0.0054	HGM
IMU-TC-C-MH2-ETW2-4	AFZC214D	C	MH2	3	2	12.632	0.929	0.020	0.086	16	0.0054	HGM

Average	12.911	1.013	0.022	Average	0.0056
Standard Dev.	0.650	0.068	0.004		
Coeff. of Var. [%]	5.032	6.692	19.570		
Min.	12.159	0.929	0.011	Min.	0.0054
Max.	14.503	1.146	0.031	Max.	0.0059
Number of Spec.	19	19	19	Number of Spec.	19



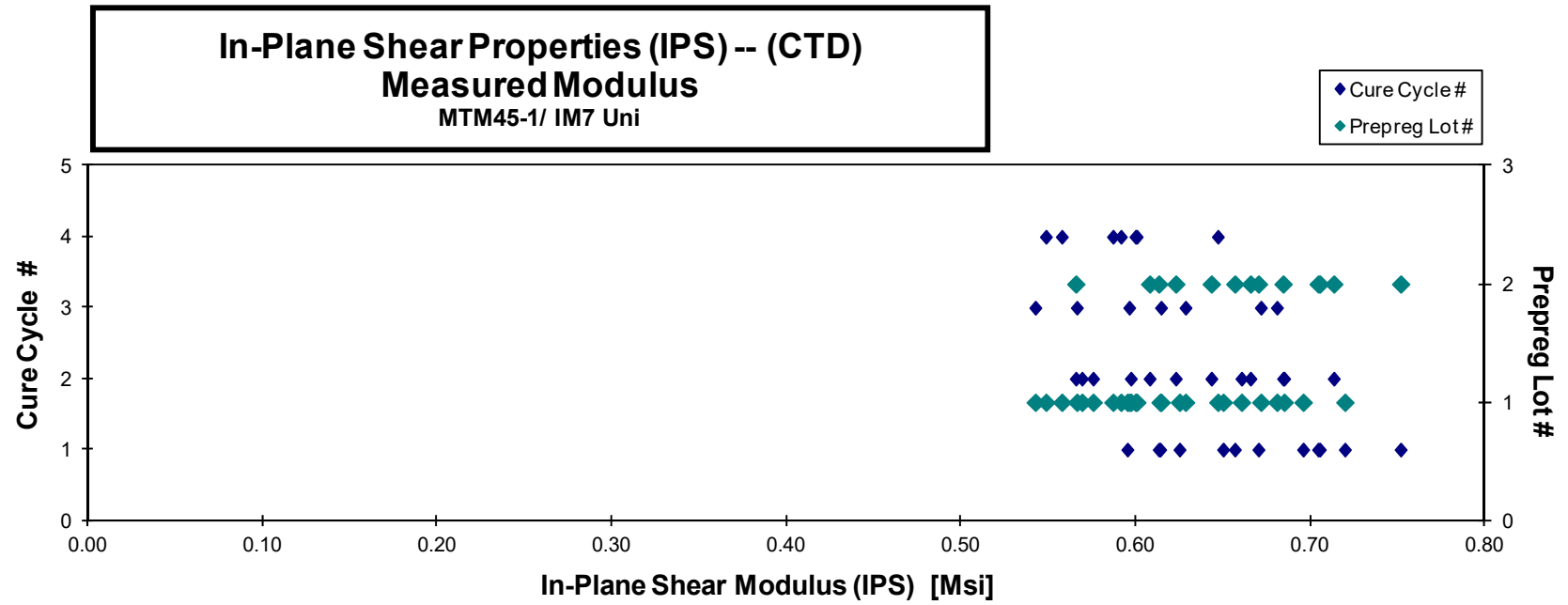
4.5 In-Plane Shear Properties (IPS)

**In-Plane Shear Properties (IPS) -- (CTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
IMU-IPS-A-MH1-CTD-1*	AFNA111B	A	MH1	1	1	7.485		0.595	0.046	8	0.0058
IMU-IPS-A-MH1-CTD-2*	AFNA112B	A	MH1	1	1	7.731		0.614	0.047	8	0.0059
IMU-IPS-A-MH1-CTD-3*	AFNA113B	A	MH1	1	1	7.657		0.625	0.047	8	0.0059
IMU-IPS-A-MH1-CTD-R1	AFNA121B	A	MH1	1	1	7.961	14.055	0.650	0.045	8	0.0057
IMU-IPS-A-MH1-CTD-R2	AFNA122B	A	MH1	1	1	8.607	14.526	0.720	0.045	8	0.0056
IMU-IPS-A-MH1-CTD-R3	AFNA123B	A	MH1	1	1	8.581	14.452	0.696	0.045	8	0.0056
IMU-IPS-A-MH2-CTD-2	AFNA212B	A	MH2	1	2	7.447	13.114	0.575	0.047	8	0.0059
IMU-IPS-A-MH2-CTD-3*	AFNA213B	A	MH2	1	2	7.688		0.597	0.047	8	0.0059
IMU-IPS-A-MH2-CTD-4*	AFNA214B	A	MH2	1	2	7.211		0.569	0.047	8	0.0059
IMU-IPS-A-MH2-CTD-R1	AFNA221B	A	MH2	1	2	7.987	13.548	0.660	0.045	8	0.0056
IMU-IPS-A-MH2-CTD-R2	AFNA222B	A	MH2	1	2	8.343	13.535	0.685	0.045	8	0.0057
IMU-IPS-B-MH1-CTD-1*	AFNB111B	B	MH1	2	1	8.080		0.670	0.046	8	0.0057
IMU-IPS-B-MH1-CTD-2*	AFNB112B	B	MH1	2	1	8.229		0.657	0.046	8	0.0057
IMU-IPS-B-MH1-CTD-3*	AFNB113B	B	MH1	2	1	7.810		0.613	0.047	8	0.0059
IMU-IPS-B-MH1-CTD-R1**	AFNB121B	B	MH1	2	1	8.430	13.599	0.704	0.044	8	0.0054
IMU-IPS-B-MH1-CTD-R1 (IMU-IPS-B-MH1-ETW-1)**	AFNB131B	B	MH1	2	1	9.080	13.268	0.751	0.041	8	0.0052
IMU-IPS-B-MH1-CTD-R2 (IMU-IPS-B-MH1-ETW2-1)**	AFNB132B	B	MH1	2	1	8.513		0.705	0.043	8	0.0054
IMU-IPS-B-MH2-CTD-2*	AFNB212B	B	MH2	2	2	7.024		0.565	0.047	8	0.0059
IMU-IPS-B-MH2-CTD-3*	AFNB213B	B	MH2	2	2	7.487		0.608	0.046	8	0.0057
IMU-IPS-B-MH2-CTD-4*	AFNB214B	B	MH2	2	2	8.355		0.684	0.047	8	0.0058
IMU-IPS-B-MH2-CTD-R1**	AFNB221B	B	MH2	2	2	7.977	13.065	0.643	0.046	8	0.0057
IMU-IPS-B-MH2-CTD-R2**	AFNB222B	B	MH2	2	2	7.749	12.778	0.623	0.045	8	0.0056
IMU-IPS-B-MH2-CTD-R3**	AFNB223B	B	MH2	2	2	7.029		0.665	0.045	8	0.0057
IMU-IPS-B-MH2-CTD-R4**	AFNB224B	B	MH2	2	2	8.436		0.713	0.044	8	0.0055
IMU-IPS-A-MH3-CTD-1	AFNA311B	A	MH3	1	3	7.325		0.566	0.046	8	0.0058
IMU-IPS-A-MH3-CTD-2	AFNA312B	A	MH3	1	3	7.992		0.596	0.047	8	0.0059
IMU-IPS-A-MH3-CTD-3	AFNA313B	A	MH3	1	3	6.805		0.542	0.046	8	0.0058
IMU-IPS-A-MH3-CTD-4	AFNA314B	A	MH3	1	3	8.149	13.557	0.614	0.046	8	0.0058
IMU-IPS-A-MH3-CTD-R3**	AFNA323B	A	MH3	1	3	7.787	13.219	0.628	0.046	8	0.0058
IMU-IPS-A-MH3-CTD-R4**	AFNA324B	A	MH3	1	3	8.249	13.775	0.671	0.045	8	0.0056
IMU-IPS-A-MH3-CTD-R5**	AFNA325B	A	MH3	1	3	8.227	13.362	0.681	0.046	8	0.0057
IMU-IPS-A-MH4-CTD-1	AFNA411B	A	MH4	1	4	6.662	10.560	0.587	0.048	8	0.0060
IMU-IPS-A-MH4-CTD-2	AFNA412B	A	MH4	1	4	6.926		0.591	0.048	8	0.0060
IMU-IPS-A-MH4-CTD-3	AFNA413B	A	MH4	1	4	6.809		0.557	0.047	8	0.0059
IMU-IPS-A-MH4-CTD-4	AFNA414B	A	MH4	1	4	6.837		0.548	0.047	8	0.0059
IMU-IPS-A-MH4-CTD-R2**	AFNA422B	A	MH4	1	4	7.391	11.375	0.647	0.046	8	0.0058
IMU-IPS-A-MH4-CTD-R3**	AFNA423B	A	MH4	1	4	6.953	11.264	0.600	0.047	8	0.0058
IMU-IPS-A-MH4-RTD-1**	AFNA411A	A	MH4	1	4	7.045	10.954	0.600	0.048	8	0.0059

*Strain gauge failed prior to 5% strain
** Average of two strain gauge readings

Average	7.738	13.000	0.632	Average	0.0057
Standard Dev.	0.617	1.176	0.053	Standard Dev.	
Coeff. of Var. [%]	7.980	9.047	8.437	Coeff. of Var. [%]	
Min.	6.662	10.560	0.542	Min.	0.0052
Max.	9.080	14.526	0.751	Max.	0.0060
Number of Spec.	38	18	38	Number of Spec.	38

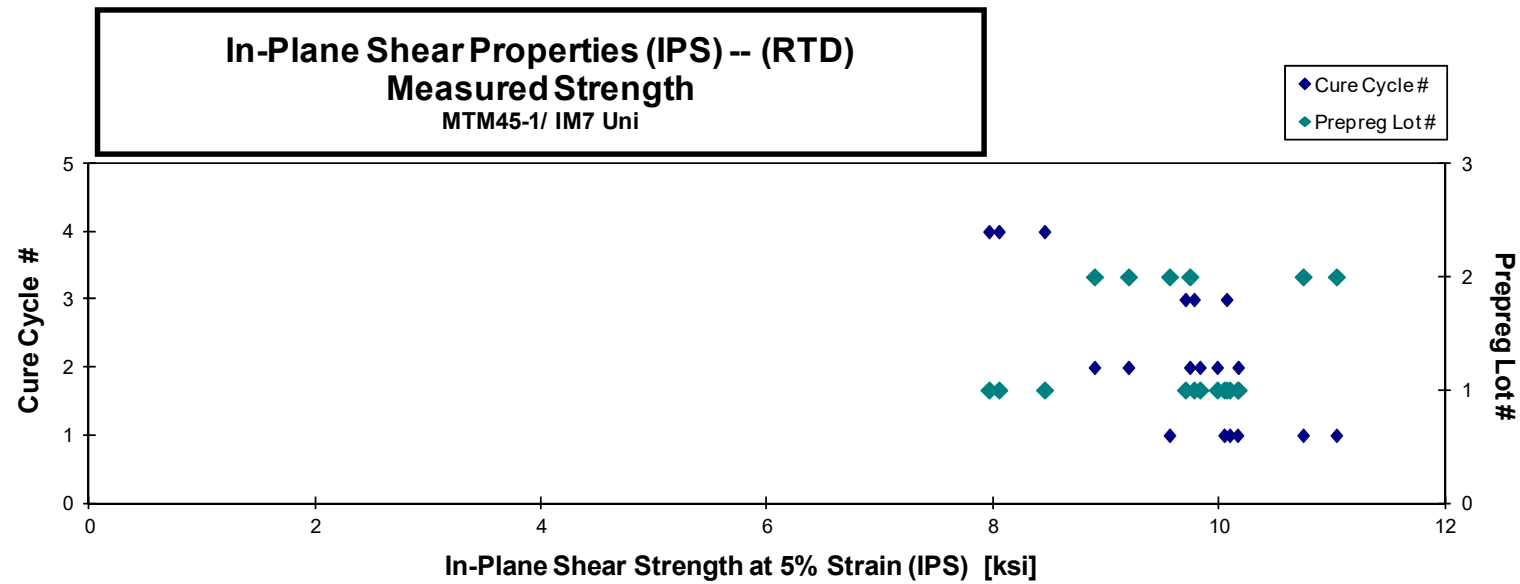
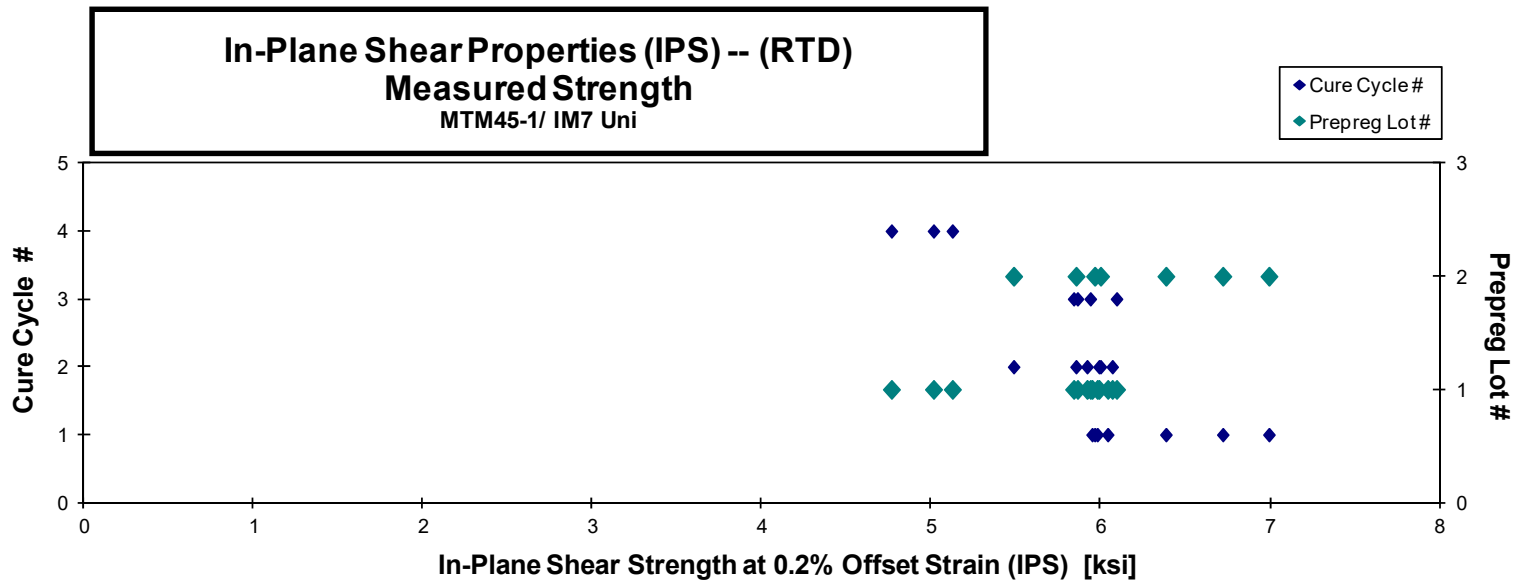


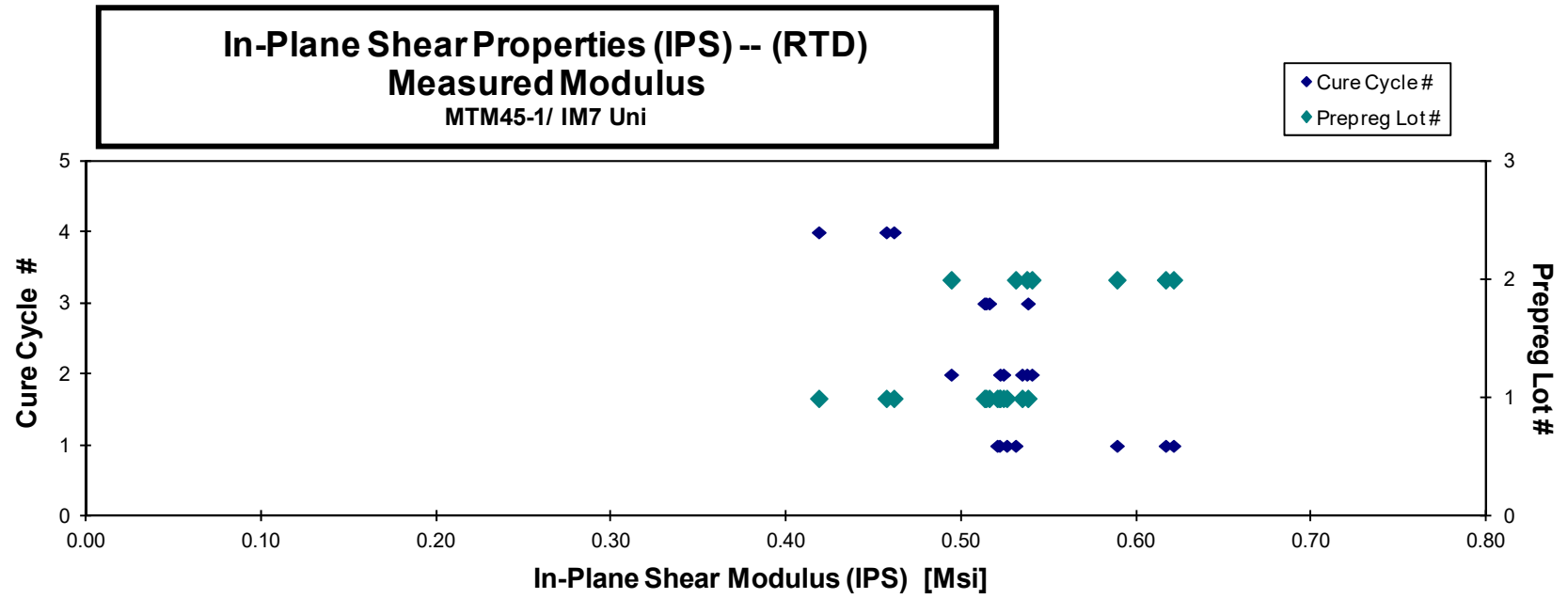
In-Plane Shear Properties (IPS) -- (RTD) Strength & Modulus MTM45-1/ IM7 Uni
--

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
IMU-IPS-A-MH1-RTD-2	AFNA112A	A	MH1	1	1	5.977	10.089	0.522	0.046	8	0.0058
IMU-IPS-A-MH1-RTD-3	AFNA113A	A	MH1	1	1	5.946	10.041	0.521	0.047	8	0.0058
IMU-IPS-A-MH1-RTD-4	AFNA114A	A	MH1	1	1	6.038	10.159	0.526	0.048	8	0.0059
IMU-IPS-A-MH2-RTD-2	AFNA212A	A	MH2	1	2	5.916	9.826	0.522	0.047	8	0.0059
IMU-IPS-A-MH2-RTD-3	AFNA213A	A	MH2	1	2	6.065	10.165	0.535	0.047	8	0.0058
IMU-IPS-A-MH2-RTD-4	AFNA214A	A	MH2	1	2	5.987	9.979	0.524	0.047	8	0.0059
IMU-IPS-B-MH1-RTD-3	AFNB113A	B	MH1	2	1	5.962	9.557	0.531	0.047	8	0.0059
IMU-IPS-B-MH1-RTD-4*	AFNB114A	B	MH1	2	1	6.382		0.589	0.046	8	0.0058
IMU-IPS-B-MH1-RTD-R1	AFNB121A	B	MH1	2	1	6.990	11.034	0.621	0.043	8	0.0053
IMU-IPS-B-MH1-RTD-R2	AFNB122A	B	MH1	2	1	6.718	10.740	0.617	0.044	8	0.0055
IMU-IPS-B-MH2-RTD-2	AFNB212A	B	MH2	2	2	5.483	8.893	0.494	0.047	8	0.0059
IMU-IPS-B-MH2-RTD-3	AFNB213A	B	MH2	2	2	5.996	9.737	0.540	0.046	8	0.0058
IMU-IPS-B-MH2-RTD-4	AFNB214A	B	MH2	2	2	5.851	9.194	0.537	0.047	8	0.0059
IMU-IPS-A-MH3-RTD-1	AFNA311A	A	MH3	1	3	5.936	9.774	0.516	0.047	8	0.0059
IMU-IPS-A-MH3-RTD-2	AFNA312A	A	MH3	1	3	6.091	10.062	0.538	0.046	8	0.0058
IMU-IPS-A-MH3-RTD-3	AFNA313A	A	MH3	1	3	5.837	9.698	0.513	0.047	8	0.0058
IMU-IPS-A-MH3-RTD-4*	AFNA314A	A	MH3	1	3	5.860		0.514	0.047	8	0.0059
IMU-IPS-A-MH4-RTD-2	AFNA412A	A	MH4	1	4	5.121	8.451	0.457	0.048	8	0.0060
IMU-IPS-A-MH4-RTD-3	AFNA413A	A	MH4	1	4	5.010	8.046	0.461	0.049	8	0.0061
IMU-IPS-A-MH4-RTD-4	AFNA414A	A	MH4	1	4	4.762	7.959	0.419	0.048	8	0.0060

*Strain gauge failed prior to 5% strain

Average	5.896	9.634	0.525	Average	0.0058
Standard Dev.	0.517	0.839	0.048	Standard Dev.	
Coeff. of Var. [%]	8.767	8.709	9.144	Coeff. of Var. [%]	
Min.	4.762	7.959	0.419	Min.	0.0053
Max.	6.990	11.034	0.621	Max.	0.0061
Number of Spec.	20	18	20	Number of Spec.	20



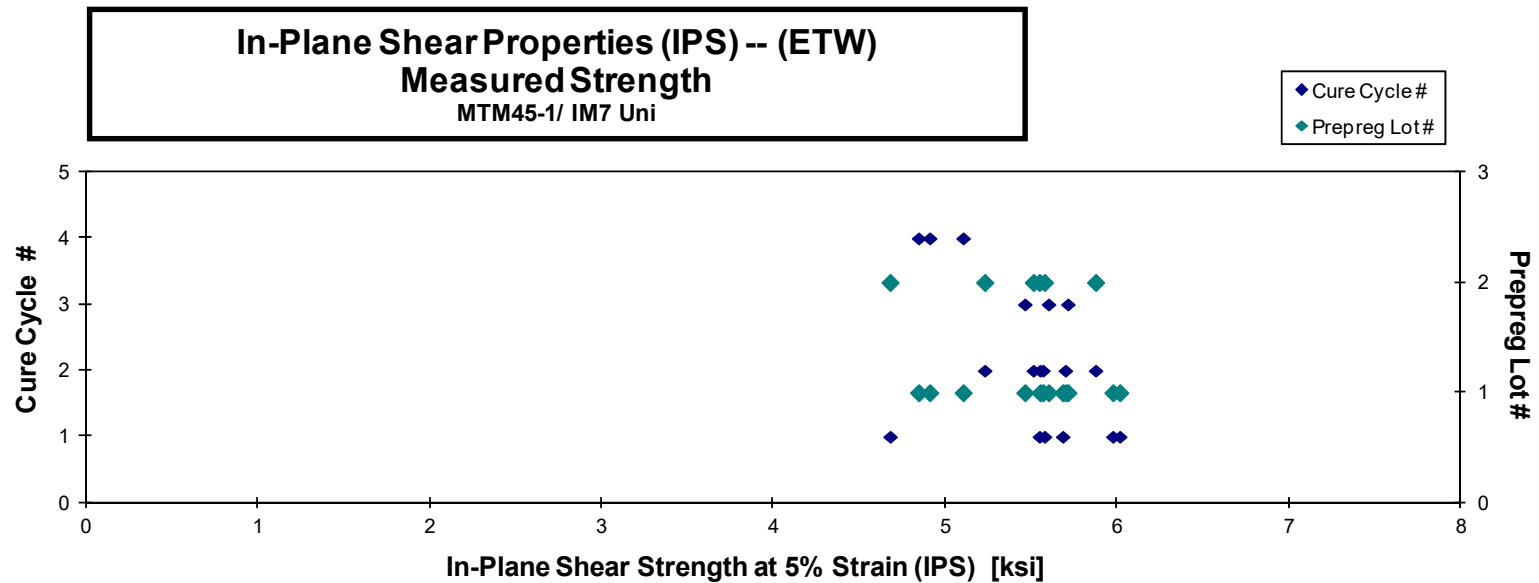
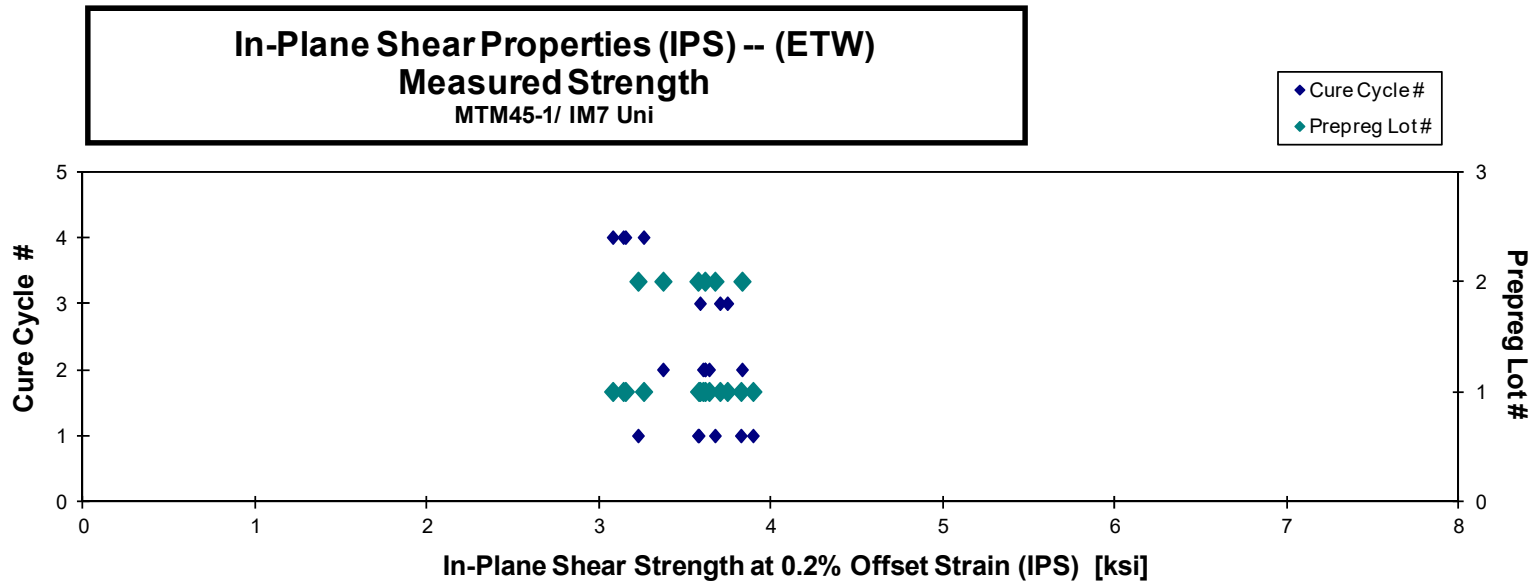


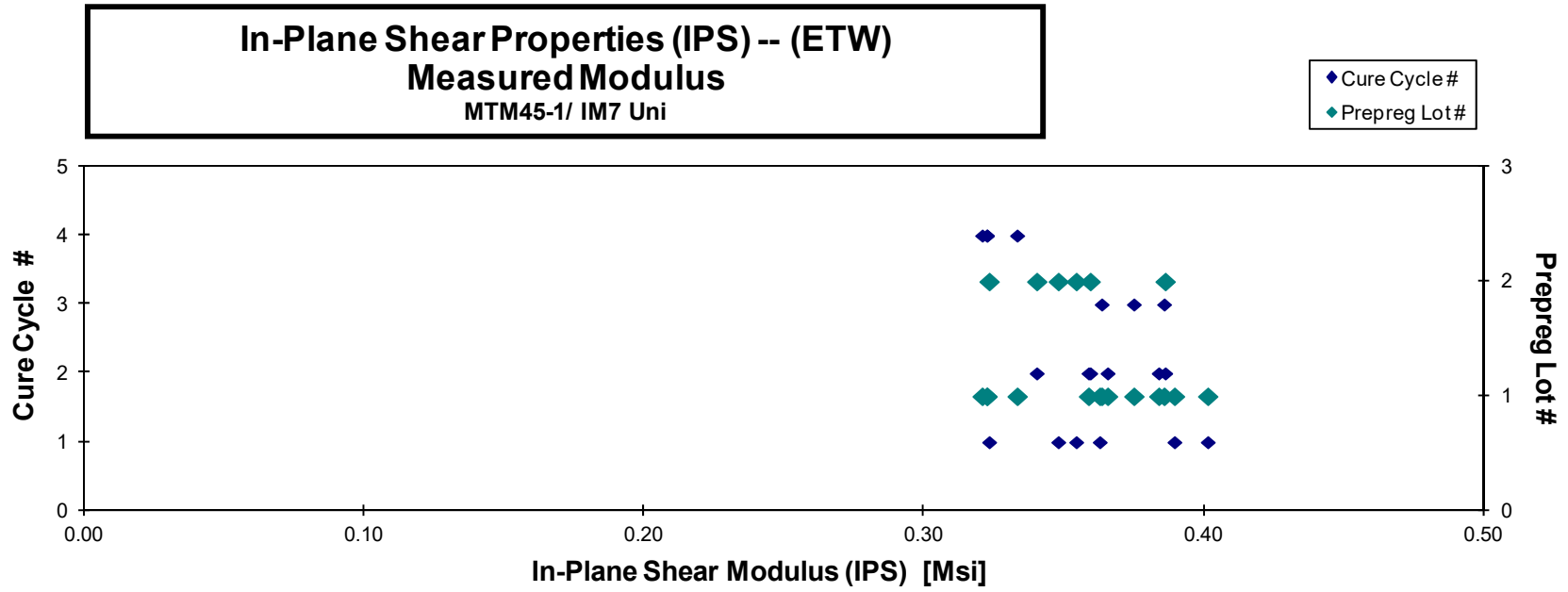
**In-Plane Shear Properties (IPS) -- (ETW)
Strength & Modulus
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]
IMU-IPS-A-MH1-ETW-2	AFNA112N	A	MH1	1	1	3.822	5.976	0.402	0.045	8	0.0056
IMU-IPS-A-MH1-ETW-3	AFNA113N	A	MH1	1	1	3.576	5.684	0.363	0.045	8	0.0057
IMU-IPS-A-MH1-ETW-4	AFNA114N	A	MH1	1	1	3.892	6.015	0.390	0.045	8	0.0057
IMU-IPS-A-MH2-ETW-2	AFNA212N	A	MH2	1	2	3.613	5.699	0.384	0.045	8	0.0056
IMU-IPS-A-MH2-ETW-3	AFNA213N	A	MH2	1	2	3.637	5.569	0.366	0.046	8	0.0057
IMU-IPS-A-MH2-ETW-4	AFNA214N	A	MH2	1	2	3.601	5.552	0.359	0.046	8	0.0057
IMU-IPS-B-MH1-ETW-2	AFNB112N	B	MH1	2	1	3.671	5.548	0.355	0.044	8	0.0055
IMU-IPS-B-MH1-ETW-3	AFNB113N	B	MH1	2	1	3.223	4.679	0.324	0.047	8	0.0059
IMU-IPS-B-MH1-ETW-4	AFNB114N	B	MH1	2	1	3.572	5.578	0.348	0.044	8	0.0056
IMU-IPS-B-MH2-ETW-1	AFNB211N	B	MH2	2	2	3.612	5.513	0.360	0.044	8	0.0055
IMU-IPS-B-MH2-ETW-2	AFNB212N	B	MH2	2	2	3.828	5.875	0.387	0.045	8	0.0056
IMU-IPS-B-MH2-ETW-4	AFNB214N	B	MH2	2	2	3.369	5.230	0.341	0.045	8	0.0056
IMU-IPS-A-MH3-ETW-2	AFNA312N	A	MH3	1	3	3.584	5.464	0.364	0.047	8	0.0058
IMU-IPS-A-MH3-ETW-3	AFNA313N	A	MH3	1	3	3.700	5.601	0.375	0.045	8	0.0056
IMU-IPS-A-MH3-ETW-4	AFNA314N	A	MH3	1	3	3.743	5.714	0.386	0.046	8	0.0057
IMU-IPS-A-MH4-ETW-1*	AFNA411N	A	MH4	1	4	3.076		0.321	0.046	8	0.0058
IMU-IPS-A-MH4-ETW-2	AFNA412N	A	MH4	1	4	3.150	4.845	0.323	0.047	8	0.0059
IMU-IPS-A-MH4-ETW-3	AFNA413N	A	MH4	1	4	3.256	5.104	0.334	0.047	8	0.0058
IMU-IPS-A-MH4-ETW-4	AFNA414N	A	MH4	1	4	3.137	4.910	0.323	0.047	8	0.0058

*Strain gauge failed prior to 5% strain

Average	3.530	5.475	0.358	Average	0.0057
Standard Dev.	0.251	0.379	0.025	Standard Dev.	
Coeff. of Var. [%]	7.118	6.930	7.109	Coeff. of Var. [%]	
Min.	3.076	4.679	0.321	Min.	0.0055
Max.	3.892	6.015	0.402	Max.	0.0059
Number of Spec.	19	18	19	Number of Spec.	19

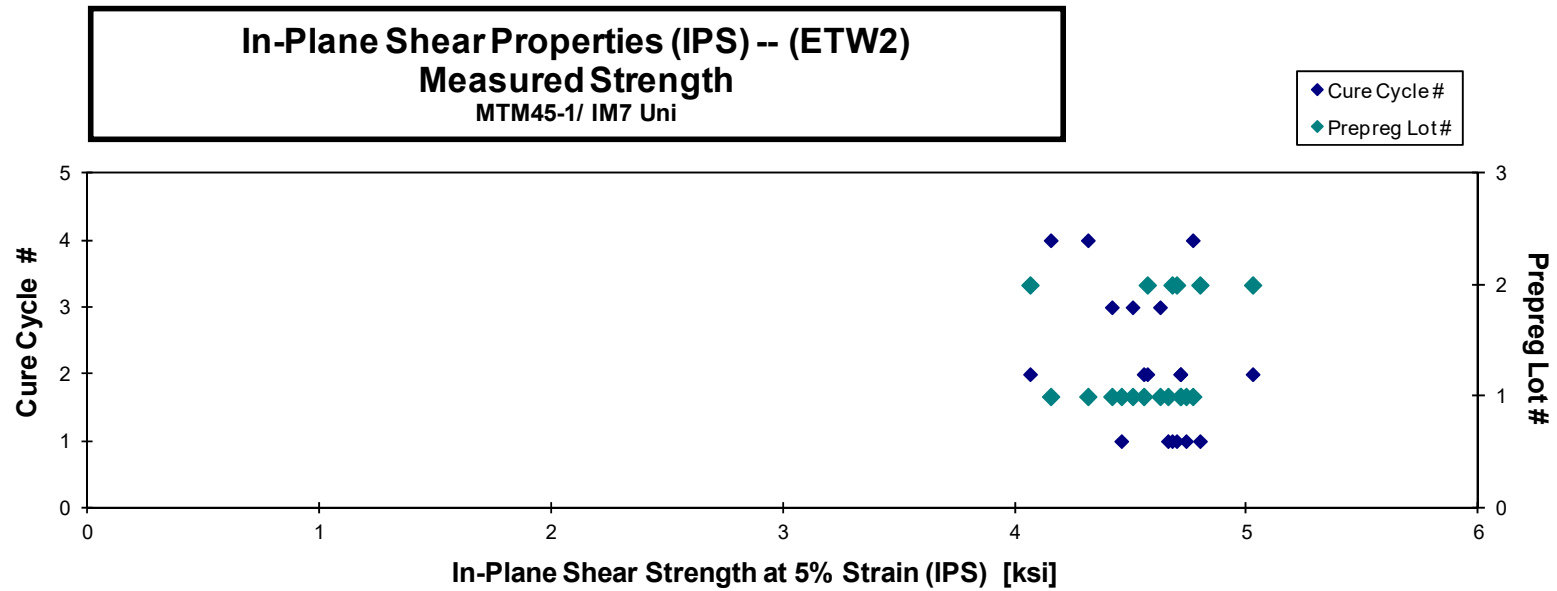
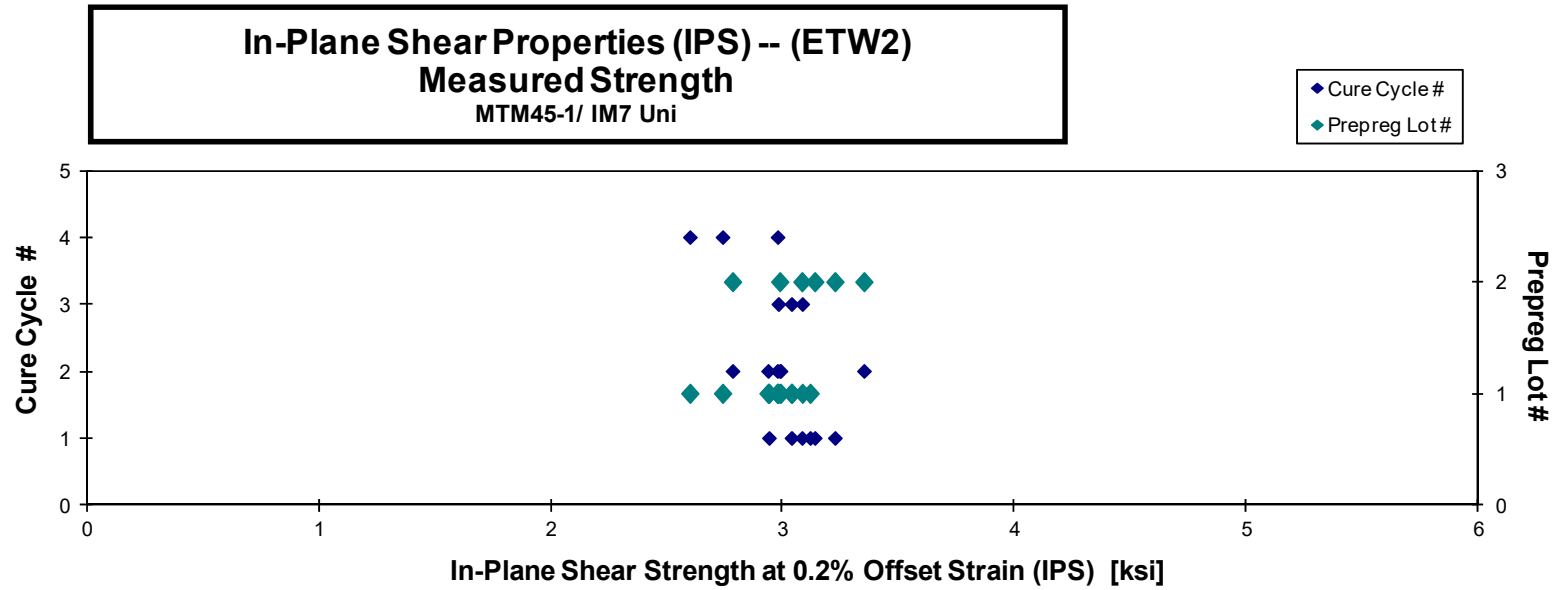


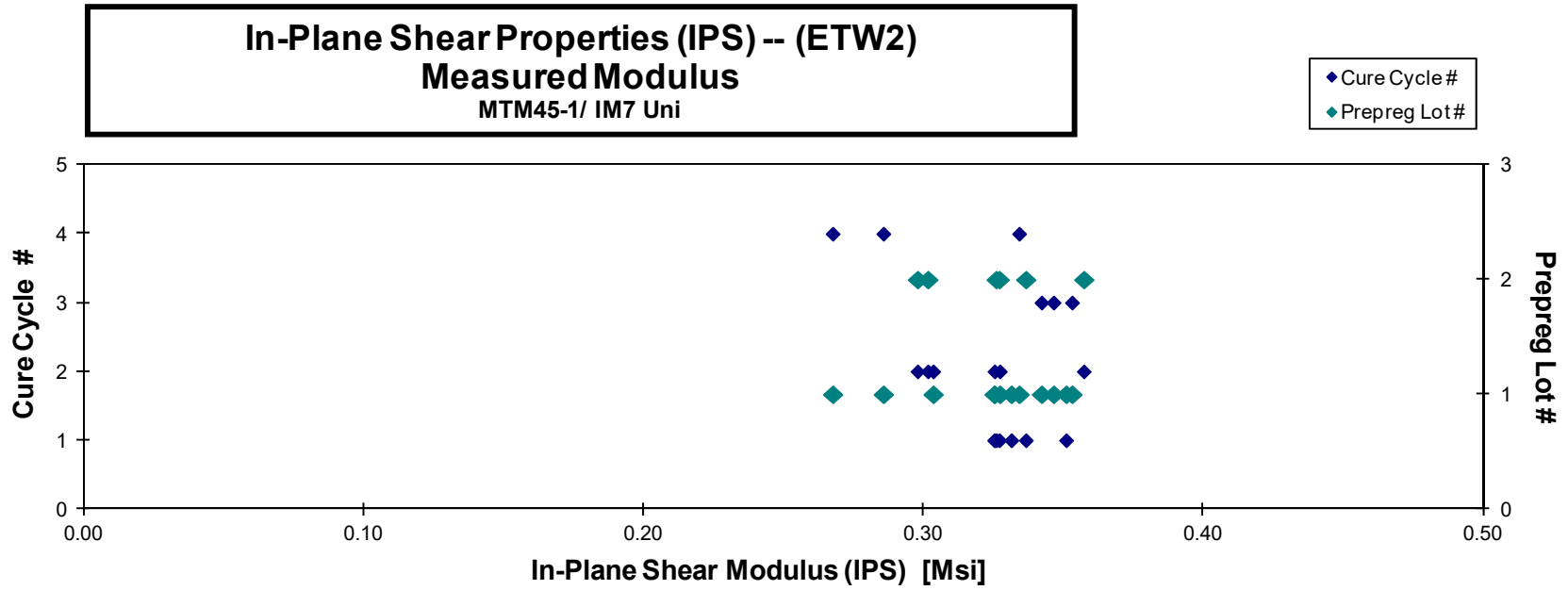


**In-Plane Shear Properties (IPS) -- (ETW2)
Strength & Modulus
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	0.2% Offset Strength [ksi]	Strength at 5% Strain [ksi]	Modulus [Msi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Avg. tply [in]
IMU-IPS-A-MH1-ETW2-2	AFNA112D	A	MH1	1	1	3.118	4.739	0.351	0.045	8	0.0057
IMU-IPS-A-MH1-ETW2-3	AFNA113D	A	MH1	1	1	3.038	4.661	0.332	0.045	8	0.0057
IMU-IPS-A-MH1-ETW2-4	AFNA114D	A	MH1	1	1	2.941	4.460	0.325	0.045	8	0.0056
IMU-IPS-A-MH2-ETW2-2	AFNA212D	A	MH2	1	2	2.937	4.715	0.304	0.046	8	0.0057
IMU-IPS-A-MH2-ETW2-3	AFNA213D	A	MH2	1	2	2.991	4.715	0.326	0.045	8	0.0056
IMU-IPS-A-MH2-ETW2-4	AFNA214D	A	MH2	1	2	2.977	4.557	0.327	0.045	8	0.0057
IMU-IPS-B-MH1-ETW2-2	AFNB112D	B	MH1	2	1	3.083	4.699	0.327	0.044	8	0.0055
IMU-IPS-B-MH1-ETW2-3	AFNB113D	B	MH1	2	1	3.138	4.679	0.337	0.045	8	0.0056
IMU-IPS-B-MH1-ETW2-4	AFNB114D	B	MH1	2	1	3.225	4.799	0.326	0.044	8	0.0055
IMU-IPS-B-MH2-ETW2-2	AFNB212D	B	MH2	2	2	2.988	4.572	0.302	0.045	8	0.0056
IMU-IPS-B-MH2-ETW2-3	AFNB213D	B	MH2	2	2	2.784	4.067	0.298	0.045	8	0.0056
IMU-IPS-B-MH2-ETW2-4	AFNB214D	B	MH2	2	2	3.351	5.026	0.357	0.045	8	0.0056
IMU-IPS-A-MH3-ETW2-2	AFNA312D	A	MH3	1	3	3.085	4.627	0.347	0.045	8	0.0056
IMU-IPS-A-MH3-ETW2-3	AFNA313D	A	MH3	1	3	2.982	4.419	0.342	0.045	8	0.0056
IMU-IPS-A-MH3-ETW2-4	AFNA314D	A	MH3	1	3	3.038	4.509	0.353	0.046	8	0.0057
IMU-IPS-A-MH4-ETW2-1	AFNA411D	A	MH4	1	4	2.978	4.768	0.334	0.046	8	0.0057
IMU-IPS-A-MH4-ETW2-3	AFNA413D	A	MH4	1	4	2.741	4.316	0.286	0.048	8	0.0060
IMU-IPS-A-MH4-ETW2-4	AFNA414D	A	MH4	1	4	2.600	4.156	0.268	0.047	8	0.0058

Average	3.000	4.582	0.325	Average	0.0057
Standard Dev.	0.173	0.235	0.024	Standard Dev.	
Coeff. of Var. [%]	5.755	5.121	7.517	Coeff. of Var. [%]	
Min.	2.600	4.067	0.268	Min.	0.0055
Max.	3.351	5.026	0.357	Max.	0.0060
Number of Spec.	18	18	18	Number of Spec.	18





4.6 “50/0/50” Unnotched Tension 0 Properties (UNT0)

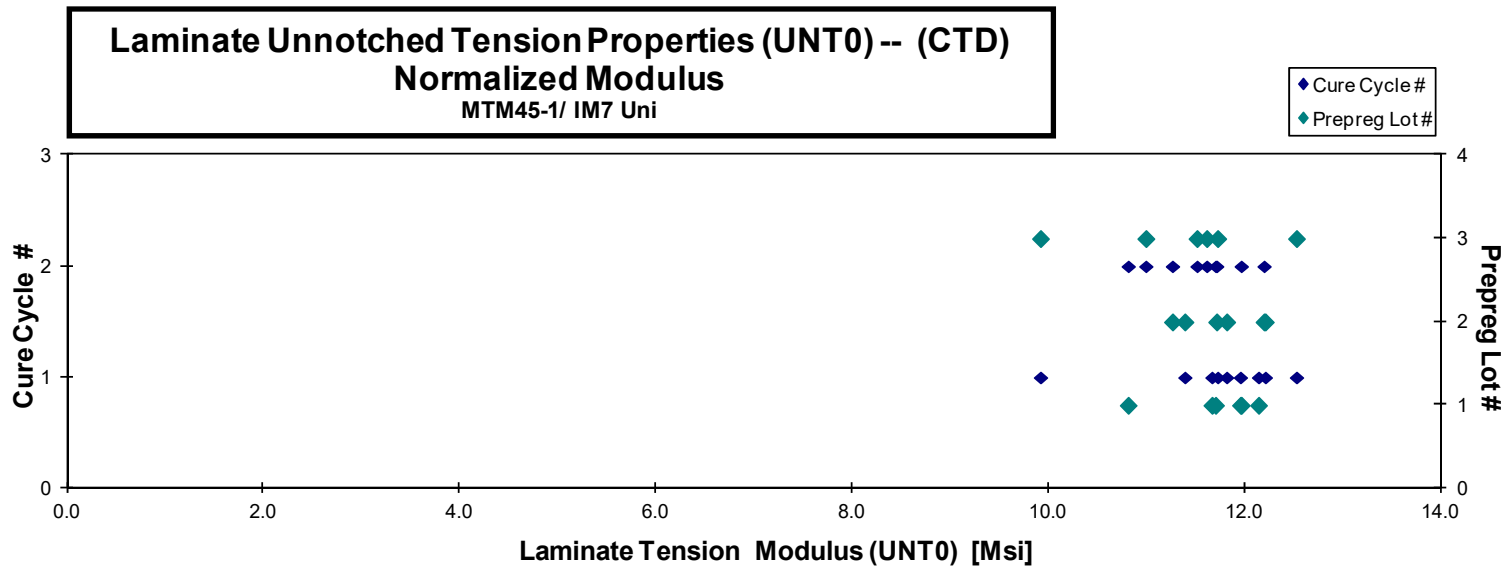
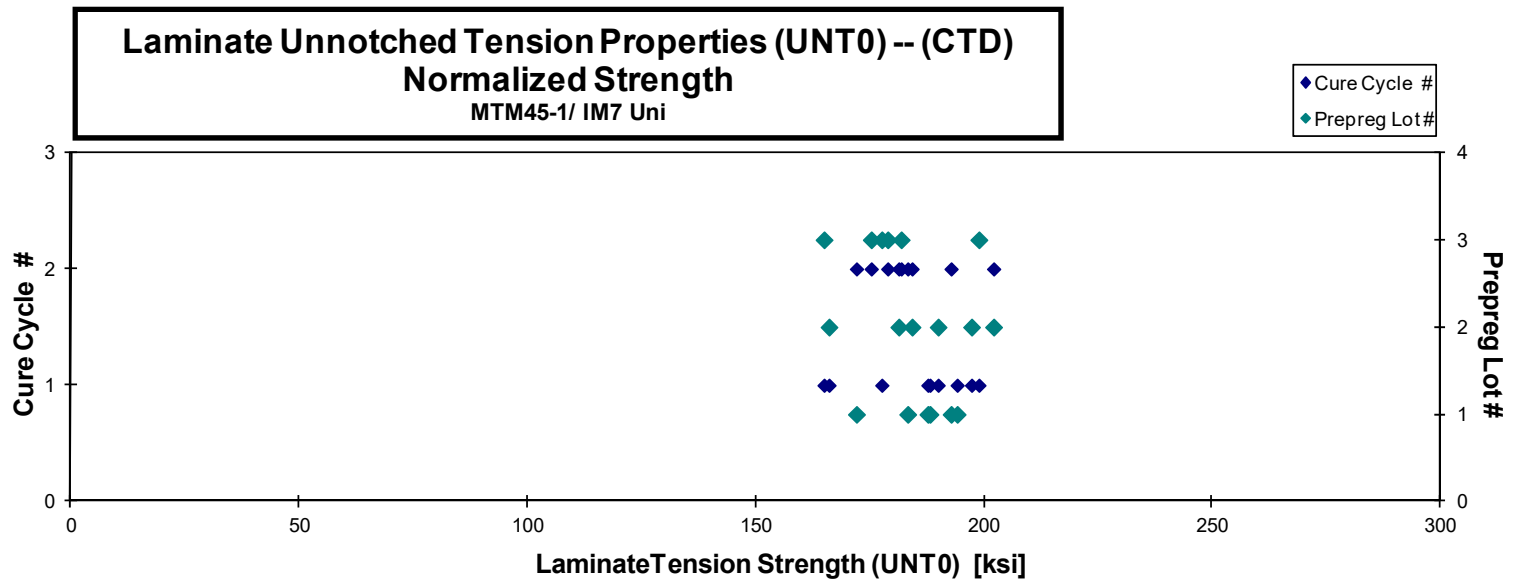
Laminate Unnotched Tension Properties (UNT0) -- (CTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	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]
IMU-UNT0-A-MH1-CTD-2	AFPA112B	A	MH1	1	1	185.523	11.151	0.092	16	LWT/LAB	0.0058	194.167	11.671
IMU-UNT0-A-MH1-CTD-3	AFPA113B	A	MH1	1	1	179.015	11.580	0.092	16	LAT/LAB	0.0058	187.762	12.146
IMU-UNT0-A-MH1-CTD-4	AFPA114B	A	MH1	1	1	178.855	11.367	0.093	16	LAT/LAB	0.0058	188.204	11.961
IMU-UNT0-A-MH2-CTD-2	AFPA212B	A	MH2	1	2	185.268	11.499	0.092	16	LWB/DWT	0.0057	192.847	11.969
IMU-UNT0-A-MH2-CTD-3	AFPA213B	A	MH2	1	2	165.887	10.426	0.091	16	LWT/LAB	0.0057	172.108	10.817
IMU-UNT0-A-MH2-CTD-4	AFPA214B	A	MH2	1	2	177.483	11.334	0.091	16	XGM	0.0057	183.332	11.708
IMU-UNT0-B-MH1-CTD-2	AFPB112B	B	MH1	2	1	164.045	11.254	0.089	16	LAT/LAB	0.0056	166.095	11.395
IMU-UNT0-B-MH1-CTD-3	AFPB113B	B	MH1	2	1	184.351	11.469	0.091	16	LAT/LAB	0.0057	190.007	11.821
IMU-UNT0-B-MH1-CTD-4	AFPB114B	B	MH1	2	1	186.713	11.558	0.093	16	LAT/LAB	0.0058	197.322	12.215
IMU-UNT0-B-MH2-CTD-2	AFPB212B	B	MH2	2	2	174.634	11.283	0.091	16	LAT/LAB	0.0057	181.382	11.719
IMU-UNT0-B-MH2-CTD-3	AFPB213B	B	MH2	2	2	189.253	11.423	0.094	16	LAT/LAB/DGM	0.0059	202.157	12.202
IMU-UNT0-B-MH2-CTD-4	AFPB214B	B	MH2	2	2	179.398	10.969	0.090	16	LAT/LAB	0.0057	184.291	11.268
IMU-UNT0-C-MH1-CTD-1	AFPC111B	C	MH1	3	1	158.181	9.512	0.092	16	LAT/LAB	0.0057	165.012	9.923
IMU-UNT0-C-MH1-CTD-2	AFPC112B	C	MH1	3	1	169.949	11.219	0.092	16	LAT/LAB	0.0058	177.674	11.729
IMU-UNT0-C-MH1-CTD-3	AFPC113B	C	MH1	3	1	189.048	11.910	0.093	16	LAT/LAB	0.0058	198.930	12.533
IMU-UNT0-C-MH2-CTD-1	AFPC211B	C	MH2	3	2	173.377	11.487	0.089	16	LAT/LAB	0.0056	175.348	11.618
IMU-UNT0-C-MH2-CTD-2	AFPC212B	C	MH2	3	2	180.074	11.402	0.089	16	LAT/LAB	0.0056	181.916	11.519
IMU-UNT0-C-MH2-CTD-3	AFPC213B	C	MH2	3	2	178.570	10.972	0.088	16	LAT/LAB	0.0055	178.976	10.997

Average 177.757 11.212
 Standard Dev. 8.791 0.527
 Coeff. of Var. [%] 4.945 4.700
 Min. 158.181 9.512
 Max. 189.253 11.910
 Number of Spec. 18 18

Average_{norm} 0.0057 184.307 11.623
 Standard Dev._{norm} 10.716 0.604
 Coeff. of Var. [%]_{norm} 5.814 5.201
 Min. 0.0055 165.012 9.923
 Max. 0.0059 202.157 12.533
 Number of Spec. 18 18



Laminate Unnotched Tension Properties (UNT0) -- (RTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

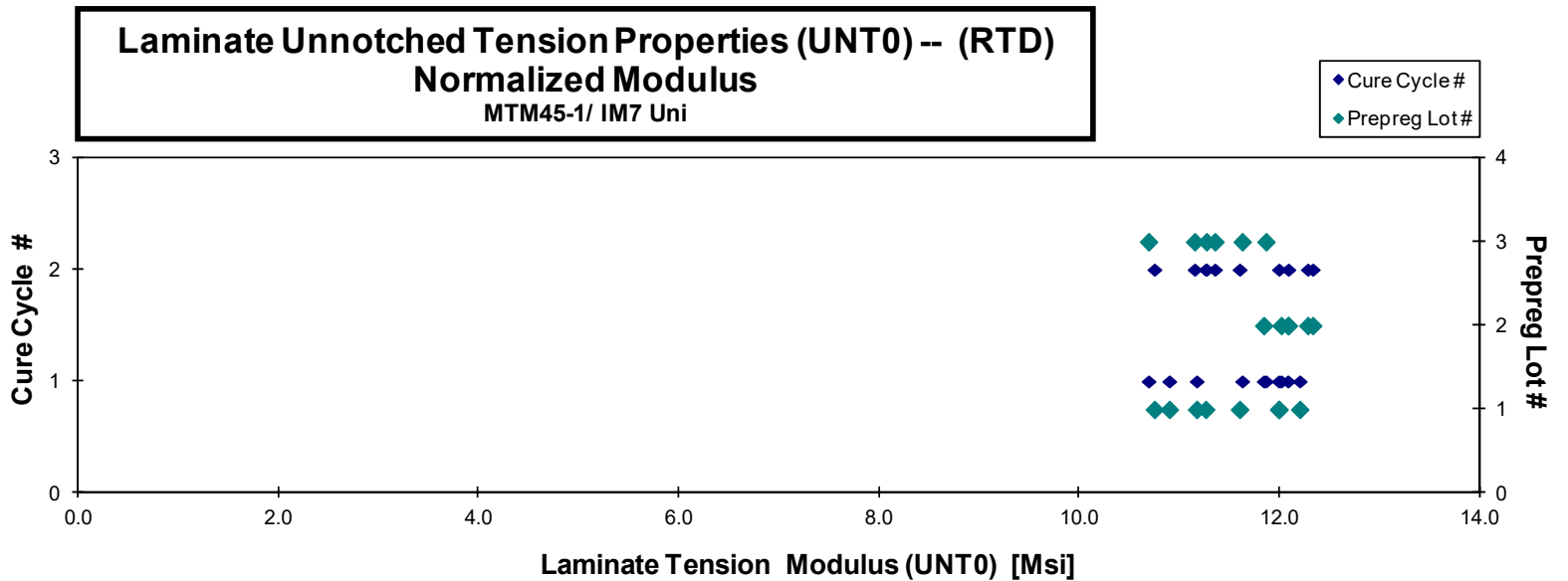
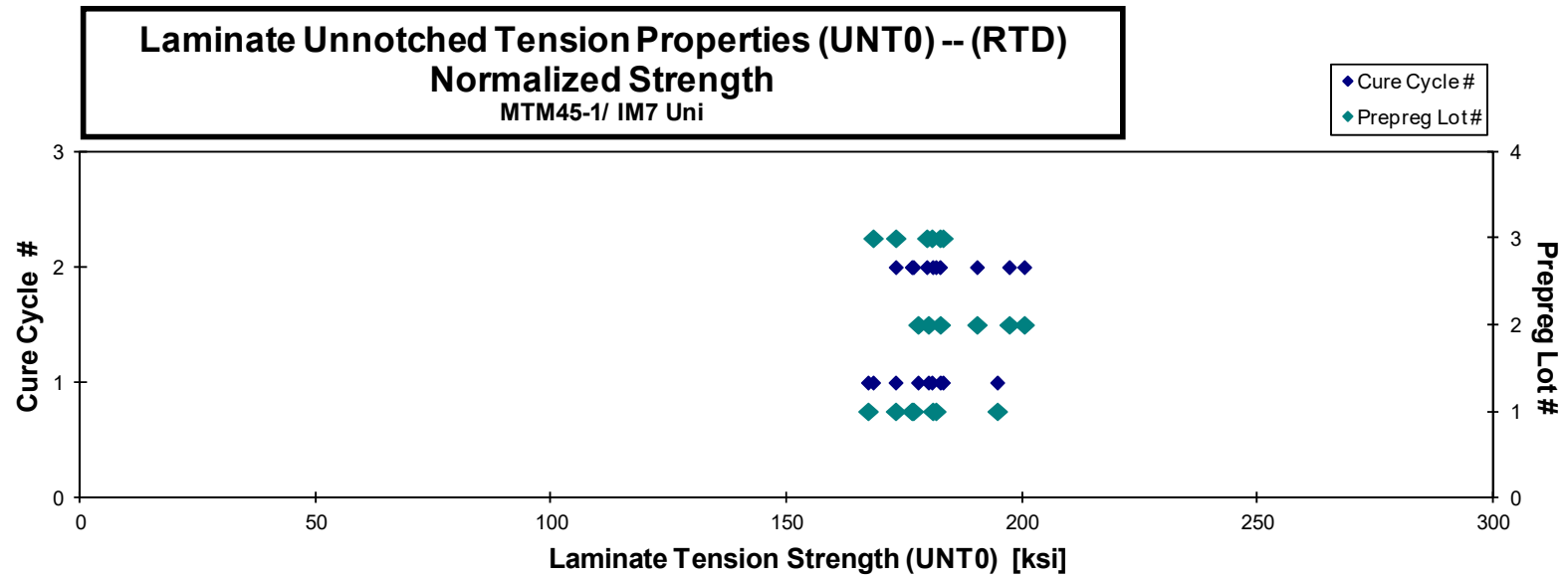
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thckn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
IMU-UNT0-A-MH1-RTD-1	AFPA111A	A	MH1	1	1	167.309	10.792	0.091	16	LAT/LWT	0.0057	173.203	11.172
IMU-UNT0-A-MH1-RTD-2	AFPA112A	A	MH1	1	1	160.605	11.508	0.092	16	LAT	0.0057	167.358	11.992
IMU-UNT0-A-MH1-RTD-3	AFPA113A	A	MH1	1	1	*	10.528	0.091	16	LIT	0.0057		10.899
IMU-UNT0-A-MH1-RTD-4	AFPA114A	A	MH1	1	1	185.127	11.596	0.093	16	LAT/LGM/LWB	0.0058	194.804	12.202
IMU-UNT0-A-MH2-RTD-1	AFPA211A	A	MH2	1	2	172.916	10.714	0.093	16	LAT/LAB	0.0058	181.758	11.262
IMU-UNT0-A-MH2-RTD-2	AFPA212A	A	MH2	1	2	174.734	10.373	0.091	16	LAT/LAB	0.0057	181.088	10.750
IMU-UNT0-A-MH2-RTD-3	AFPA213A	A	MH2	1	2	169.348	11.121	0.092	16	LAT/DWB	0.0057	176.661	11.601
IMU-UNT0-A-MH2-RTD-4	AFPA214A	A	MH2	1	2	167.637	11.362	0.093	16	LGM/LAB	0.0058	176.971	11.995
IMU-UNT0-B-MH1-RTD-1	AFPB111A	B	MH1	2	1	171.966	11.469	0.092	16	LAT/LAB	0.0058	180.174	12.016
IMU-UNT0-B-MH1-RTD-2	AFPB112A	B	MH1	2	1	170.615	11.352	0.092	16	LWB/LAT	0.0057	177.982	11.842
IMU-UNT0-B-MH1-RTD-3	AFPB113A	B	MH1	2	1	175.321	11.596	0.092	16	LGM/LAT	0.0057	182.693	12.084
IMU-UNT0-B-MH2-RTD-1	AFPB211A	B	MH2	2	2	189.756	11.669	0.093	16	LWB/LAT/LGM	0.0058	200.537	12.332
IMU-UNT0-B-MH2-RTD-2	AFPB212A	B	MH2	2	2	192.102	11.767	0.090	16	LAT/LWB	0.0057	197.341	12.088
IMU-UNT0-B-MH2-RTD-4	AFPB214A	B	MH2	2	2	179.675	11.585	0.093	16	LAB/LWT/LGM	0.0058	190.497	12.283
IMU-UNT0-C-MH1-RTD-2	AFPC112A	C	MH1	3	1	162.168	10.294	0.091	16	LAT/LAB	0.0057	168.434	10.692
IMU-UNT0-C-MH1-RTD-3	AFPC113A	C	MH1	3	1	173.617	11.158	0.092	16	LAT/LAB	0.0057	180.916	11.627
IMU-UNT0-C-MH1-RTD-4	AFPC114A	C	MH1	3	1	175.298	11.349	0.092	16	LAT/LWB	0.0058	183.266	11.865
IMU-UNT0-C-MH2-RTD-1	AFPC211A	C	MH2	3	2	171.878	11.064	0.089	16	LGM/LAT	0.0055	173.245	11.152
IMU-UNT0-C-MH2-RTD-2	AFPC212A	C	MH2	3	2	180.983	11.252	0.089	16	LGM/LAT	0.0056	182.629	11.354
IMU-UNT0-C-MH2-RTD-3	AFPC213A	C	MH2	3	2	178.413	11.181	0.089	16	LAT/LAB	0.0055	179.832	11.270

*Tensile strength is not reported due to unacceptable failure mode.

Average	174.709	11.187
Standard Dev.	8.308	0.437
Coeff. of Var. [%]	4.755	3.906
Min.	160.605	10.294
Max.	192.102	11.767
Number of Spec.	19	20

Average _{norm}	0.0057	181.547	11.624
Standard Dev. _{norm}		8.964	0.520
Coeff. of Var. [%] _{norm}		4.937	4.476
Min.	0.0055	167.358	10.692
Max.	0.0058	200.537	12.332
Number of Spec.		19	20



Laminate Unnotched Tension Properties (UNT0) -- (ETW)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

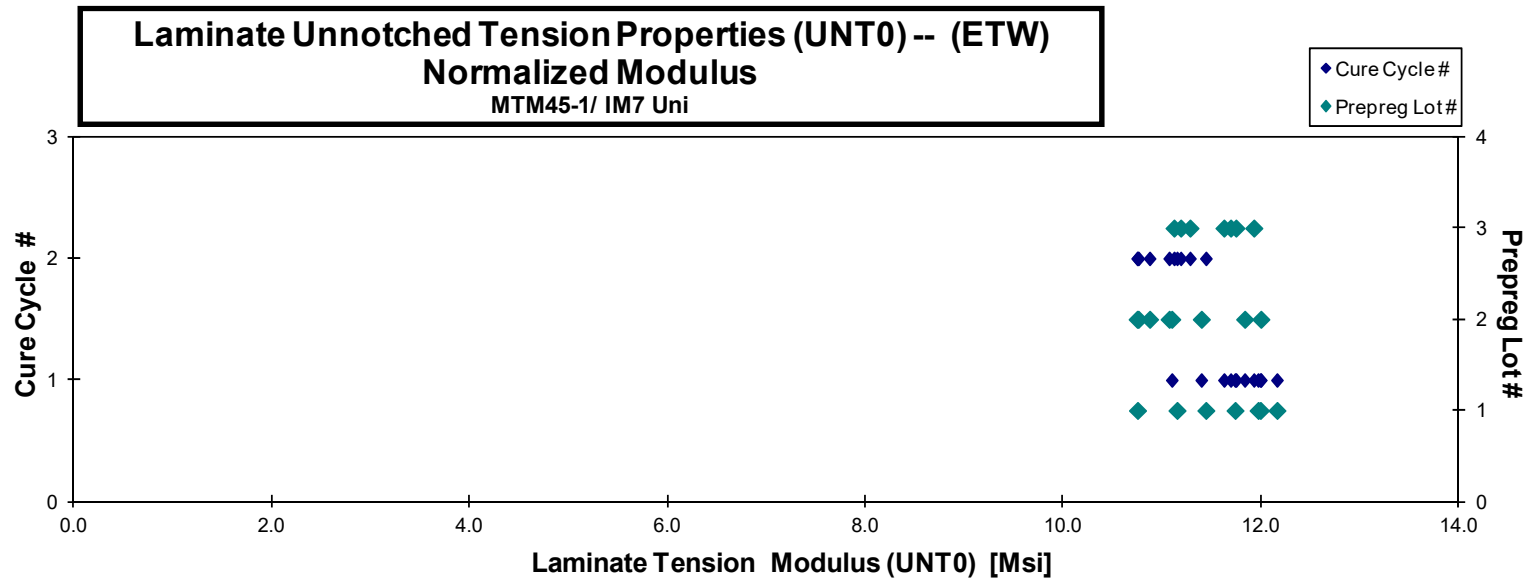
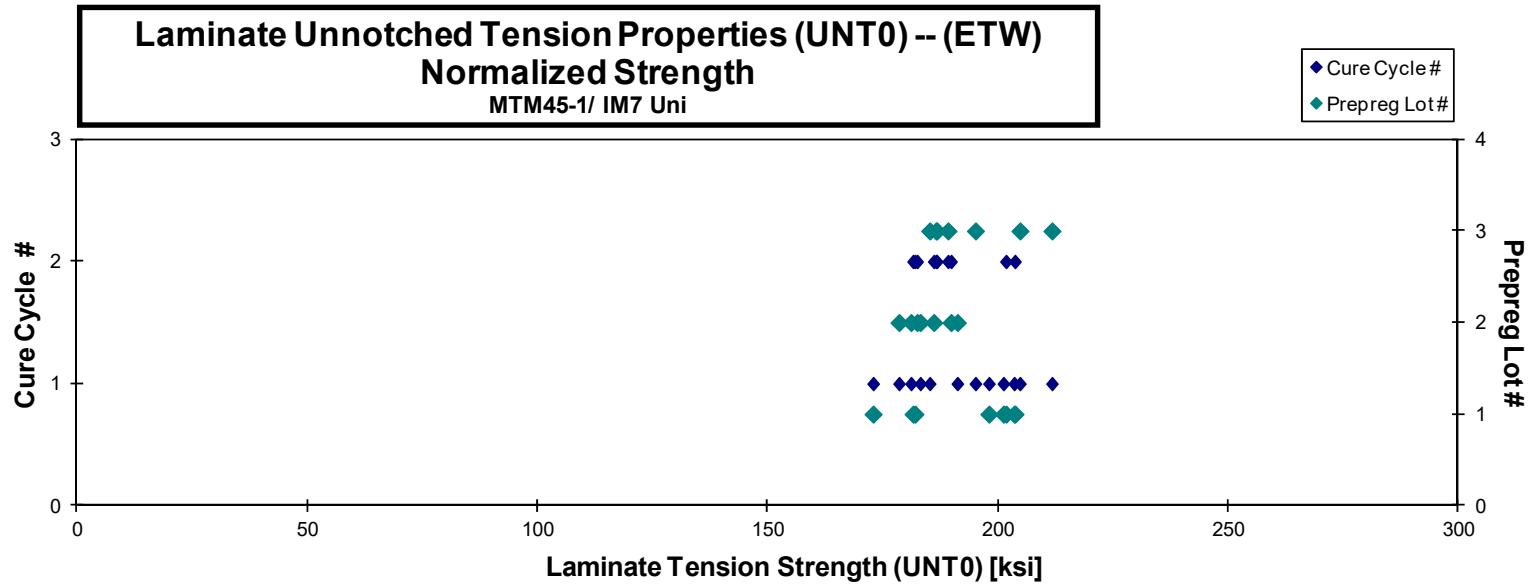
Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksj]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNT0-A-MH1-ETW-1	AFPA111N	A	MH1	1	1	190.089	11.488	0.093	16	LAB/LAT
IMU-UNT0-A-MH1-ETW-2	AFPA112N	A	MH1	1	1	165.174	11.212	0.092	16	LAT/LWB
IMU-UNT0-A-MH1-ETW-3	AFPA113N	A	MH1	1	1	188.869	11.414	0.092	16	LWT
IMU-UNT0-A-MH1-ETW-4	AFPA114N	A	MH1	1	1	192.917	11.366	0.093	16	LAB/LWT
IMU-UNT0-A-MH2-ETW-1	AFPA211N	A	MH2	1	2	195.895	10.337	0.091	16	LGM/LAT
IMU-UNT0-A-MH2-ETW-2	AFPA212N	A	MH2	1	2	175.720	10.790	0.091	16	LWT/LAB
IMU-UNT0-A-MH2-ETW-3	AFPA213N	A	MH2	1	2	193.630	10.980	0.092	16	LAT/LGM/LAB
IMU-UNT0-A-MH2-ETW-4	AFPA214N	A	MH2	1	2	174.803	**	0.092	16	LGM/LAT/LAB
IMU-UNT0-B-MH1-ETW-1	AFPB111N	B	MH1	2	1	180.354	11.346	0.088	16	LWT/LWB
IMU-UNT0-B-MH1-ETW-2	AFPB112N	B	MH1	2	1	188.459	11.664	0.089	16	LAT/LWB/LGM
IMU-UNT0-B-MH1-ETW-3	AFPB113N	B	MH1	2	1	181.881	11.914	0.089	16	SGM/LWB/LAT
IMU-UNT0-B-MH1-ETW-4	AFPB114N	B	MH1	2	1	176.887	10.995	0.089	16	LAB/LGM/LWT
IMU-UNT0-B-MH2-ETW-1	AFPB211N	B	MH2	2	2	191.878	11.189	0.087	16	LAB/LAT
IMU-UNT0-B-MH2-ETW-2	AFPB212N	B	MH2	2	2	*	10.939	0.087	16	SLIPPED
IMU-UNT0-B-MH2-ETW-3	AFPB213N	B	MH2	2	2	183.033	10.571	0.089	16	LAT/LWB/LGM
IMU-UNT0-B-MH2-ETW-4	AFPB214N	B	MH2	2	2	180.822	10.662	0.089	16	LAT/LAB/LGM
IMU-UNT0-C-MH1-ETW-1	AFPC111N	C	MH1	3	1	200.626	11.683	0.090	16	LGM / LAB
IMU-UNT0-C-MH1-ETW-2	AFPC112N	C	MH1	3	1	203.849	11.255	0.091	16	LAB / LAT
IMU-UNT0-C-MH1-ETW-3	AFPC113N	C	MH1	3	1	181.828	11.413	0.090	16	LAT / LAB
IMU-UNT0-C-MH1-ETW-4	AFPC114N	C	MH1	3	1	188.804	11.365	0.091	16	LAT / LWB
IMU-UNT0-C-MH2-ETW-1	AFPC211N	C	MH2	3	2	187.488	11.232	0.088	16	LGM / LWT
IMU-UNT0-C-MH2-ETW-2	AFPC212N	C	MH2	3	2	191.975	11.448	0.087	16	LAB / LWT
IMU-UNT0-C-MH2-ETW-3	AFPC213N	C	MH2	3	2	188.245	11.220	0.087	16	LAB / LWT

Avg. t_{ply} [in]	Strength _{norm} [ksj]	Modulus _{norm} [Msi]
0.0058	201.069	12.152
0.0058	172.776	11.728
0.0058	197.919	11.961
0.0058	203.403	11.984
0.0057	203.575	10.742
0.0057	181.444	11.141
0.0057	201.624	11.433
0.0057	181.854	
0.0055	181.003	11.387
0.0056	191.064	11.825
0.0055	183.018	11.988
0.0055	178.395	11.089
0.0054	189.698	11.062
0.0055		10.864
0.0056	185.945	10.739
0.0055	182.329	10.751
0.0056	204.653	11.918
0.0057	211.610	11.683
0.0056	185.065	11.616
0.0057	194.990	11.737
0.0055	186.600	11.179
0.0054	189.030	11.272
0.0054	186.427	11.112

*Tensile strength is not reported due to specimen slipped prematurely.
 **Tensile modulus is not reported due to strain gauge failed prematurely.

Average 186.510 11.204
 Standard Dev. 8.989 0.380
 Coeff. of Var. [%] 4.820 3.391
 Min. 165.174 10.337
 Max. 203.849 11.914
 Number of Spec. 22 22

Average_{norm} 0.0056 190.613 11.426
 Standard Dev._{norm} 10.257 0.455
 Coeff. of Var. [%]_{norm} 5.381 3.986
 Min. 0.0054 172.776 10.739
 Max. 0.0058 211.610 12.152
 Number of Spec. 22 22



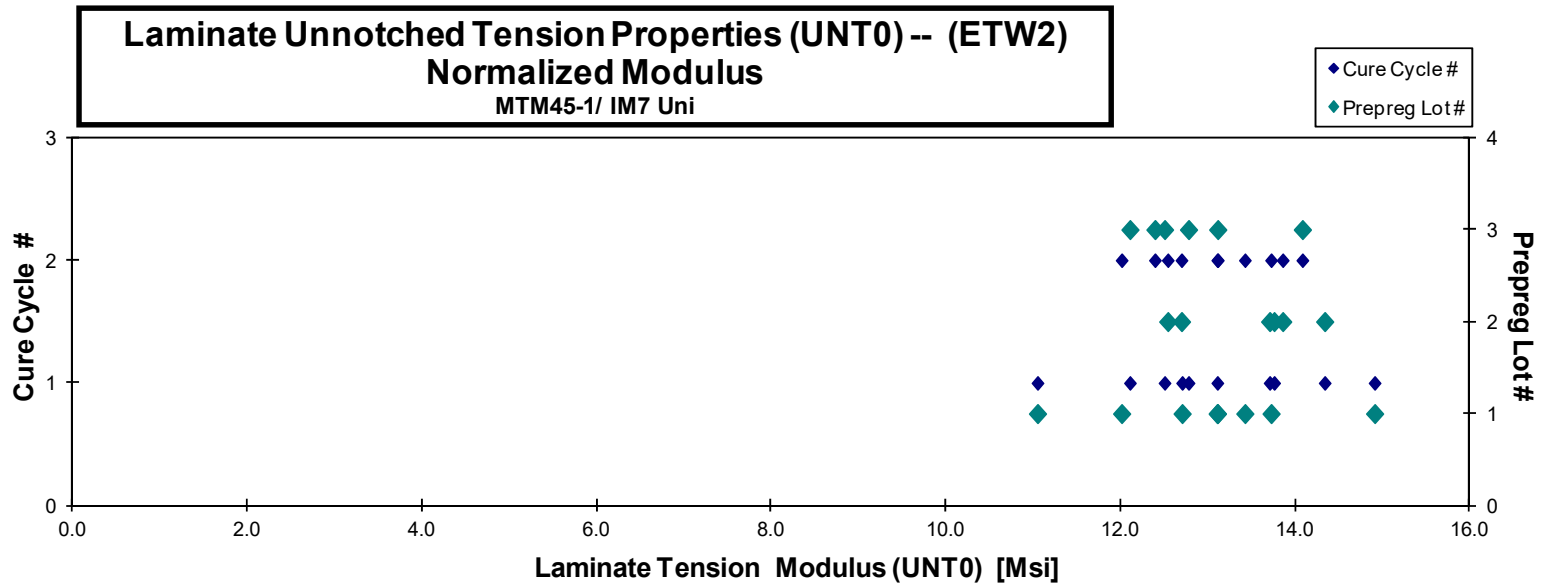
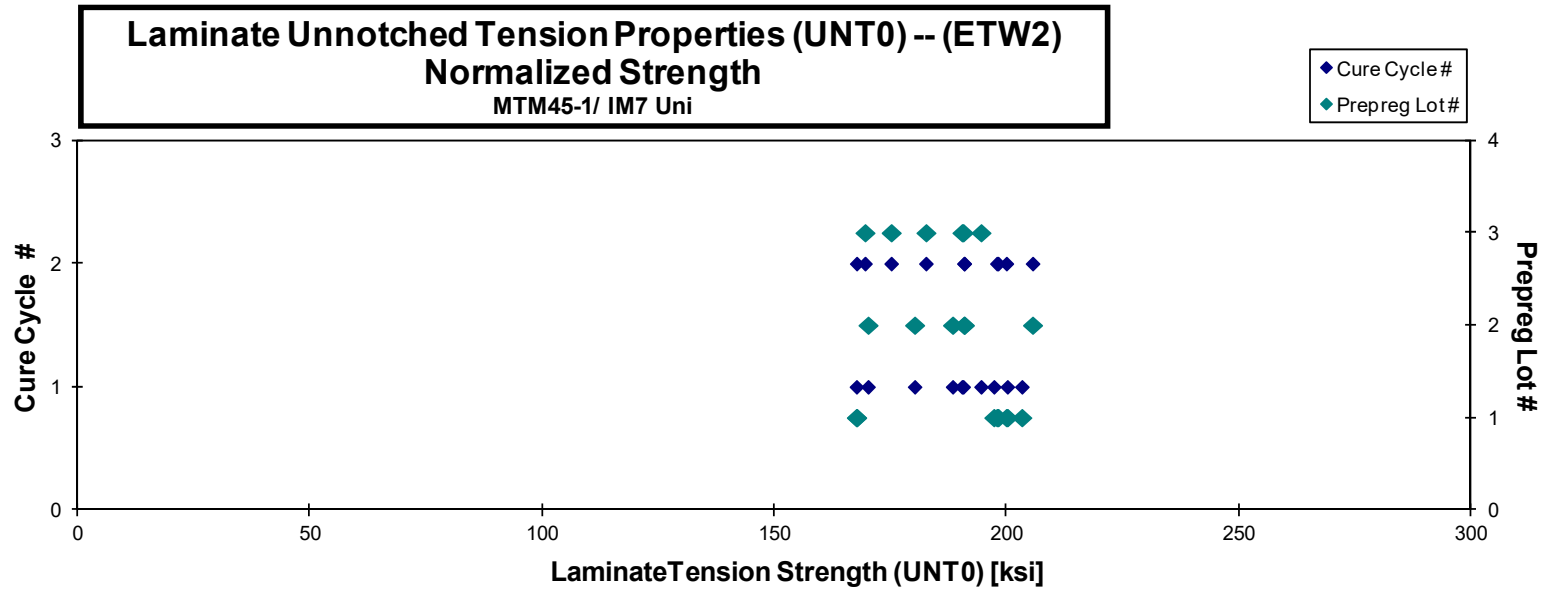
Laminate Unnotched Tension Properties (UNT0) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Naming	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]
IMU-UNT0-A-MH1-ETW2-1	AFPA111D	A	MH1	1	1	161.295	12.590	0.092	16	LWT/LAB	0.0057	167.832	13.100
IMU-UNT0-A-MH1-ETW2-2	AFPA112D	A	MH1	1	1	197.100	14.437	0.091	16	LWT/LAB	0.0057	203.446	14.902
IMU-UNT0-A-MH1-ETW2-3	AFPA113D	A	MH1	1	1	187.984	10.513	0.092	16	LAT/LAB	0.0058	197.419	11.041
IMU-UNT0-A-MH1-ETW2-4	AFPA114D	A	MH1	1	2	192.393	12.193	0.092	16	LWT/LWB	0.0057	200.337	12.696
IMU-UNT0-A-MH2-ETW2-1	AFPA211D	A	MH2	1	2	163.370	12.748	0.090	16	LAB	0.0057	167.887	13.101
IMU-UNT0-A-MH2-ETW2-2	AFPA212D	A	MH2	1	2	192.206	13.293	0.091	16	LAT/LAB	0.0057	198.321	13.716
IMU-UNT0-A-MH2-ETW2-3	AFPA213D	A	MH2	1	2	190.802	12.924	0.091	16	LAB/LWT	0.0057	198.066	13.416
IMU-UNT0-A-MH2-ETW2-4	AFPA214D	A	MH2	1	2	195.242	11.711	0.090	16	LAT/LGM	0.0056	200.123	12.004
IMU-UNT0-B-MH1-ETW2-2	AFPB112D	B	MH1	2	1	182.696	13.274	0.091	16	LAT/LWB	0.0057	188.544	13.699
IMU-UNT0-B-MH1-ETW2-3	AFPB113D	B	MH1	2	1	180.056	14.305	0.088	16	LAT/LAB	0.0055	180.363	14.329
IMU-UNT0-B-MH1-ETW2-4	AFPB114D	B	MH1	2	1	167.262	13.502	0.090	16	LGM	0.0056	170.335	13.750
IMU-UNT0-B-MH2-ETW2-1	AFPB211D	B	MH2	2	2	186.375	12.378	0.090	16	LGM	0.0056	191.070	12.690
IMU-UNT0-B-MH2-ETW2-2	AFPB212D	B	MH2	2	2	199.447	13.424	0.091	16	LGM	0.0057	205.756	13.849
IMU-UNT0-B-MH2-ETW2-3	AFPB213D	B	MH2	2	2	189.253	12.420	0.089	16	LAT/LGM/LAB	0.0056	190.974	12.533
IMU-UNT0-C-MH1-ETW2-2	AFPC112D	C	MH1	3	1	190.684	12.510	0.090	16	LGM / LAT / LAB	0.0056	194.657	12.771
IMU-UNT0-C-MH1-ETW2-3	AFPC113D	C	MH1	3	1	186.001	12.180	0.090	16	LAT / LAB	0.0056	190.827	12.496
IMU-UNT0-C-MH1-ETW2-4	AFPC114D	C	MH1	3	1	184.272	11.700	0.091	16	LAT / LGM	0.0057	190.554	12.099
IMU-UNT0-C-MH2-ETW2-1	AFPC211D	C	MH2	3	2	183.635	12.442	0.088	16	LGM / LWB	0.0055	182.801	12.385
IMU-UNT0-C-MH2-ETW2-2	AFPC212D	C	MH2	3	2	170.357	13.157	0.088	16	LGM / LAB	0.0055	169.680	13.105
IMU-UNT0-C-MH2-ETW2-3	AFPC213D	C	MH2	3	2	175.520	14.090	0.088	16	LAT/ LWB / LGM	0.0055	175.320	14.074

Average 183.798 12.790
 Standard Dev. 11.037 0.948
 Coeff. of Var. [%] 6.005 7.409
 Min. 161.295 10.513
 Max. 199.447 14.437
 Number of Spec. 20 20

Average_{norm} 0.0056 188.216 13.088
 Standard Dev._{norm} 12.421 0.906
 Coeff. of Var. [%]_{norm} 6.599 6.925
 Min. 0.0055 167.832 11.041
 Max. 0.0058 205.756 14.902
 Number of Spec. 20 20



4.7 “25/50/25” Unnotched Tension 1 Properties (UNT1)

**Laminate Unnotched Tension Properties (UNT1) -- (CTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

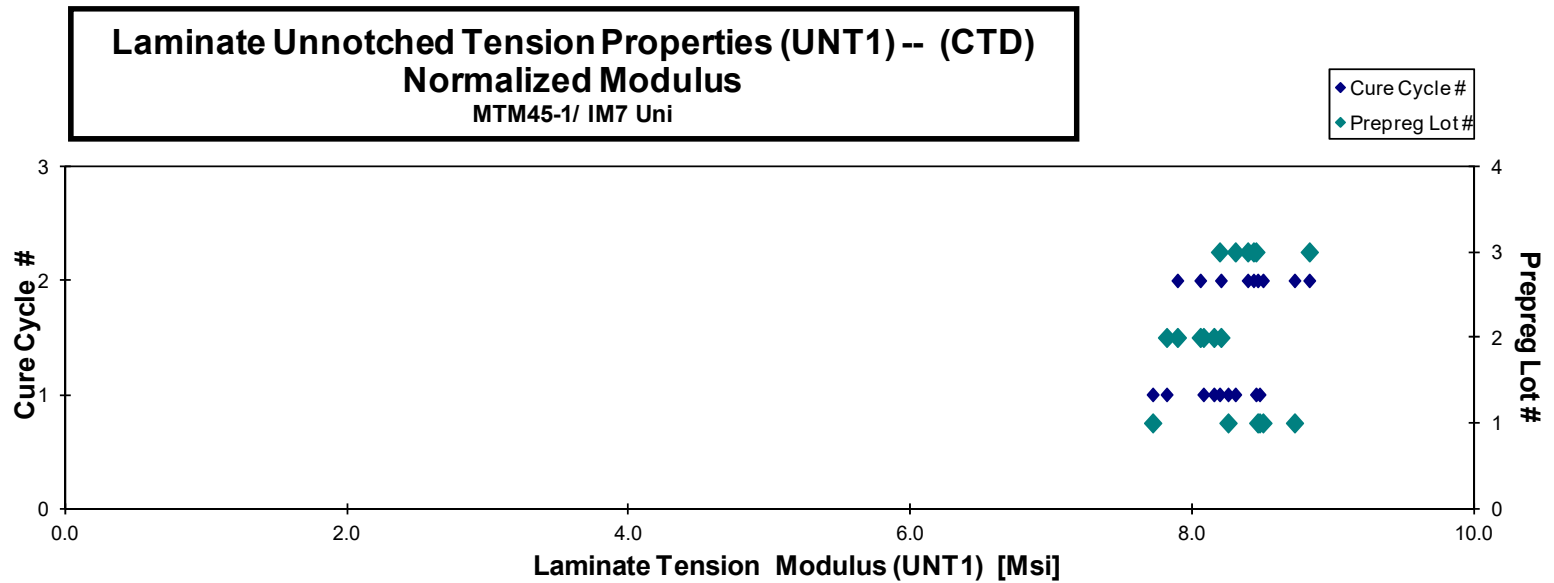
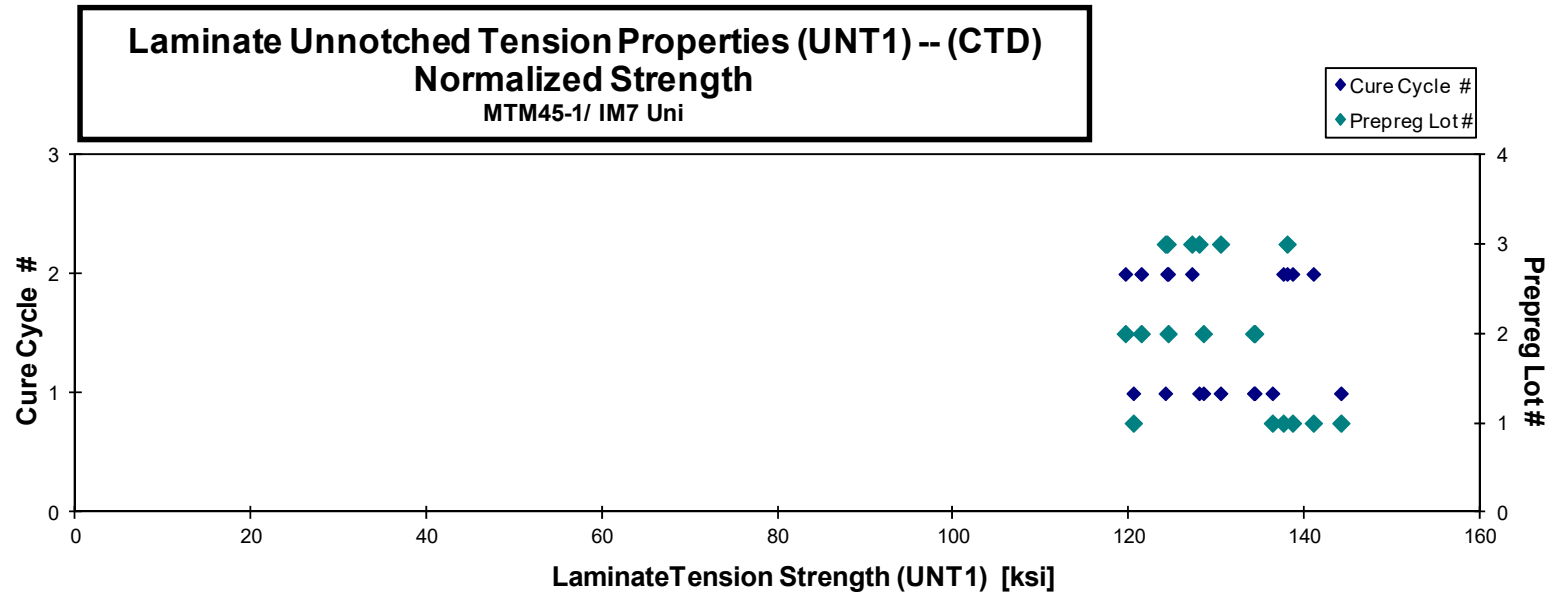
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNT1-A-MH1-CTD-1	AFAA111B	A	MH1	1	1	140.307	8.247	0.136	24	AGM
IMU-UNT1-A-MH1-CTD-2	AFAA112B	A	MH1	1	1	134.095	8.113	0.134	24	LWT / AGM
IMU-UNT1-A-MH1-CTD-3	AFAA113B	A	MH1	1	1	118.512	7.587	0.134	24	AGM
IMU-UNT1-A-MH2-CTD-2	AFAA212B	A	MH2	1	2	133.747	8.162	0.137	24	XGM
IMU-UNT1-A-MH2-CTD-3	AFAA213B	A	MH2	1	2	137.048	8.476	0.136	24	XWT / LGM / LAB
IMU-UNT1-A-MH2-CTD-4	AFAA214B	A	MH2	1	2	132.728	8.198	0.137	24	XWB
IMU-UNT1-B-MH1-CTD-2	AFAB112B	B	MH1	2	1	125.792	7.650	0.135	24	AGM
IMU-UNT1-B-MH1-CTD-3	AFAB113B	B	MH1	2	1	130.456	7.914	0.136	24	AWT/LWB
IMU-UNT1-B-MH1-CTD-4	AFAB114B	B	MH1	2	1	131.126	7.888	0.135	24	AGM/LAT
IMU-UNT1-B-MH2-CTD-2	AFAB212B	B	MH2	2	2	117.880	7.777	0.134	24	LWT/LAB
IMU-UNT1-B-MH2-CTD-3	AFAB213B	B	MH2	2	2	119.572	7.931	0.134	24	LWT/LAB
IMU-UNT1-B-MH2-CTD-4	AFAB214B	B	MH2	2	2	121.412	7.998	0.135	24	LGM
IMU-UNT1-C-MH1-CTD-2	AFAC112B	C	MH1	3	1	124.131	8.300	0.132	24	LGM
IMU-UNT1-C-MH1-CTD-3	AFAC113B	C	MH1	3	1	129.633	8.139	0.133	24	LGM
IMU-UNT1-C-MH1-CTD-4	AFAC114B	C	MH1	3	1	127.678	8.427	0.132	24	AGM
IMU-UNT1-C-MH2-CTD-2	AFAC212B	C	MH2	3	2	124.616	8.407	0.132	24	AGM
IMU-UNT1-C-MH2-CTD-3	AFAC213B	C	MH2	3	2	127.151	8.429	0.132	24	AWT/LWB
IMU-UNT1-C-MH2-CTD-4	AFAC214B	C	MH2	3	2	138.003	8.825	0.132	24	LAT/AWB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	144.133	8.472
0.0056	136.330	8.248
0.0056	120.487	7.713
0.0057	138.610	8.459
0.0057	140.994	8.720
0.0057	137.554	8.496
0.0056	128.460	7.812
0.0057	134.310	8.148
0.0056	134.205	8.073
0.0056	119.576	7.889
0.0056	121.384	8.051
0.0056	124.447	8.198
0.0055	124.131	8.300
0.0055	130.419	8.188
0.0055	127.968	8.446
0.0055	124.333	8.388
0.0055	127.151	8.429
0.0055	138.003	8.825

Average 128.549 8.137
 Standard Dev. 6.765 0.318
 Coeff. of Var. [%] 5.262 3.905
 Min. 117.880 7.587
 Max. 140.307 8.825
 Number of Spec. 18 18

Average_{norm} 0.0056 130.694 8.270
 Standard Dev._{norm} 7.550 0.296
 Coeff. of Var. [%]_{norm} 5.777 3.577
 Min. 0.0055 119.576 7.713
 Max. 0.0057 144.133 8.825
 Number of Spec. 18 18



Laminate Unnotched Tension Properties (UNT1) -- (RTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

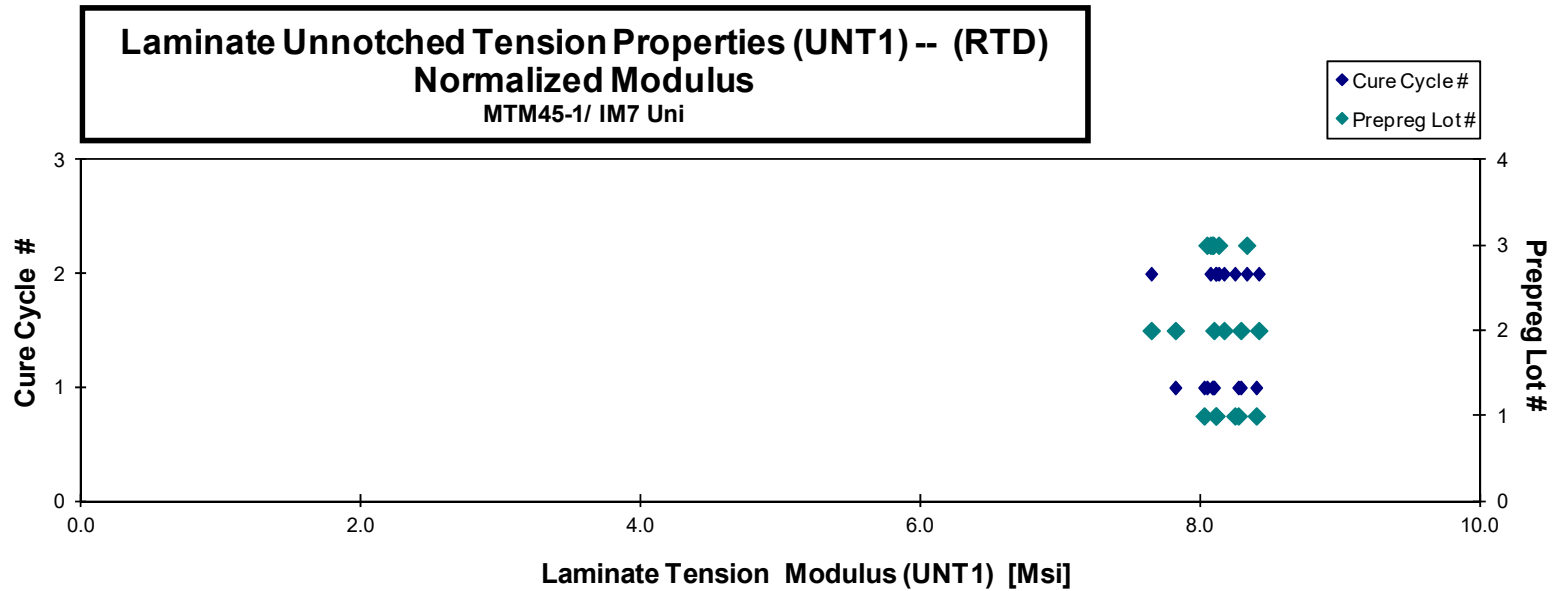
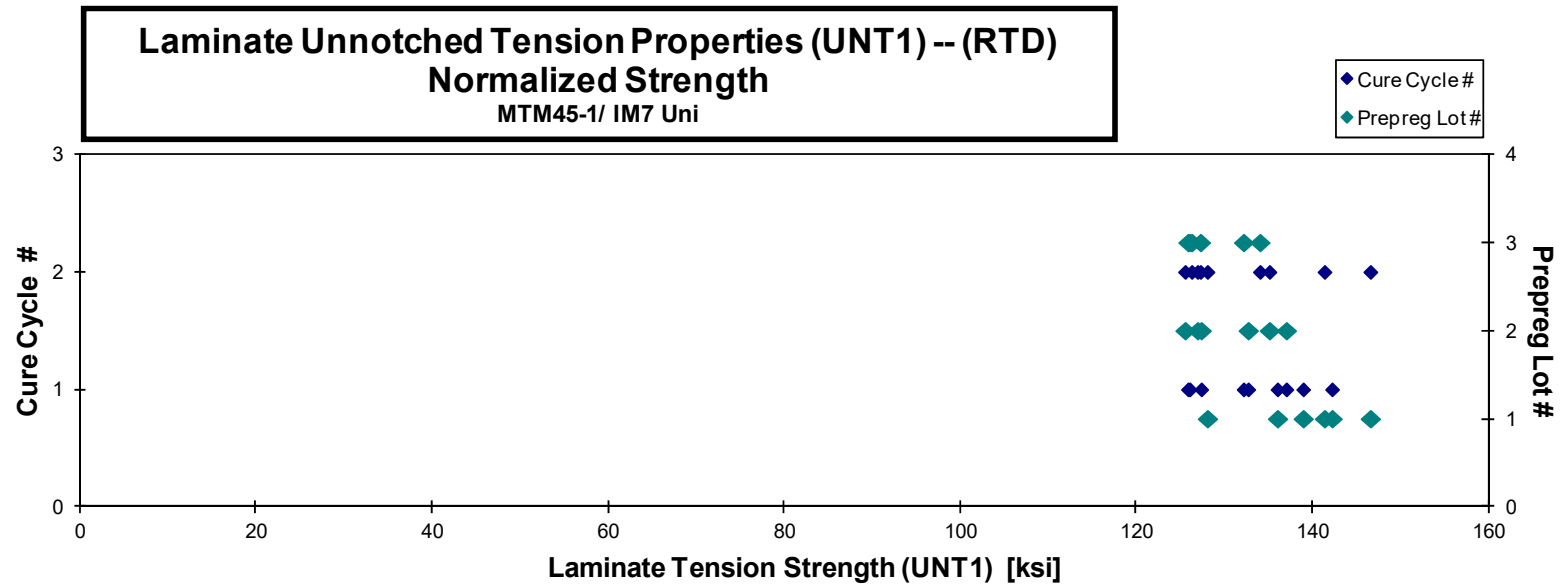
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNT1-A-MH1-RTD-2	AFAA112A	A	MH1	1	1	132.471	7.811	0.136	24	AGM
IMU-UNT1-A-MH1-RTD-3	AFAA113A	A	MH1	1	1	137.494	7.990	0.137	24	AGM
IMU-UNT1-A-MH1-RTD-4	AFAA114A	A	MH1	1	1	135.719	8.198	0.135	24	AGM
IMU-UNT1-A-MH2-RTD-2	AFAA212A	A	MH2	1	2	138.179	8.055	0.135	24	LWT / LWB / DGM
IMU-UNT1-A-MH2-RTD-3	AFAA213A	A	MH2	1	2	124.451	7.874	0.136	24	AGM
IMU-UNT1-A-MH2-RTD-4	AFAA214A	A	MH2	1	2	142.847	7.899	0.136	24	AGM / LWB
IMU-UNT1-B-MH1-RTD-2	AFAB112A	B	MH1	2	1	133.550	8.072	0.136	24	LWB/AGM
IMU-UNT1-B-MH1-RTD-3	AFAB113A	B	MH1	2	1	128.667	7.845	0.136	24	AGM/LGM
IMU-UNT1-B-MH1-RTD-4	AFAB114A	B	MH1	2	1	126.656	7.771	0.133	24	LWT/AGM
IMU-UNT1-B-MH2-RTD-2	AFAB212A	B	MH2	2	2	123.165	7.498	0.135	24	AGM/LGM
IMU-UNT1-B-MH2-RTD-3	AFAB213A	B	MH2	2	2	133.652	8.320	0.134	24	AGM/LWB
IMU-UNT1-B-MH2-RTD-4	AFAB214A	B	MH2	2	2	127.875	8.222	0.131	24	LWT/LWB
IMU-UNT1-C-MH1-RTD-2	AFAC112A	C	MH1	3	1	131.336	8.027	0.133	24	LWB/AGM
IMU-UNT1-C-MH1-RTD-3	AFAC113A	C	MH1	3	1	124.603	7.948	0.134	24	AGM
IMU-UNT1-C-MH1-RTD-4	AFAC114A	C	MH1	3	1	125.345	8.052	0.133	24	LWT/LWB
IMU-UNT1-C-MH2-RTD-1	AFAC211A	C	MH2	3	2	133.992	8.322	0.132	24	LAB/LWT
IMU-UNT1-C-MH2-RTD-2	AFAC212A	C	MH2	3	2	127.012	8.171	0.131	24	AGM/LAT/LAB
IMU-UNT1-C-MH2-RTD-3	AFAC213A	C	MH2	3	2	127.431	8.075	0.132	24	LWT/AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	136.084	8.024
0.0057	142.286	8.269
0.0056	139.009	8.397
0.0056	141.424	8.244
0.0057	128.127	8.107
0.0056	146.634	8.108
0.0056	137.091	8.286
0.0057	132.761	8.095
0.0055	127.423	7.818
0.0056	125.591	7.646
0.0056	135.171	8.415
0.0055	127.003	8.166
0.0055	132.232	8.082
0.0056	126.114	8.044
0.0055	125.915	8.089
0.0055	134.094	8.328
0.0055	126.338	8.128
0.0055	127.335	8.069

Average 130.803 8.008
 Standard Dev. 5.532 0.208
 Coeff. of Var. [%] 4.229 2.593
 Min. 123.165 7.498
 Max. 142.847 8.322
 Number of Spec. 18 18

Average_{norm} 0.0056 132.813 8.129
 Standard Dev._{norm} 6.558 0.189
 Coeff. of Var. [%]_{norm} 4.938 2.330
 Min. 0.0055 125.591 7.646
 Max. 0.0057 146.634 8.415
 Number of Spec. 18 18



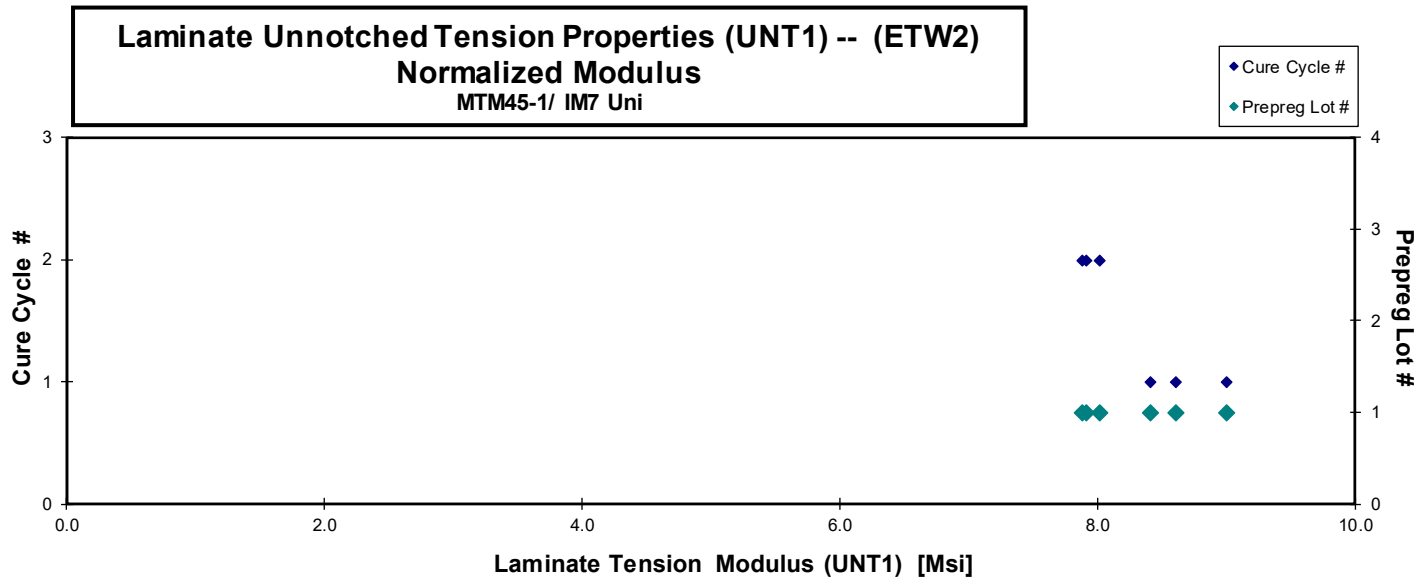
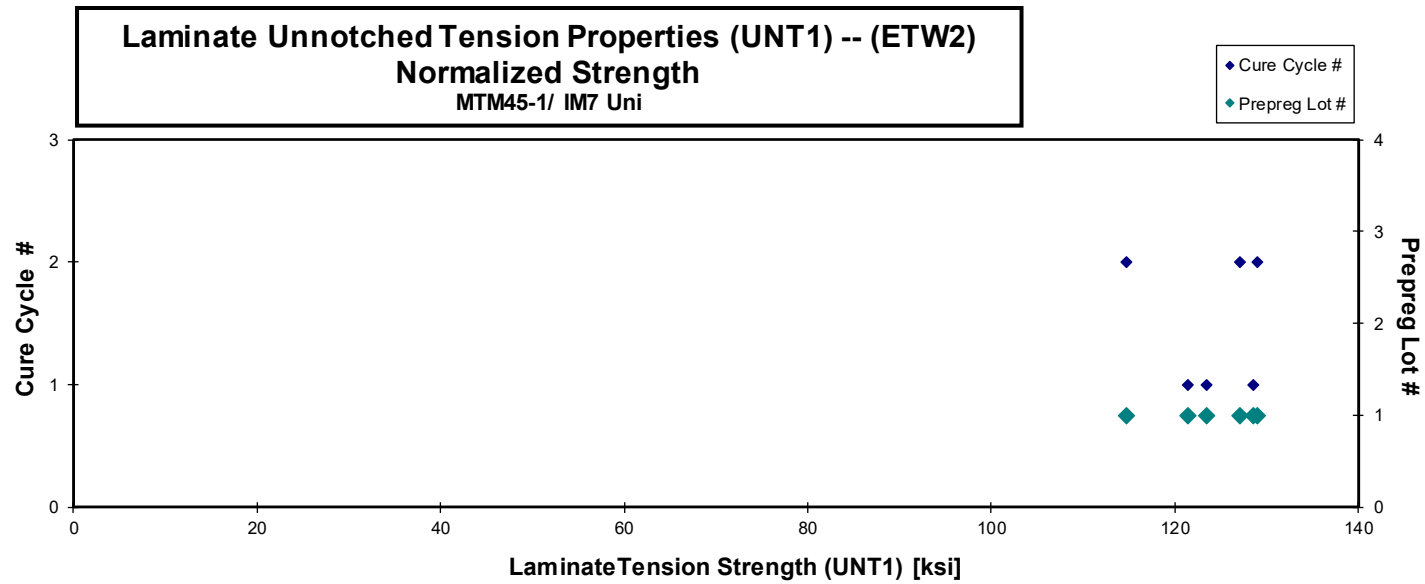
Laminate Unnotched Tension Properties (UNT1) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksj]	Modulus [Msj]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksj]	Modulus _{norm} [Msj]
IMU-UNT1-A-MH1-ETW2-1	AFAA111D	A	MH1	1	1	118.629	8.401	0.135	24	LWT / AGM	0.0056	121.550	8.608
IMU-UNT1-A-MH1-ETW2-2	AFAA112D	A	MH1	1	1	124.973	8.745	0.136	24	LWT / AGM	0.0057	128.665	9.003
IMU-UNT1-A-MH1-ETW2-3	AFAA113D	A	MH1	1	1	121.308	8.267	0.134	24	AGM	0.0056	123.498	8.416
IMU-UNT1-A-MH2-ETW2-2	AFAA212D	A	MH2	1	2	111.021	7.627	0.137	24	AGM	0.0057	114.848	7.890
IMU-UNT1-A-MH2-ETW2-3	AFAA213D	A	MH2	1	2	123.541	7.688	0.136	24	AWB/LWT	0.0057	127.144	7.912
IMU-UNT1-A-MH2-ETW2-4	AFAA214D	A	MH2	1	2	126.328	7.849	0.135	24	AGM / SLIP	0.0056	129.072	8.019

Average 120.967 8.096
 Standard Dev. 5.584 0.445
 Coeff. of Var. [%] 4.616 5.499
 Min. 111.021 7.627
 Max. 126.328 8.745
 Number of Spec. 6 6

Average_{norm} 0.0056 124.130 8.308
 Standard Dev._{norm} 5.427 0.447
 Coeff. of Var. [%]_{norm} 4.372 5.382
 Min. 0.0056 114.848 7.890
 Max. 0.0057 129.072 9.003
 Number of Spec. 6 6



4.8 “10/80/10” Unnotched Tension 2 Properties (UNT2)

Laminate Unnotched Tension Properties (UNT2) -- (CTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

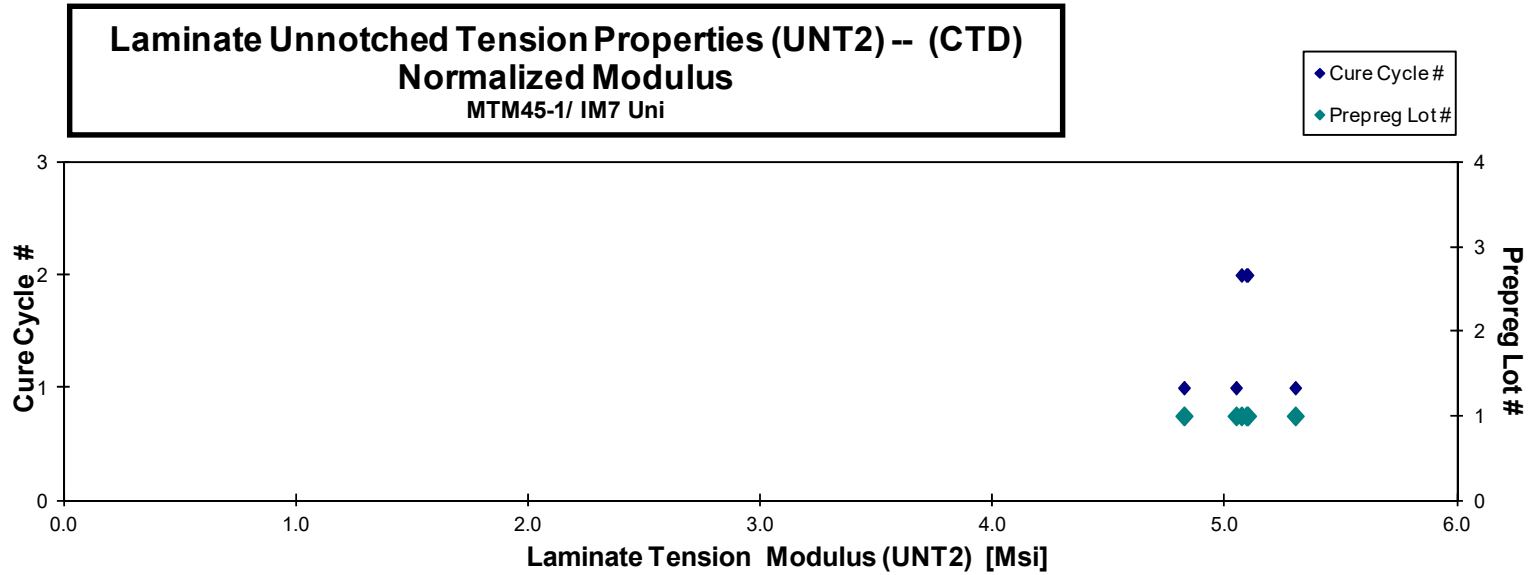
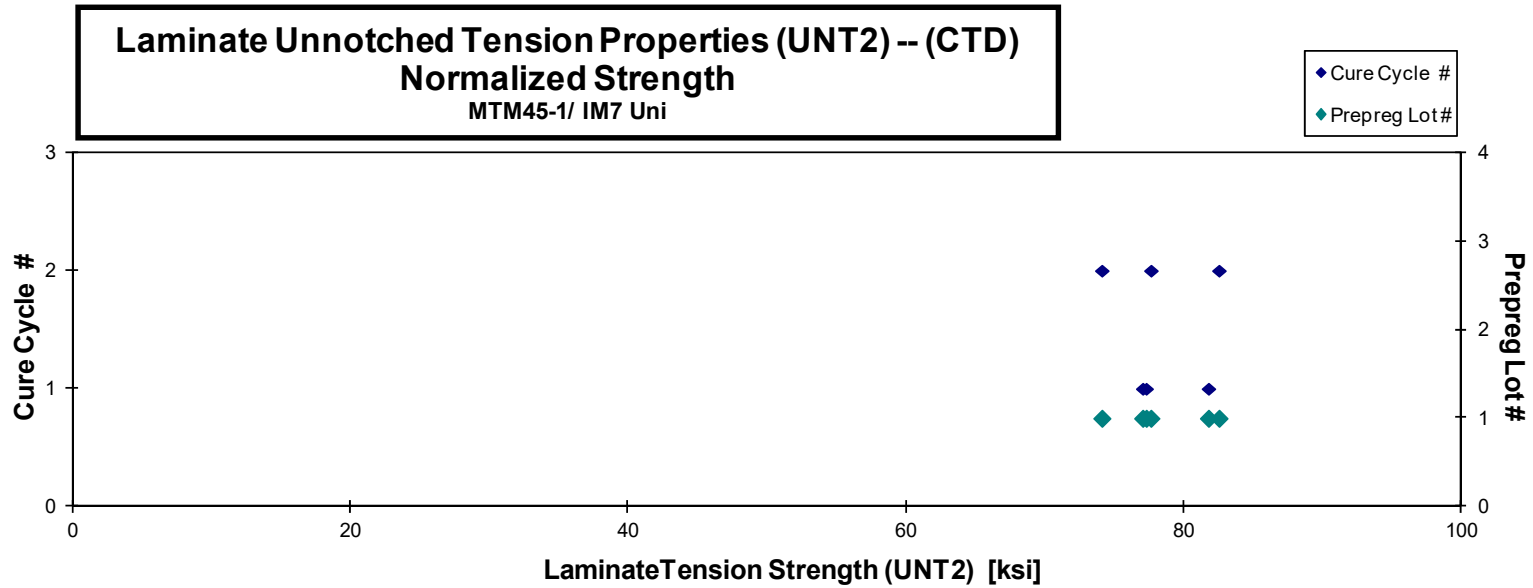
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNT2-A-MH1-CTD-2	AFBA112B	A	MH1	1	1	74.505	4.658	0.114	20	AGM
IMU-UNT2-A-MH1-CTD-3	AFBA113B	A	MH1	1	1	74.353	4.850	0.114	20	AGM
IMU-UNT2-A-MH1-CTD-4	AFBA114B	A	MH1	1	1	79.219	5.131	0.114	20	DWB
IMU-UNT2-A-MH2-CTD-2	AFBA212B	A	MH2	1	2	79.739	4.893	0.114	20	AWT
IMU-UNT2-A-MH2-CTD-3	AFBA213B	A	MH2	1	2	71.975	4.940	0.113	20	AWT
IMU-UNT2-A-MH2-CTD-4	AFBA214B	A	MH2	1	2	75.607	4.958	0.113	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	77.078	4.819
0.0057	77.327	5.043
0.0057	81.811	5.298
0.0057	82.566	5.066
0.0057	74.134	5.088
0.0057	77.669	5.093

Average 75.900 4.905
 Standard Dev. 3.019 0.154
 Coeff. of Var. [%] 3.978 3.144
 Min. 71.975 4.658
 Max. 79.739 5.131
 Number of Spec. 6 6

Average_{norm} 0.0057 78.431 5.068
 Standard Dev._{norm} 3.182 0.153
 Coeff. of Var. [%]_{norm} 4.057 3.013
 Min. 0.0057 74.134 4.819
 Max. 0.0057 82.566 5.298
 Number of Spec. 6 6



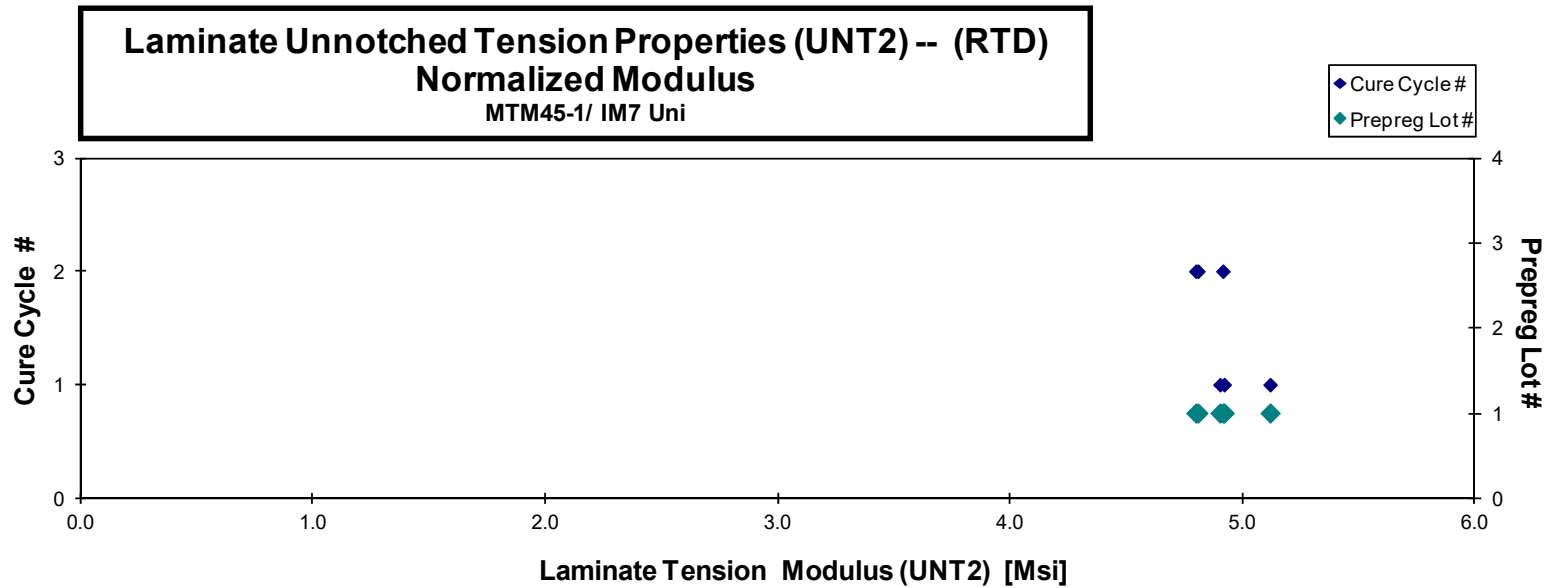
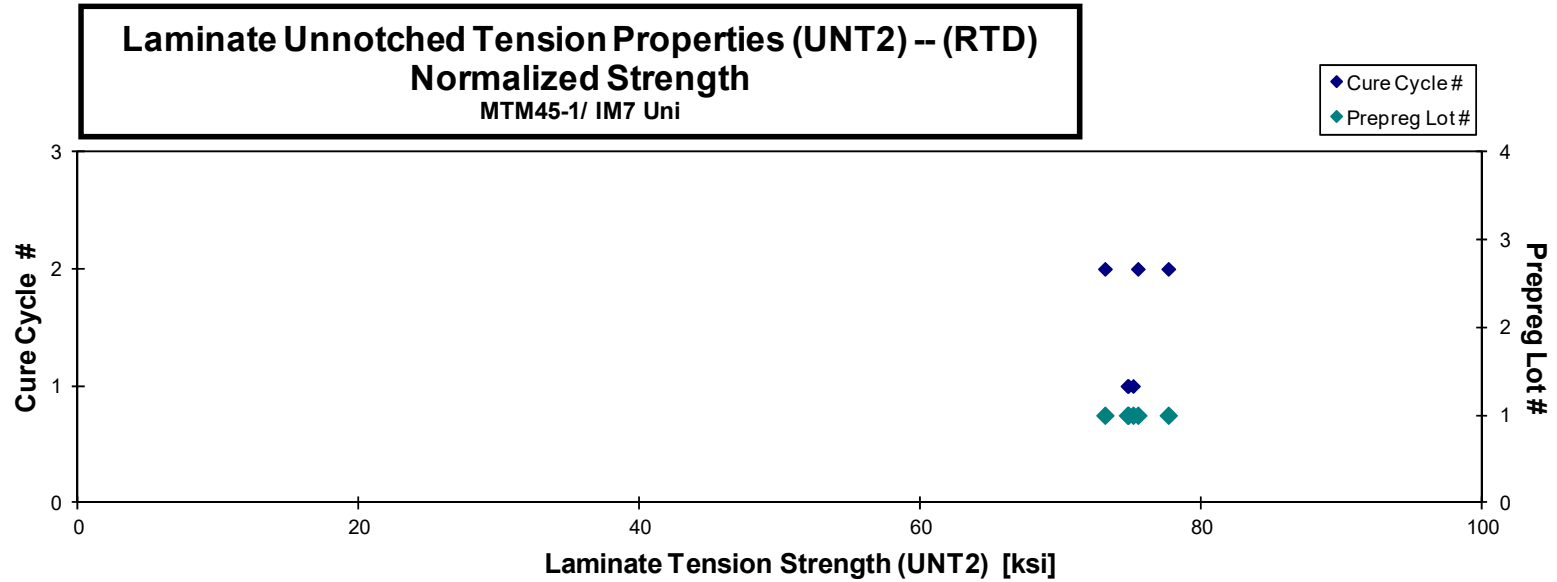
Laminate Unnotched Tension Properties (UNT2) -- (RTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksj]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksj]	Modulus _{norm} [Msi]
IMU-UNT2-A-MH1-RTD-2	AFBA112A	A	MH1	1	1	72.388	4.768	0.114	20	DGM	0.0057	74.757	4.924
IMU-UNT2-A-MH1-RTD-3	AFBA113A	A	MH1	1	1	72.588	4.767	0.113	20	DGM	0.0057	74.700	4.906
IMU-UNT2-A-MH1-RTD-4	AFBA114A	A	MH1	1	1	73.360	5.003	0.113	20	DGM	0.0056	75.094	5.121
IMU-UNT2-A-MH2-RTD-2	AFBA212A	A	MH2	1	2	71.659	4.708	0.112	20	DGM	0.0056	73.092	4.802
IMU-UNT2-A-MH2-RTD-3	AFBA213A	A	MH2	1	2	73.047	4.763	0.114	20	DGM	0.0057	75.438	4.918
IMU-UNT2-A-MH2-RTD-4	AFBA214A	A	MH2	1	2	75.277	4.667	0.113	20	DGM	0.0057	77.604	4.811

Average 73.053 4.779
Standard Dev. 1.237 0.117
Coeff. of Var. [%] 1.693 2.449
Min. 71.659 4.667
Max. 75.277 5.003
Number of Spec. 6 6

Average_{norm} 0.0057 75.114 4.914
Standard Dev._{norm} 1.462 0.115
Coeff. of Var. [%]_{norm} 1.947 2.346
Min. 0.0056 73.092 4.802
Max. 0.0057 77.604 5.121
Number of Spec. 6 6



Laminate Unnotched Tension Properties (UNT2) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

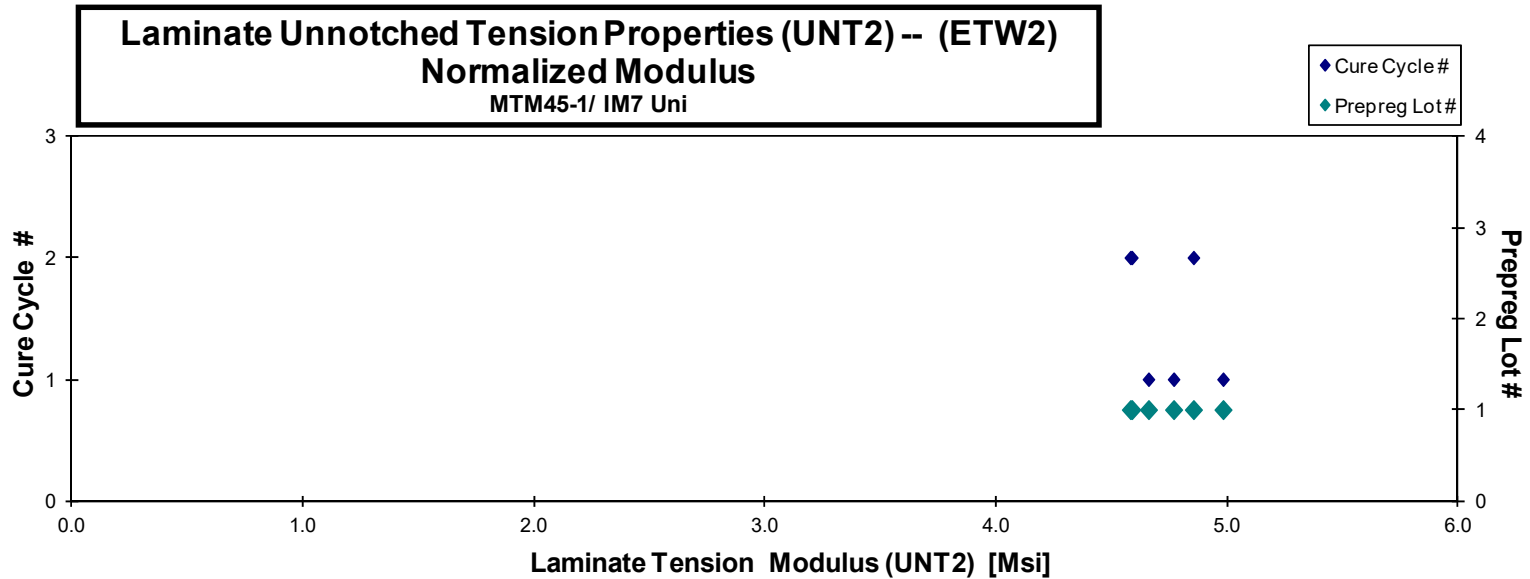
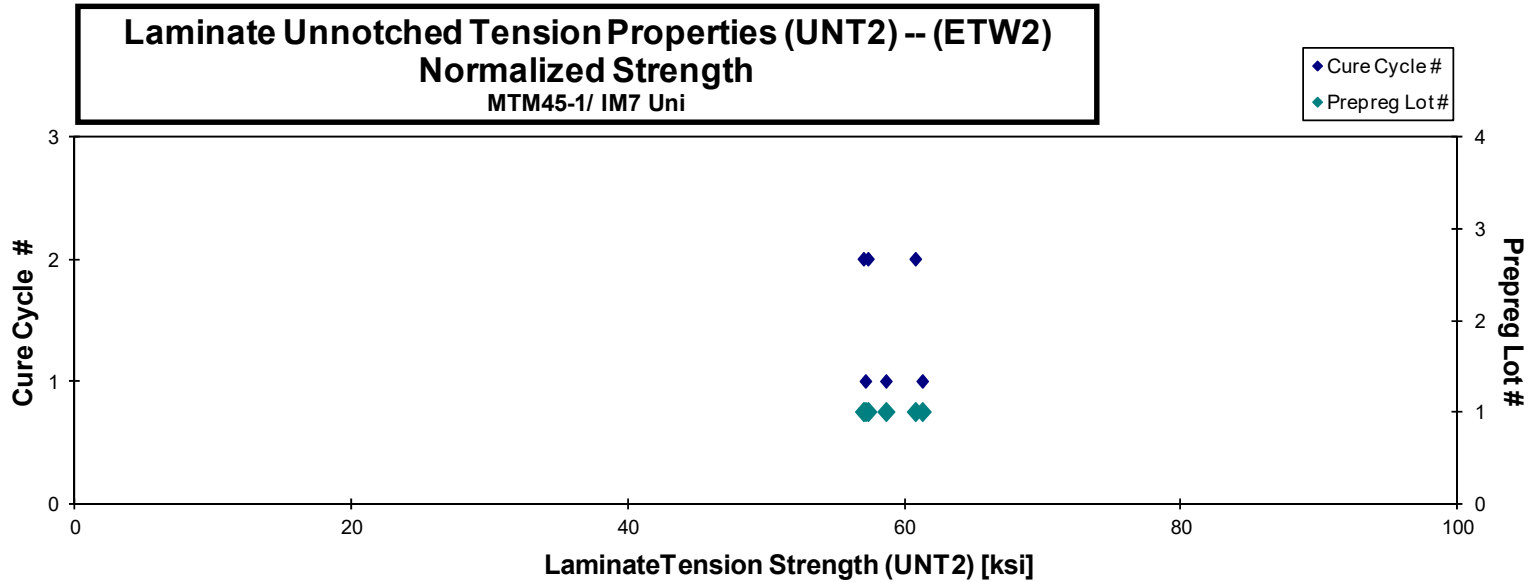
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNT2-A-MH1-ETW2-2	AFBA112D	A	MH1	1	1	56.444	4.602	0.111	20	DGM
IMU-UNT2-A-MH1-ETW2-3	AFBA113D	A	MH1	1	1	56.822	4.621	0.113	20	DGM
IMU-UNT2-A-MH1-ETW2-4	AFBA114D	A	MH1	1	1	60.141	4.891	0.112	20	DGM
IMU-UNT2-A-MH2-ETW2-1	AFBA211D	A	MH2	1	2	55.894	4.466	0.113	20	DGM
IMU-UNT2-A-MH2-ETW2-2	AFBA212D	A	MH2	1	2	55.295	4.449	0.113	20	DGM
IMU-UNT2-A-MH2-ETW2-4	AFBA214D	A	MH2	1	2	59.850	4.781	0.112	20	DGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0056	57.102	4.655
0.0057	58.587	4.764
0.0056	61.216	4.978
0.0056	57.283	4.577
0.0057	56.962	4.583
0.0056	60.712	4.850

Average 57.407 4.635
 Standard Dev. 2.072 0.174
 Coeff. of Var. [%] 3.609 3.750
 Min. 55.295 4.449
 Max. 60.141 4.891
 Number of Spec. 6 6

Average_{norm} 0.0056 58.643 4.735
 Standard Dev._{norm} 1.895 0.160
 Coeff. of Var. [%]_{norm} 3.231 3.372
 Min. 0.0056 56.962 4.577
 Max. 0.0057 61.216 4.978
 Number of Spec. 6 6



4.9 “50/40/10” Unnotched Tension 3 Properties (UNT3)

Laminate Unnotched Tension Properties (UNT3) -- (CTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

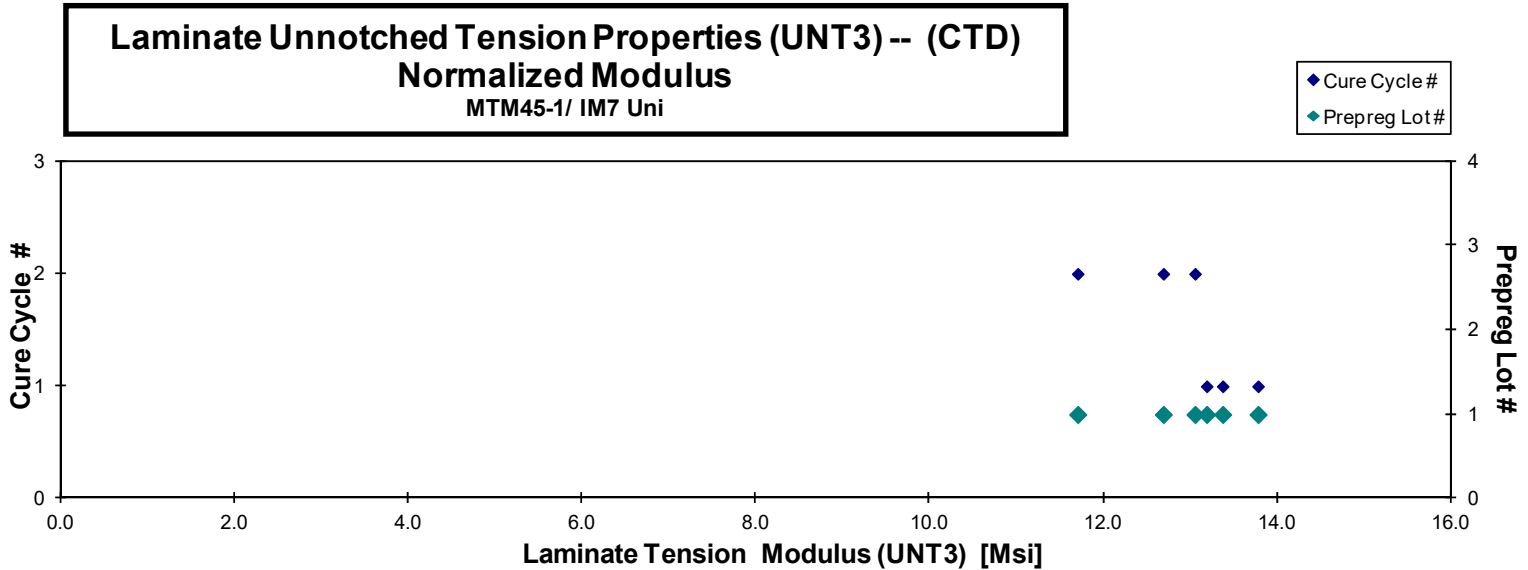
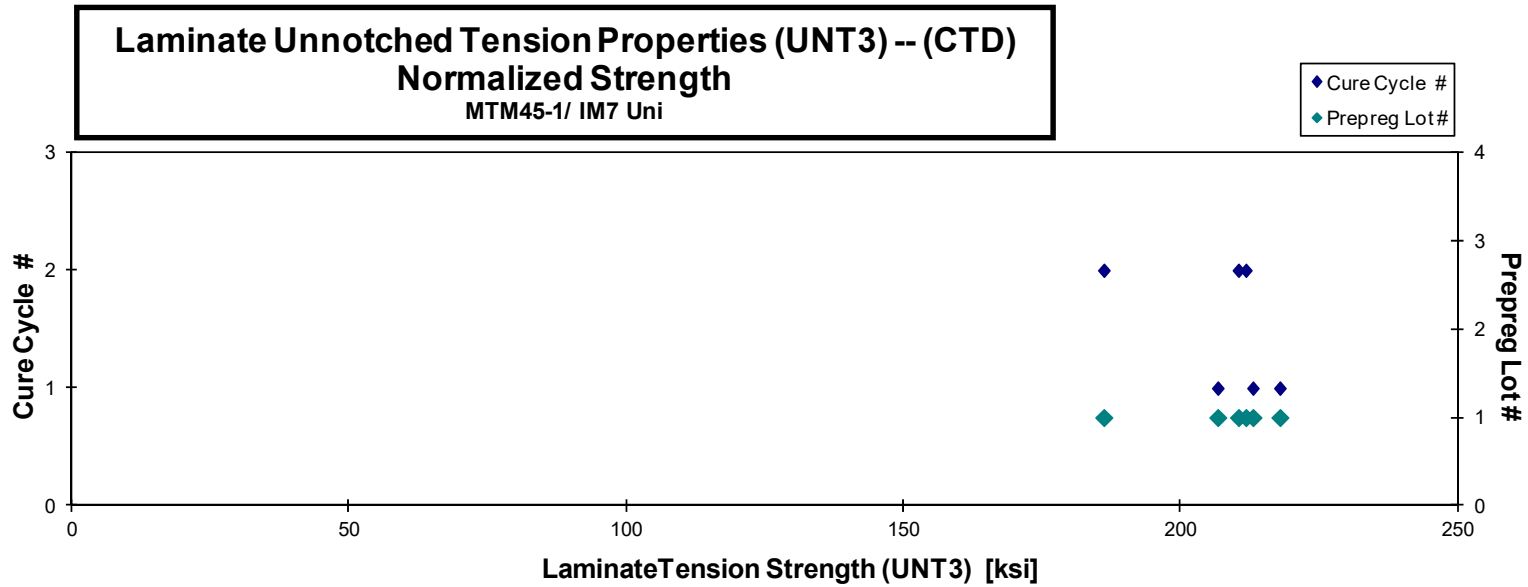
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNT3-A-MH1-CTD-2	AFCA112B	A	MH1	1	1	211.814	13.398	0.113	20	LAT / AWB
IMU-UNT3-A-MH1-CTD-3	AFCA113B	A	MH1	1	1	202.085	12.688	0.116	20	LAT / LWB
IMU-UNT3-A-MH1-CTD-4	AFCA114B	A	MH1	1	1	198.288	12.654	0.115	20	LWT / DGM
IMU-UNT3-A-MH2-CTD-2	AFCA212B	A	MH2	1	2	204.585	12.261	0.114	20	LWT / LWB
IMU-UNT3-A-MH2-CTD-3	AFCA213B	A	MH2	1	2	182.870	11.501	0.112	20	LAT
IMU-UNT3-A-MH2-CTD-4	AFCA214B	A	MH2	1	2	206.185	12.793	0.112	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	217.784	13.776
0.0058	212.924	13.369
0.0057	206.580	13.183
0.0057	211.653	12.685
0.0056	186.029	11.700
0.0056	210.309	13.049

Average 200.971 12.549
 Standard Dev. 9.939 0.631
 Coeff. of Var. [%] 4.945 5.030
 Min. 182.870 11.501
 Max. 211.814 13.398
 Number of Spec. 6 6

Average_{norm} 0.0057 207.546 12.960
 Standard Dev._{norm} 11.155 0.715
 Coeff. of Var. [%]_{norm} 5.375 5.515
 Min. 0.0056 186.029 11.700
 Max. 0.0058 217.784 13.776
 Number of Spec. 6 6



Laminate Unnotched Tension Properties (UNT3) -- (RTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

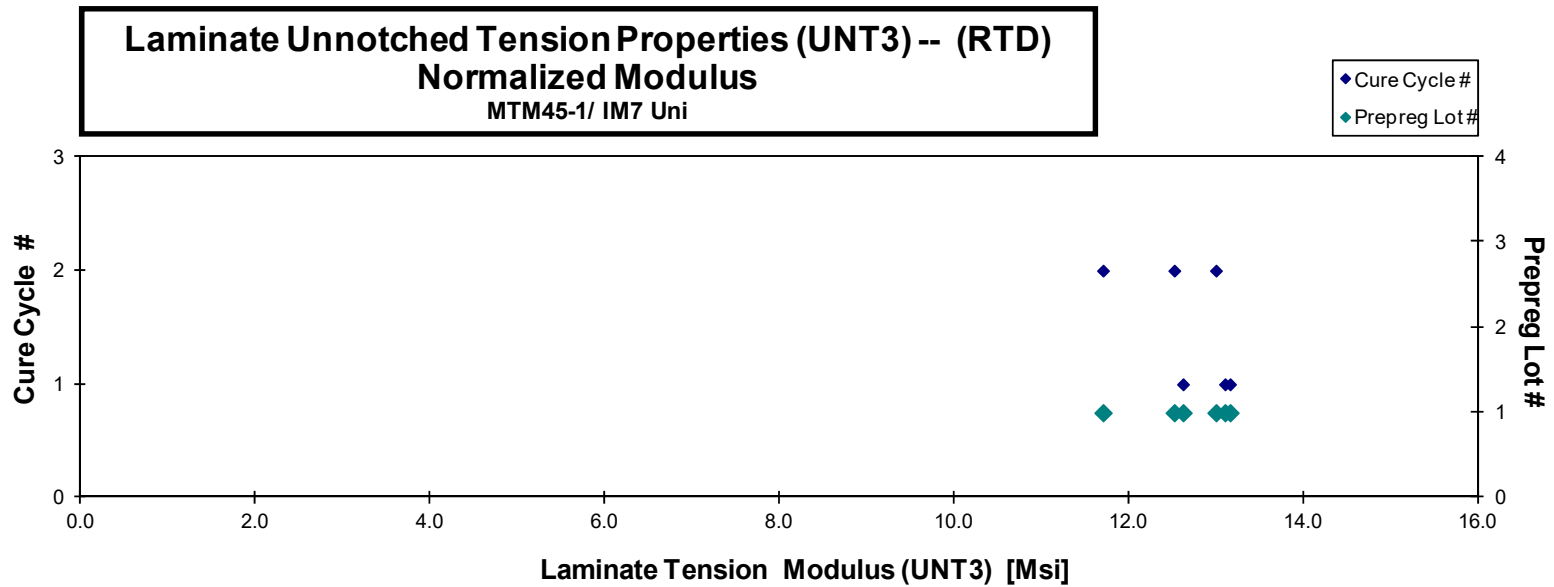
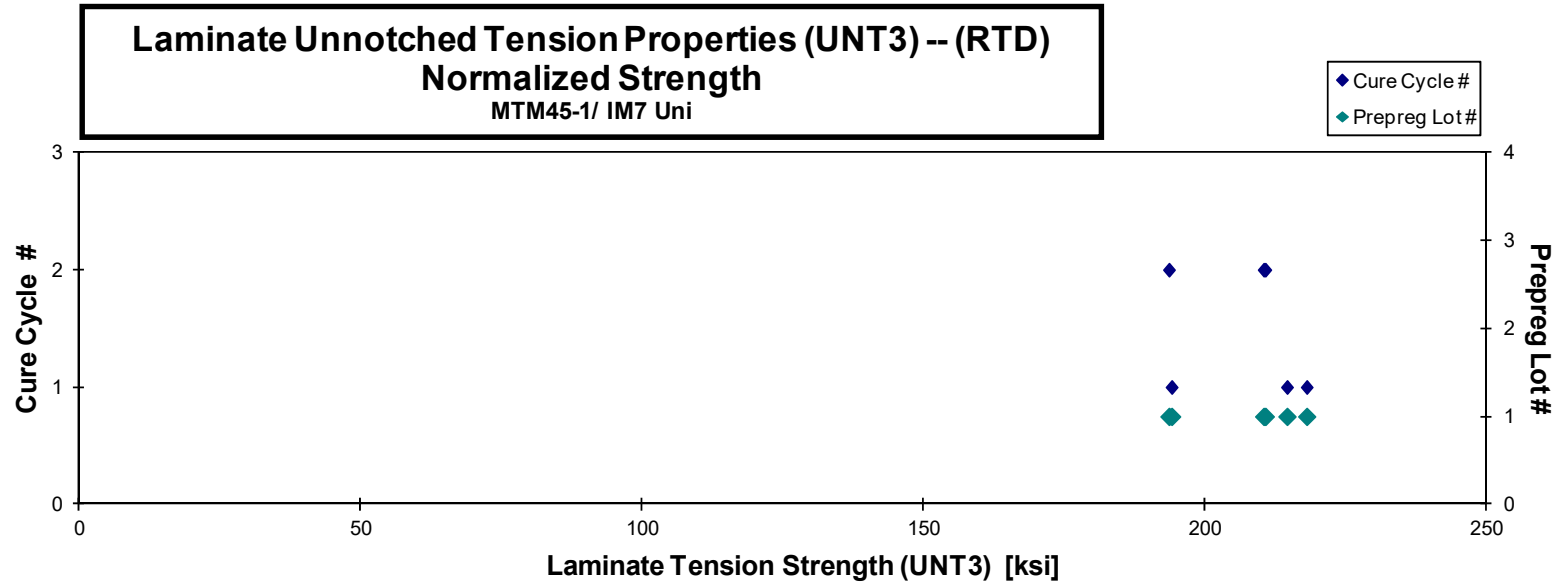
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	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]
IMU-UNT3-A-MH1-RTD-2	AFCA112A	A	MH1	1	1	190.344	12.382	0.112	20	LAT / LWB	0.0056	193.978	12.618
IMU-UNT3-A-MH1-RTD-3*	AFCA113A	A	MH1	1	1	213.130	12.808	0.113	20	LAT / LWB	0.0056	217.974	13.099
IMU-UNT3-A-MH1-RTD-4	AFCA114A	A	MH1	1	1	203.556	12.487	0.116	20	LAT / LWB	0.0058	214.474	13.157
IMU-UNT3-A-MH2-RTD-2*	AFCA212A	A	MH2	1	2	204.121	12.132	0.114	20	LAT / LWB	0.0057	210.615	12.518
IMU-UNT3-A-MH2-RTD-3*	AFCA213A	A	MH2	1	2	201.889	12.474	0.115	20	LAT / LAB	0.0057	210.332	12.996
IMU-UNT3-A-MH2-RTD-4	AFCA214A	A	MH2	1	2	185.898	11.242	0.115	20	LAT / LWB	0.0057	193.503	11.702

*Specimen slipped during testing.

Average	199.823	12.254
Standard Dev.	9.975	0.541
Coeff. of Var. [%]	4.992	4.417
Min.	185.898	11.242
Max.	213.130	12.808
Number of Spec.	6	6

Average _{norm}	0.0057	206.813	12.682
Standard Dev. _{norm}		10.507	0.546
Coeff. of Var. [%] _{norm}		5.081	4.304
Min.	0.0056	193.503	11.702
Max.	0.0058	217.974	13.157
Number of Spec.		6	6



Laminate Unnotched Tension Properties (UNT3) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

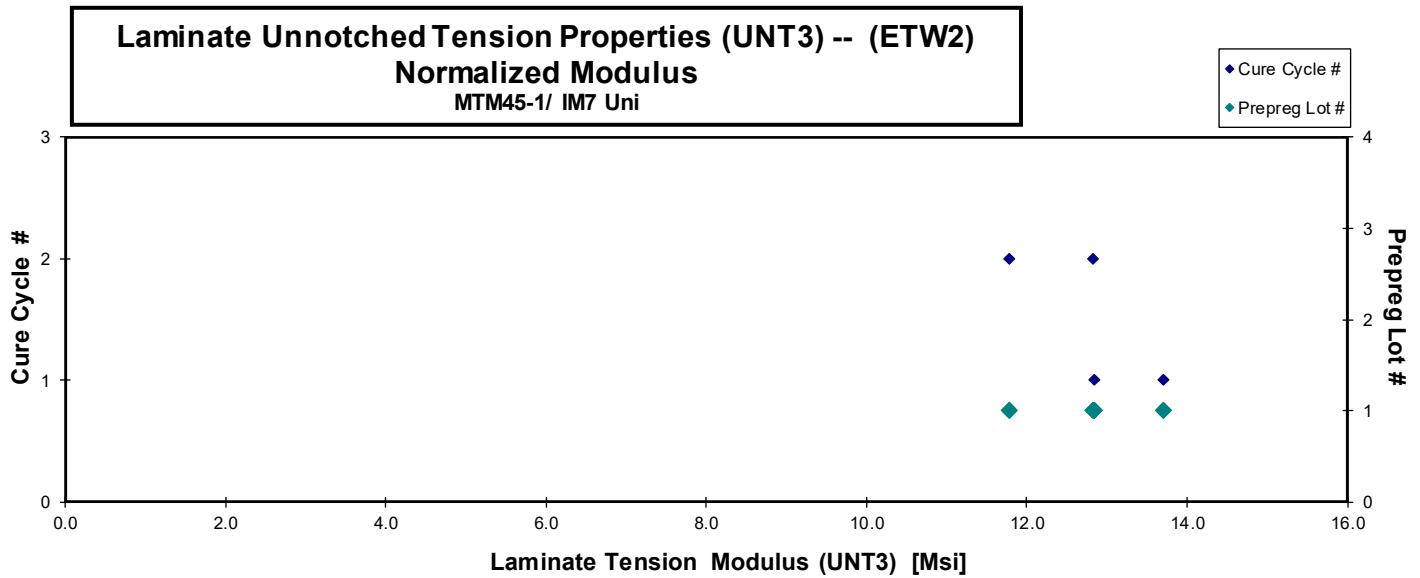
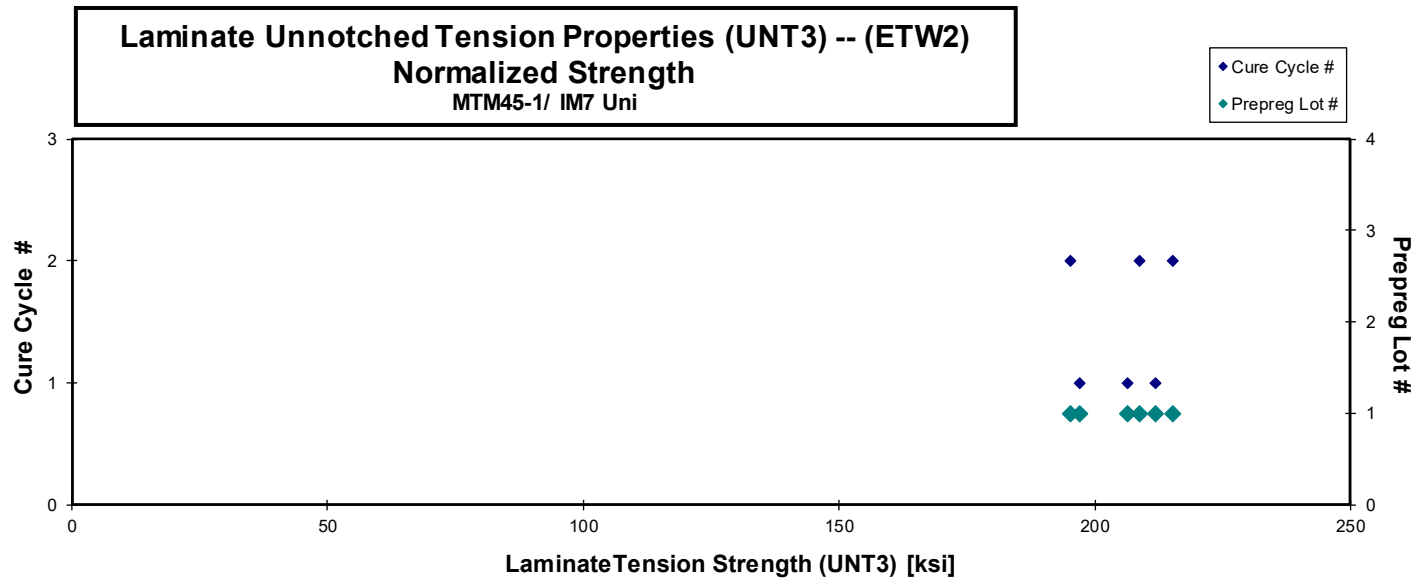
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	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]
IMU-UNT3-A-MH1-ETW2-2	AFCA112D	A	MH1	1	1	202.405	12.594	0.112	20	DGM/AWT	0.0056	206.269	12.834
IMU-UNT3-A-MH1-ETW2-3	AFCA113D	A	MH1	1	1	190.363	13.231	0.114	20	LWT/AWB/DGM	0.0057	197.083	13.698
IMU-UNT3-A-MH1-ETW2-4	AFCA114D	A	MH1	1	1	201.763	*	0.116	20	DGM/AWT/LAB	0.0058	211.942	
IMU-UNT3-A-MH2-ETW2-1	AFCA211D	A	MH2	1	2	205.636	12.244	0.115	20	DGM	0.0058	215.263	12.817
IMU-UNT3-A-MH2-ETW2-3	AFCA213D	A	MH2	1	2	188.083	11.347	0.114	20	DGM	0.0057	195.179	11.775
IMU-UNT3-A-MH2-ETW2-4	AFCA214D	A	MH2	1	2	204.110	*	0.112	20	DGM/LAB	0.0056	208.594	

* Modulus is omitted due to strain gage malfunction and recommended by CMH-17 data review working group.

Average	198.726	12.354
Standard Dev.	7.519	0.786
Coeff. of Var. [%]	3.784	6.361
Min.	188.083	11.347
Max.	205.636	13.231
Number of Spec.	6	4

Average _{norm}	0.0057	205.722	12.781
Standard Dev. _{norm}		8.051	0.787
Coeff. of Var. [%] _{norm}		3.913	6.156
Min.	0.0056	195.179	11.775
Max.	0.0058	215.263	13.698
Number of Spec.		6	4



4.10 “50/0/50” Unnotched Compression 0 Properties (UNC0)

Laminate Unnotched Compression Properties (UNC0) -- (CTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle Batch #	Strength [ksj]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNC0-A-MH1-CTD-1**	AFRA111B	A	MH1	1	1			0.033	0.089	16	END CRUSH
IMU-UNC0-A-MH1-CTD-2	AFRA112B	A	MH1	1	1	110.449	11.825	0.043	0.091	16	HAT
IMU-UNC0-A-MH1-CTD-3	AFRA113B	A	MH1	1	1	107.124	10.047	0.014	0.089	16	HAB
IMU-UNC0-A-MH1-CTD-4	AFRA114B	A	MH1	1	1	123.782	10.690	0.043	0.090	16	HGM
IMU-UNC0-A-MH2-CTD-1**	AFRA211B	A	MH2	1	2			0.038	0.091	16	END BLOOM
IMU-UNC0-A-MH2-CTD-2*	AFRA212B	A	MH2	1	2	121.178	12.439	0.047	0.091	16	HAB
IMU-UNC0-A-MH2-CTD-3	AFRA213B	A	MH2	1	2	112.432	12.698	0.058	0.092	16	HAB
IMU-UNC0-A-MH2-CTD-4	AFRA214B	A	MH2	1	2	97.973	10.586	0.029	0.090	16	HAB
IMU-UNC0-B-MH1-CTD-1**	AFRB111B	B	MH1	2	1			***	0.091	16	END BLOOM
IMU-UNC0-B-MH1-CTD-2	AFRB112B	B	MH1	2	1	109.265	9.712	0.040	0.090	16	HAB
IMU-UNC0-B-MH1-CTD-3	AFRB113B	B	MH1	2	1	118.862	11.437	0.055	0.091	16	BAT
IMU-UNC0-B-MH1-CTD-4	AFRB114B	B	MH1	2	1	103.082	12.474	0.122	0.093	16	BAT
IMU-UNC0-B-MH1-CTD-R3	AFRB123B	B	MH1	2	1	131.535	11.097	0.047	0.090	16	BAB

Avg. t_{ply} [in]	Strength _{norm} [ksj]	Modulus _{norm} [Msi]
0.0056		
0.0057	113.963	12.201
0.0055	107.854	10.116
0.0057	127.158	10.982
0.0057		
0.0057	125.309	12.863
0.0057	117.287	13.246
0.0057	100.645	10.875
0.0057		
0.0056	111.128	9.877
0.0057	122.374	11.775
0.0058	108.353	13.112
0.0056	134.001	11.305

*Modulus is taken from 1000-2400 microstrain.

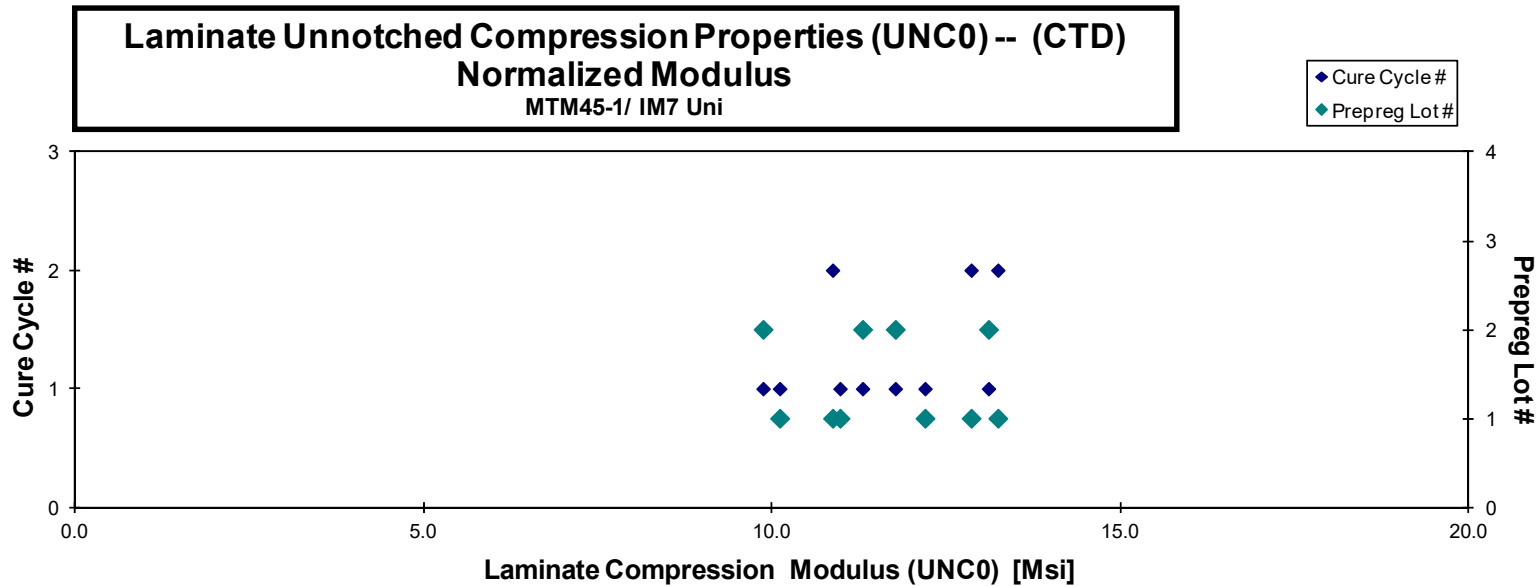
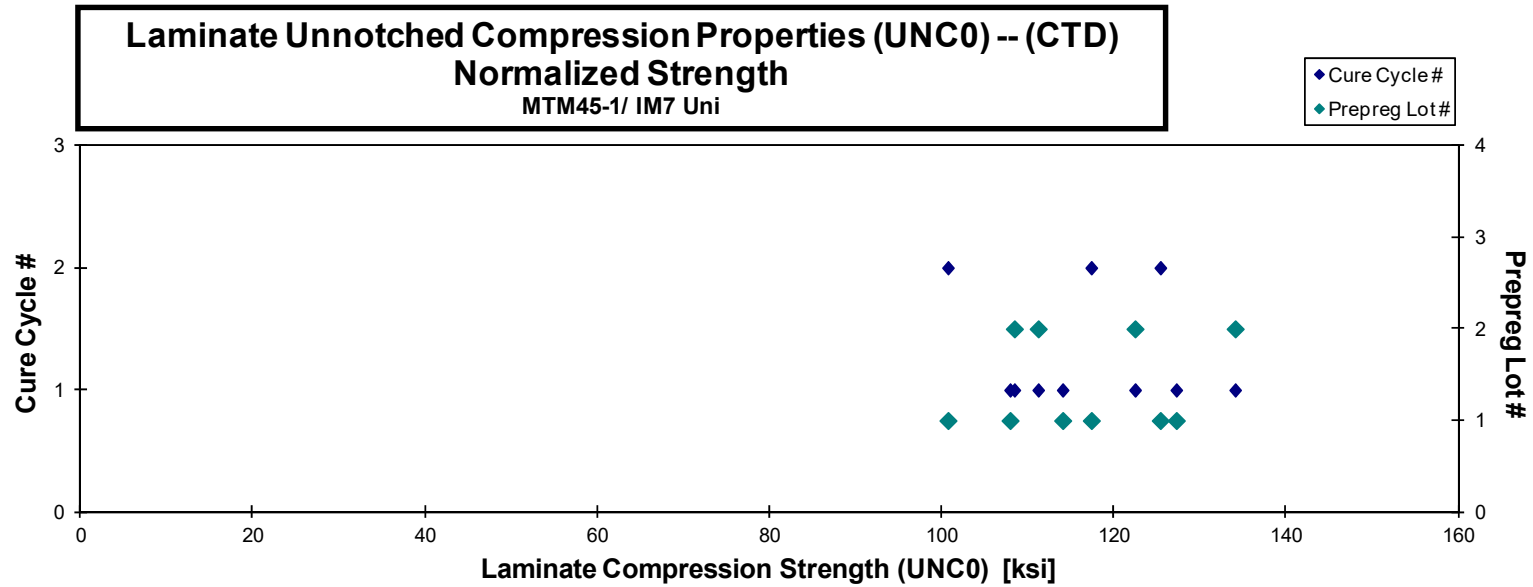
**Compressive strength is not reported due to bad failure.

***Poisson's ratio is not reported due to strain gauge failed prematurely.

Batch B cure cycle 2 and Batch C cure cycle 1 & 2 - Data is not reported due to incorrect panel layup.

Average	113.568	11.301	0.047
Standard Dev.	10.205	1.051	0.026
Coeff. of Var. [%]	8.986	9.300	55.657
Min.	97.973	9.712	0.014
Max.	131.535	12.698	0.122
Number of Spec.	10	10	12

Average _{norm}	0.0057	116.807	11.635
Standard Dev. _{norm}		10.325	1.208
Coeff. of Var. [%] _{norm}		8.839	10.384
Min.	0.0055	100.645	9.877
Max.	0.0058	134.001	13.246
Number of Spec.		10	10



**Laminate Unnotched Compression Properties (UNC0) -- (RTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Naming	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
IMU-UNC0-A-MH1-RTD-1	AFRA111A	A	MH1	1	1	103.112	11.148	0.041	0.091	16	HAB
IMU-UNC0-A-MH1-RTD-2	AFRA112A	A	MH1	1	1	90.810	11.861	0.043	0.091	16	BAT
IMU-UNC0-A-MH1-RTD-3*	AFRA113A	A	MH1	1	1	82.155	10.899	0.035	0.089	16	HAT
IMU-UNC0-A-MH1-RTD-4**	AFRA114A	A	MH1	1	1			0.036	0.091	16	HIT
IMU-UNC0-A-MH2-RTD-2	AFRA212A	A	MH2	1	2	100.154	9.880	0.032	0.091	16	BAB
IMU-UNC0-A-MH2-RTD-3	AFRA213A	A	MH2	1	2	92.882	10.726	0.037	0.089	16	BAB
IMU-UNC0-A-MH2-RTD-4	AFRA214A	A	MH2	1	2	95.378	9.759	0.041	0.092	16	BAB
IMU-UNC0-B-MH1-RTD-1	AFRB111A	B	MH1	2	1	101.468	11.433	0.044	0.090	16	BAT
IMU-UNC0-B-MH1-RTD-2**	AFRB112A	B	MH1	2	1			0.048	0.090	16	HIB
IMU-UNC0-B-MH1-RTD-3	AFRB113A	B	MH1	2	1	108.426	10.707	0.041	0.093	16	BAB
IMU-UNC0-B-MH1-RTD-4**	AFRB114A	B	MH1	2	1			0.045	0.088	16	HIB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	106.041	11.465
0.0057	93.700	12.238
0.0055	82.622	10.961
0.0057		
0.0057	103.340	10.194
0.0055	93.621	10.811
0.0057	99.280	10.158
0.0057	104.236	11.745
0.0056		
0.0058	114.340	11.291
0.0055		

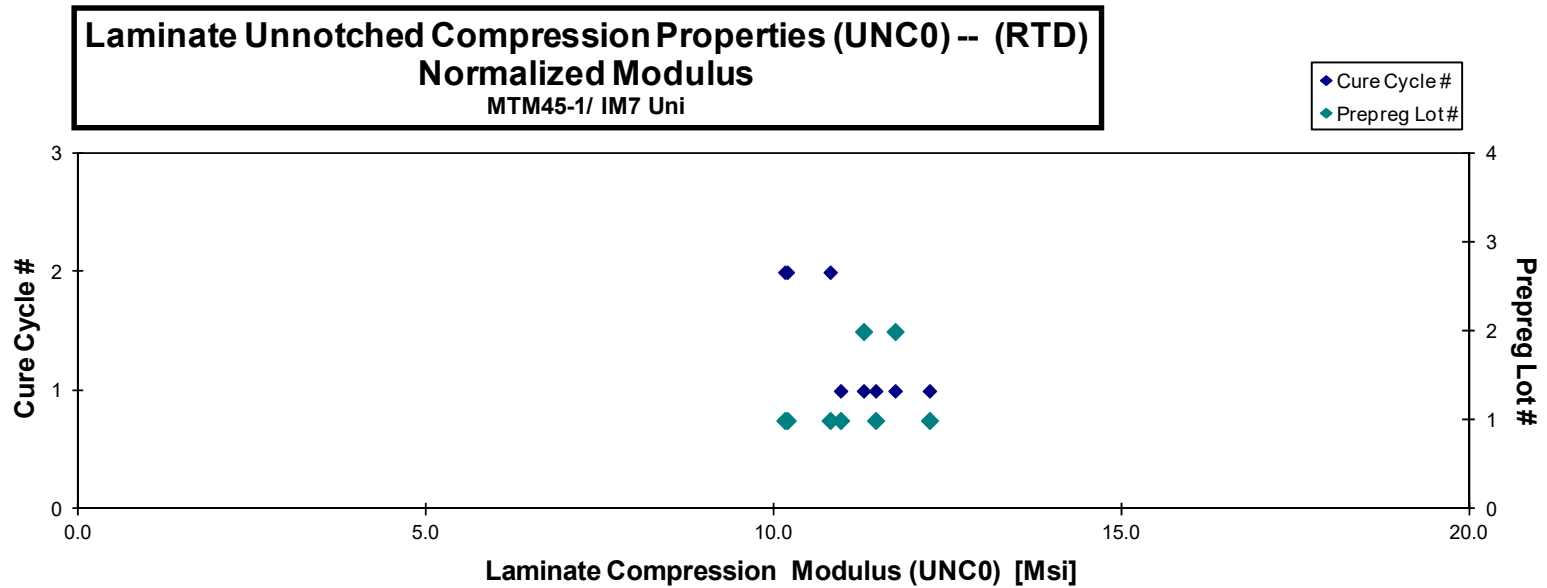
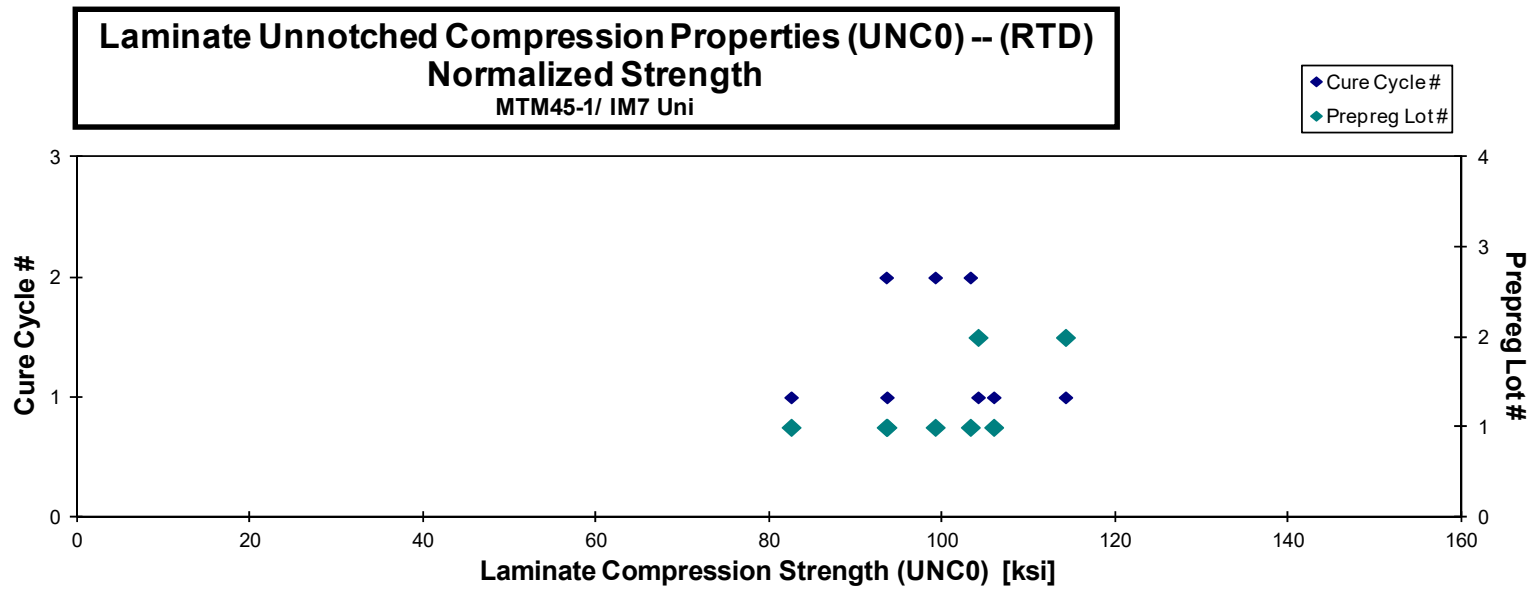
*Modulus is taken from 1000-2400 microstrain.

**Compressive strength is not reported due to bad failure.

Batch B cure cycle 2 and Batch C cure cycle 1 & 2 - Data is not reported due to incorrect panel layout.

Average	96.798	10.802	0.040
Standard Dev.	8.244	0.717	0.005
Coeff. of Var. [%]	8.517	6.641	12.096
Min.	82.155	9.759	0.032
Max.	108.426	11.861	0.048
Number of Spec.	8	8	11

Average _{norm}	0.0056	99.647	11.108
Standard Dev. _{norm}		9.660	0.726
Coeff. of Var. [%] _{norm}		9.694	6.537
Min.	0.0055	82.622	10.158
Max.	0.0058	114.340	12.238
Number of Spec.		8	8



**Laminate Unnotched Compression Properties (UNC0) -- (ETD)
Strength & Modulus
MTM45-1/ IM7 Uni**

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Naming	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
IMU-UNC0-A-MH1-ETD-1	AFRA111C	A	MH1	1	1	85.861	10.265	0.038	0.091	16	HAT
IMU-UNC0-A-MH1-ETD-2*	AFRA112C	A	MH1	1	1	95.858	11.496	0.035	0.091	16	HAT
IMU-UNC0-A-MH1-ETD-3**	AFRA113C	A	MH1	1	1	11.641	0.033	0.033	0.090	16	END BLOOM
IMU-UNC0-A-MH1-ETD-4	AFRA114C	A	MH1	1	1	92.240	11.176	0.042	0.090	16	HAT
IMU-UNC0-A-MH2-ETD-1	AFRA211C	A	MH2	1	2	89.545	11.372	0.038	0.091	16	HAT
IMU-UNC0-A-MH2-ETD-2**	AFRA212C	A	MH2	1	2	11.596	0.031	0.031	0.088	16	HIT
IMU-UNC0-A-MH2-ETD-3	AFRA213C	A	MH2	1	2	85.540	11.041	0.032	0.091	16	HAT
IMU-UNC0-A-MH2-ETD-4**	AFRA214C	A	MH2	1	2	9.592	0.041	0.041	0.090	16	HIT
IMU-UNC0-B-MH1-ETD-2	AFRB112C	B	MH1	2	1	93.606	10.253	0.041	0.089	16	HAT
IMU-UNC0-B-MH1-ETD-3	AFRB113C	B	MH1	2	1	81.830	11.720	0.049	0.091	16	HAB
IMU-UNC0-B-MH1-ETD-4	AFRB114C	B	MH1	2	1	77.880	10.602	0.046	0.091	16	HAB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	88.495	10.580
0.0057	98.908	11.862
0.0056		11.945
0.0056	94.022	11.392
0.0057	92.191	11.708
0.0055		11.583
0.0057	88.262	11.392
0.0056		9.777
0.0056	95.095	10.416
0.0057	84.154	12.053
0.0057	80.270	10.927

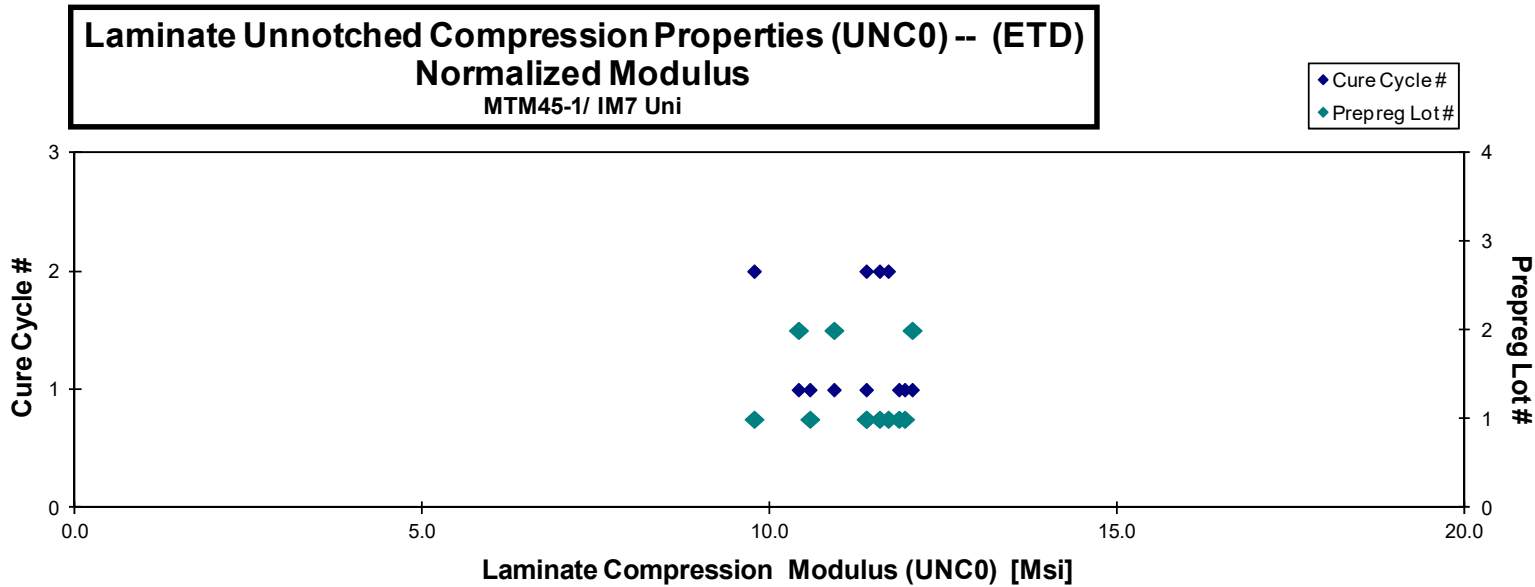
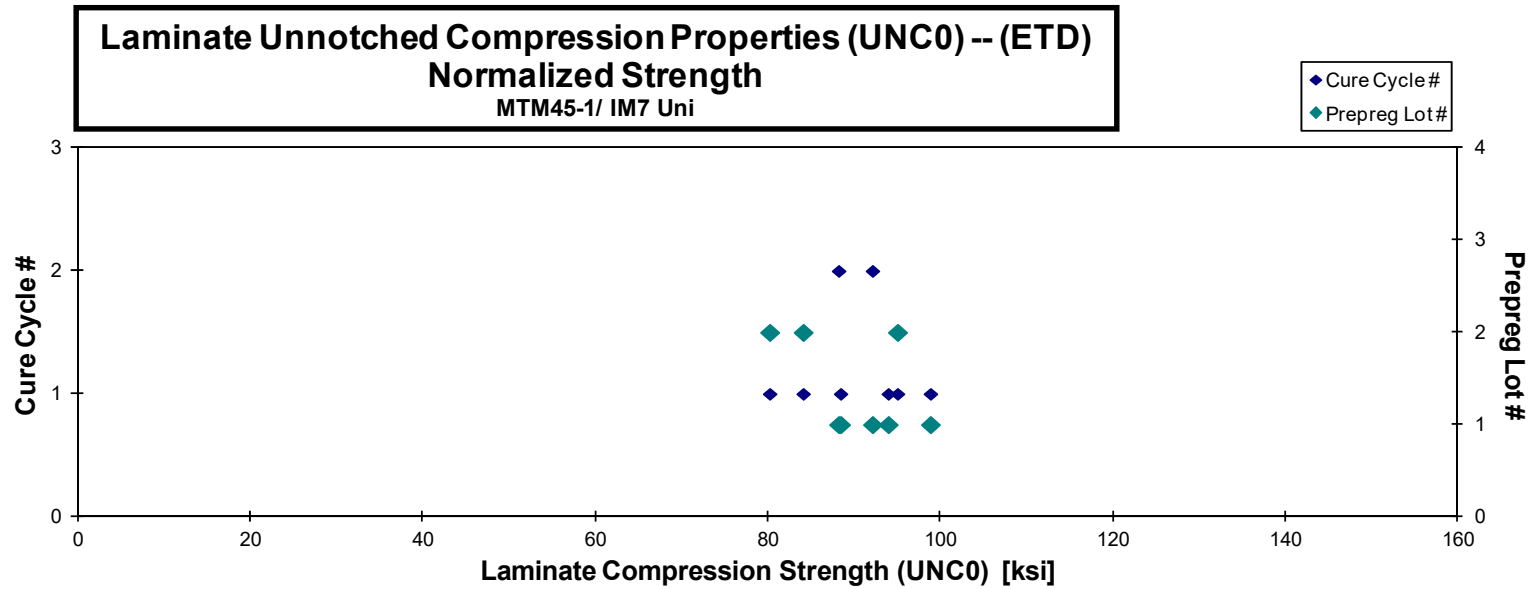
*Poisson's ratio is taken from 1800-3800 microstrain.

**Compressive strength is not reported due to bad failure.

Batch B cure cycle 2 and Batch C cure cycle 1 & 2 - Data is not reported due to incorrect panel layup.

Average	87.795	10.978	0.039
Standard Dev.	6.145	0.702	0.006
Coeff. of Var. [%]	6.999	6.399	15.063
Min.	77.880	9.592	0.031
Max.	95.858	11.720	0.049
Number of Spec.	8	11	11

Average _{norm}	0.0056	90.175	11.240
Standard Dev _{norm}		6.097	0.727
Coeff. of Var. [%] _{norm}		6.761	6.464
Min.	0.0055	80.270	9.777
Max.	0.0057	98.908	12.053
Number of Spec.		8	11



Laminate Unnotched Compression Properties (UNC0) -- (ETW)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Naming	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
IMU-UNC0-A-MH1-ETW-1**	AFRA111N	A	MH1	1	1		10.210	0.031	0.090	16	TIT
IMU-UNC0-A-MH1-ETW-2**	AFRA112N	A	MH1	1	1		10.800	0.038	0.092	16	END BLOOM
IMU-UNC0-A-MH1-ETW-3	AFRA113N	A	MH1	1	1	78.197	10.995	0.034	0.087	16	TAT
IMU-UNC0-A-MH1-ETW-4	AFRA114N	A	MH1	1	1	83.845	10.499	0.047	0.090	16	TAT
IMU-UNC0-A-MH2-ETW-1**	AFRA211N	A	MH2	1	2		10.541	0.033	0.091	16	TIT
IMU-UNC0-A-MH2-ETW-2	AFRA212N	A	MH2	1	2	86.502	10.762	0.038	0.090	16	BAB
IMU-UNC0-A-MH2-ETW-3**	AFRA213N	A	MH2	1	2		9.051	0.026	0.090	16	TIT
IMU-UNC0-A-MH2-ETW-4**	AFRA214N	A	MH2	1	2		12.095	0.040	0.090	16	END BLOOM
IMU-UNC0-B-MH1-ETW-1	AFRB111N	B	MH1	2	1	81.283	11.826	0.037	0.090	16	BAT
IMU-UNC0-B-MH1-ETW-2	AFRB112N	B	MH1	2	1	74.277	10.973	0.052	0.090	16	BAB
IMU-UNC0-B-MH1-ETW-3	AFRB113N	B	MH1	2	1	89.362	11.280	0.048	0.088	16	BAB
IMU-UNC0-B-MH1-ETW-4**	AFRB114N	B	MH1	2	1		9.895	0.045	0.087	16	BIB

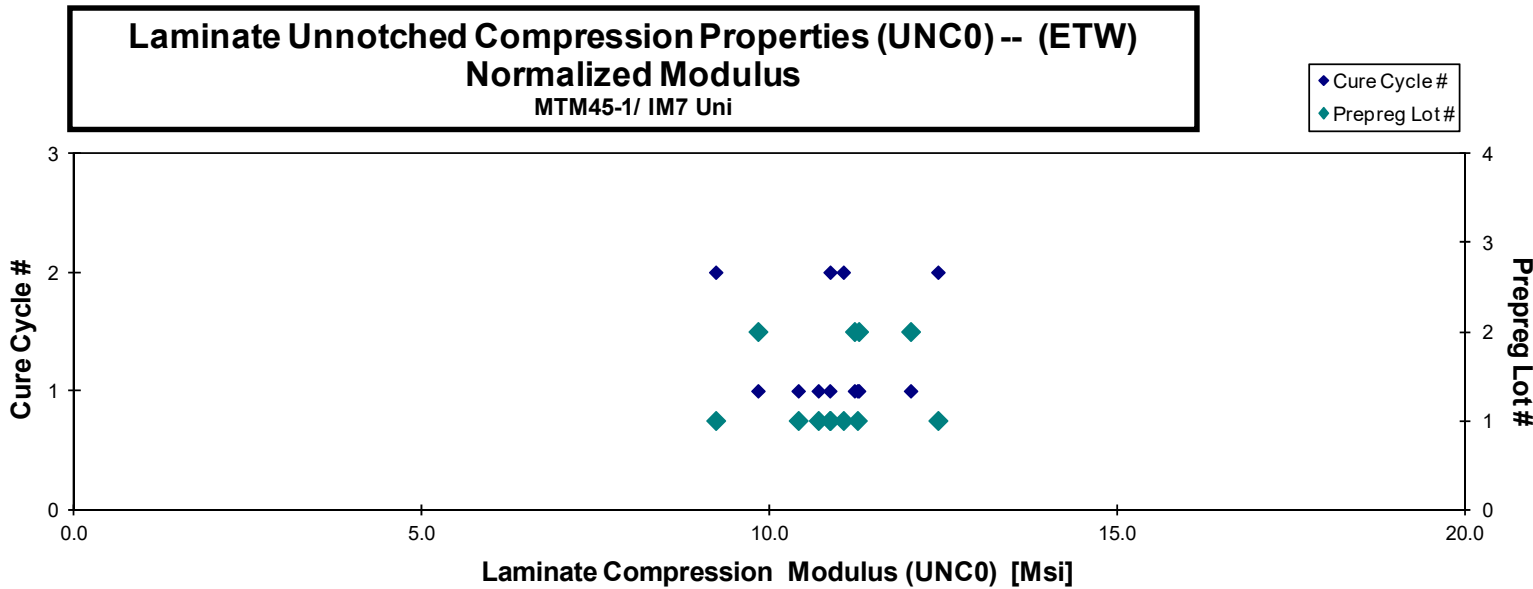
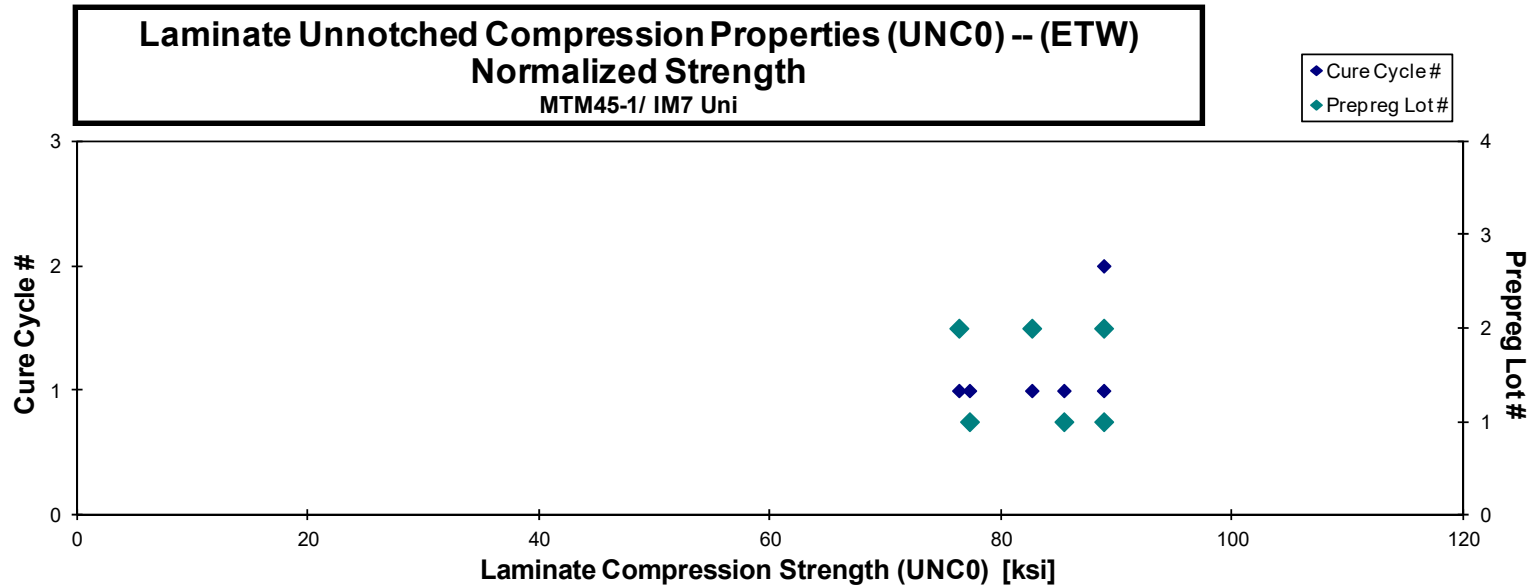
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0056		10.413
0.0057		11.264
0.0054	77.293	10.868
0.0056	85.465	10.702
0.0057		10.872
0.0057	88.911	11.062
0.0056		9.227
0.0056		12.423
0.0056	82.684	12.030
0.0057	76.373	11.283
0.0055	88.905	11.222
0.0055		9.835

**Compressive strength is not reported due to bad failure.

Batch B cure cycle 2 and Batch C cure cycle 1 & 2 - Data is not reported due to incorrect panel layup.

Average	82.244	10.744	0.039
Standard Dev.	5.516	0.819	0.008
Coeff. of Var. [%]	6.707	7.623	20.228
Min.	74.277	9.051	0.026
Max.	89.362	12.095	0.052
Number of Spec.	6	12	12

Average _{norm}	0.0056	83.272	10.933
Standard Dev. _{norm}		5.514	0.864
Coeff. of Var. [%] _{norm}		6.622	7.898
Min.	0.0054	76.373	9.227
Max.	0.0057	88.911	12.423
Number of Spec.		6	12



Laminate Unnotched Compression Properties (UNC0) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Naming	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
IMU-UNC0-A-MH1-ETW2-1	AFRA111D	A	MH1	1	1	73.440	10.072	0.031	0.090	16	HAT
MU-UNC0-A-MH1-ETW2-2*	AFRA112D	A	MH1	1	1	11.391	10.043	0.043	0.091	16	END BLOOM
IMU-UNC0-A-MH1-ETW2-3	AFRA113D	A	MH1	1	1	76.492	12.688	0.039	0.089	16	HAB
IMU-UNC0-A-MH1-ETW2-4	AFRA114D	A	MH1	1	1	76.908	10.670	0.038	0.089	16	TAB/HAB
IMU-UNC0-A-MH2-ETW2-2	AFRA212D	A	MH2	1	2	80.737	10.282	0.027	0.090	16	HAT
IMU-UNC0-A-MH2-ETW2-3	AFRA213D	A	MH2	1	2	84.618	11.426	0.029	0.090	16	HAT
IMU-UNC0-A-MH2-ETW2-4	AFRA214D	A	MH2	1	2	77.868	10.882	0.042	0.091	16	HAB
IMU-UNC0-B-MH1-ETW2-1	AFRB111D	B	MH1	2	1	60.627	11.362	0.041	0.087	16	HAB
IMU-UNC0-B-MH1-ETW2-2	AFRB112D	B	MH1	2	1	76.659	10.520	0.035	0.089	16	HAB
MU-UNC0-B-MH1-ETW2-3*	AFRB113D	B	MH1	2	1	11.444	10.034	0.034	0.087	16	HIT
IMU-UNC0-B-MH1-ETW2-4	AFRB114D	B	MH1	2	1	70.560	12.025	0.041	0.090	16	HAB

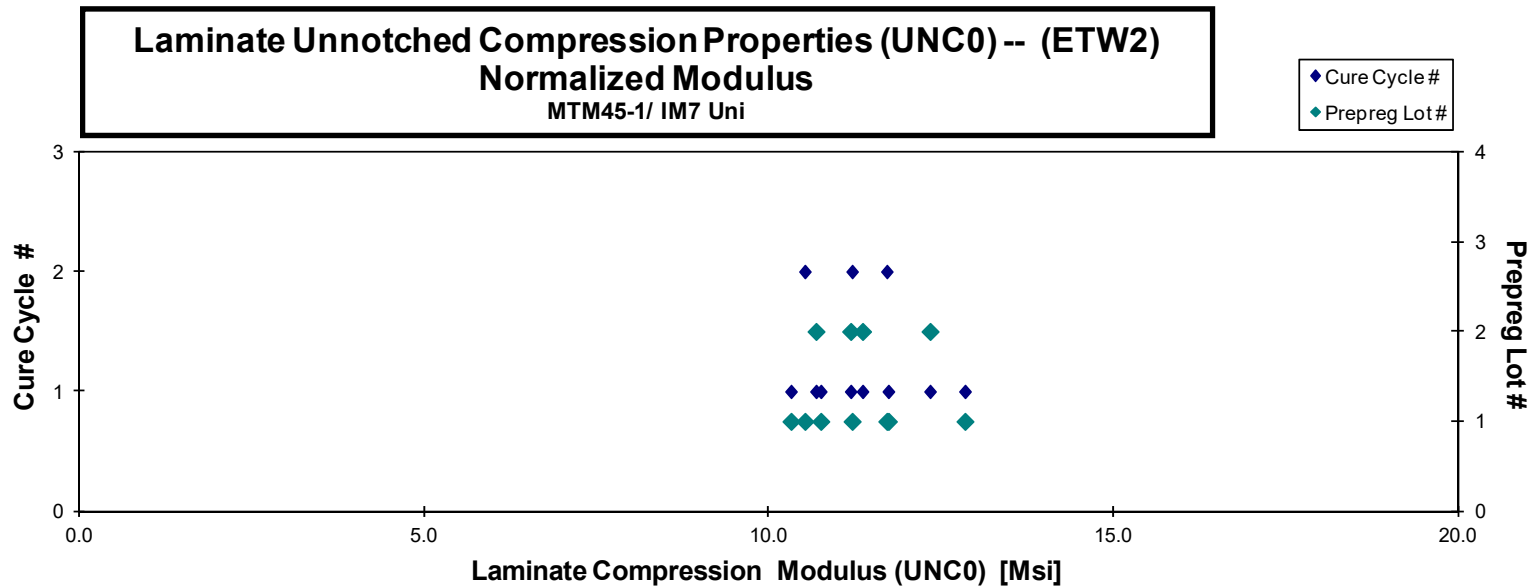
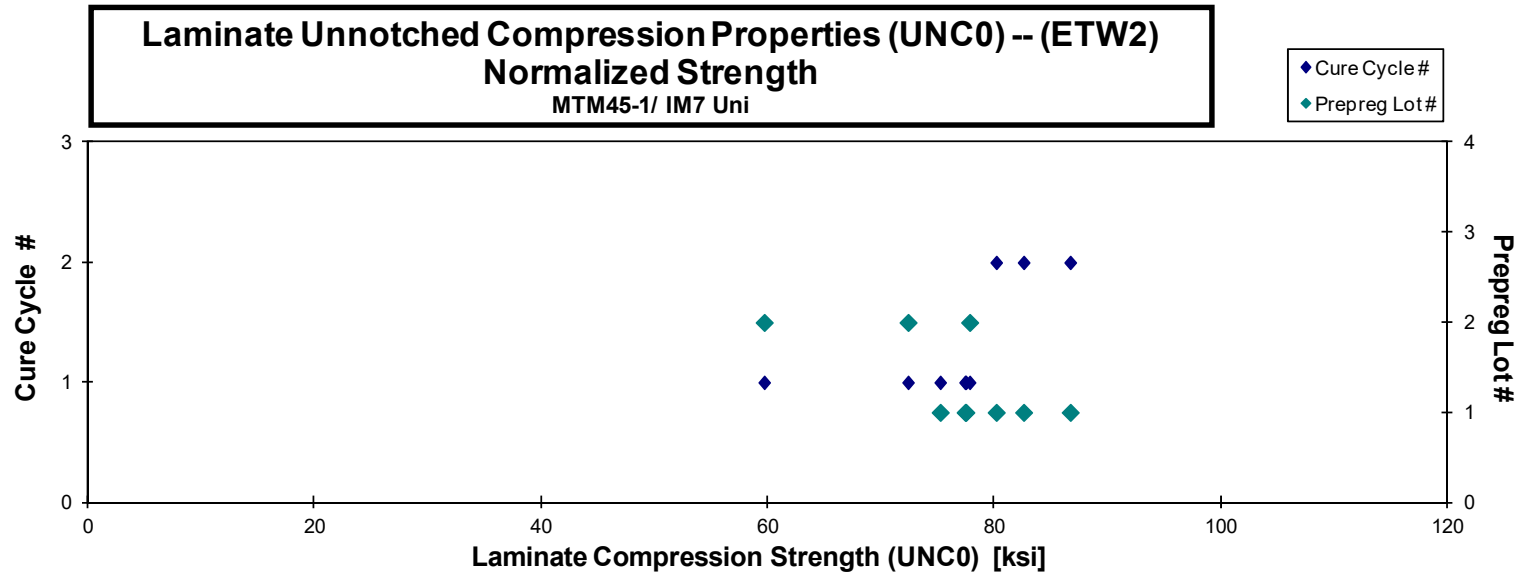
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0056	75.179	10.310
0.0057	11.723	11.723
0.0056	77.376	12.835
0.0055	77.432	10.743
0.0056	82.541	10.512
0.0056	86.654	11.701
0.0057	80.124	11.197
0.0054	59.639	11.177
0.0056	77.777	10.673
0.0055	11.349	11.349
0.0056	72.337	12.328

**Compressive strength is not reported due to unacceptable failure mode.

Batch B cure cycle 2 and Batch C cure cycle 1 & 2 - Data is not reported due to incorrect panel layout.

Average	75.323	11.160	0.036
Standard Dev.	6.801	0.775	0.006
Coeff. of Var. [%]	9.029	6.947	15.359
Min.	60.627	10.072	0.027
Max.	84.618	12.688	0.043
Number of Spec.	9	11	11

Average _{norm}	0.0056	76.562	11.323
Standard Dev _{norm}		7.577	0.780
Coeff. of Var. [%] _{norm}		9.897	6.885
Min.	0.0054	59.639	10.310
Max.	0.0057	86.654	12.835
Number of Spec.		9	11



4.11 “25/50/25” Unnotched Compression 1 Properties (UNC1)

**Laminate Unnotched Compression Properties (UNC1) -- (RTD)
Strength & Modulus
MTM45-1/ IM7 Uni**

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Naming	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
IMU-UNC1-A-MH1-RTD-1	AF0A111A	A	MH1	1	1	73.650	7.592	0.344	0.137	24	HGM
IMU-UNC1-A-MH1-RTD-2	AF0A112A	A	MH1	1	1	74.786	7.344	0.310	0.137	24	BAB
IMU-UNC1-A-MH1-RTD-3	AF0A113A	A	MH1	1	1	77.521	7.829	0.286	0.135	24	HGM
IMU-UNC1-B-MH1-RTD-1	AF0B111A	B	MH1	2	1	*	7.216	0.309	0.132	24	BGM / END BLOOM
IMU-UNC1-B-MH1-RTD-2	AF0B112A	B	MH1	2	1	80.869	7.314	0.341	0.132	24	TAT
IMU-UNC1-B-MH1-RTD-3	AF0B113A	B	MH1	2	1	84.514	7.904	0.336	0.133	24	BGM
IMU-UNC1-B-MH1-RTD-4	AF0B114A	B	MH1	2	1	82.672	7.466	0.297	0.133	24	TAT / BGM
IMU-UNC1-C-MH1-RTD-2	AF0C112A	C	MH1	3	1	82.754	7.597	0.346	0.133	24	BAB
IMU-UNC1-C-MH1-RTD-3	AF0C113A	C	MH1	3	1	84.970	7.525	0.323	0.132	24	BGM
IMU-UNC1-C-MH1-RTD-4	AF0C114A	C	MH1	3	1	83.379	7.438	0.322	0.132	24	BGM
IMU-UNC1-C-MH2-RTD-1	AF0C211A	C	MH2	3	2	79.872	7.528	0.259	0.132	24	BGM
IMU-UNC1-C-MH2-RTD-3	AF0C213A	C	MH2	3	2	80.193	7.540	0.173	0.132	24	BGM
IMU-UNC1-C-MH2-RTD-4	AF0C214A	C	MH2	3	2	77.696	7.512	0.155	0.133	24	HAB

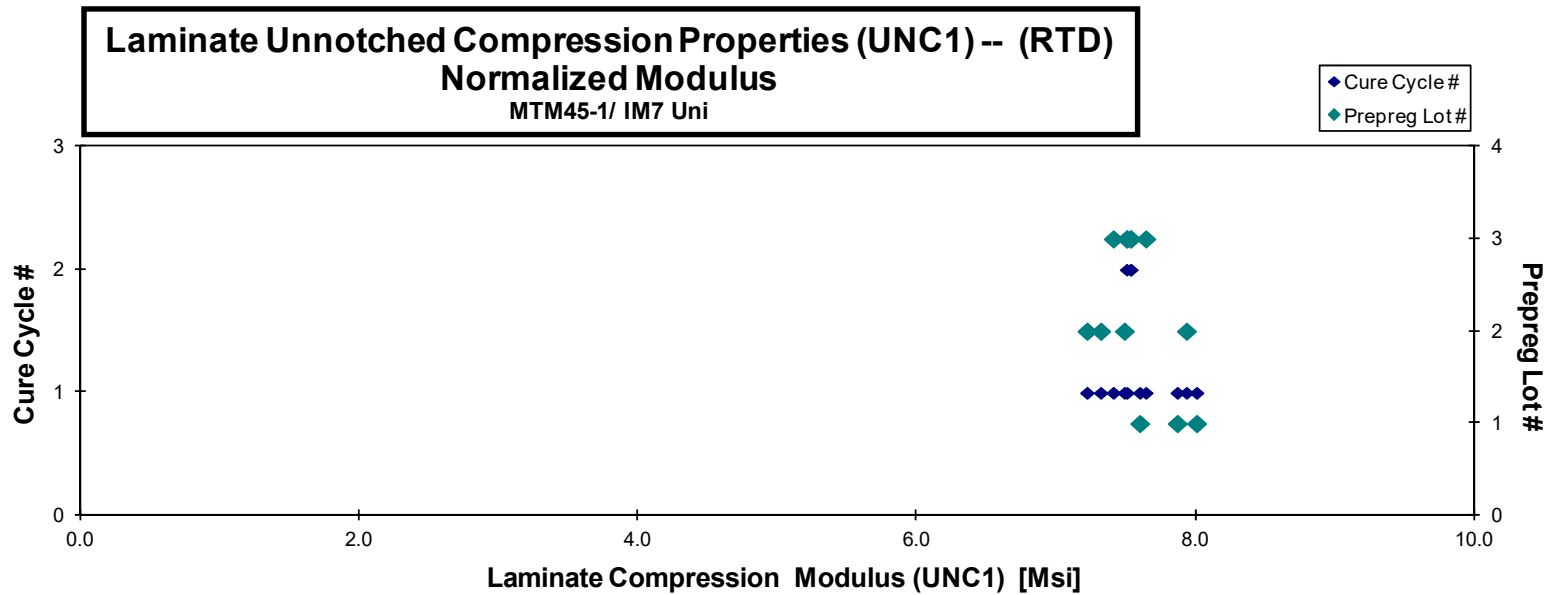
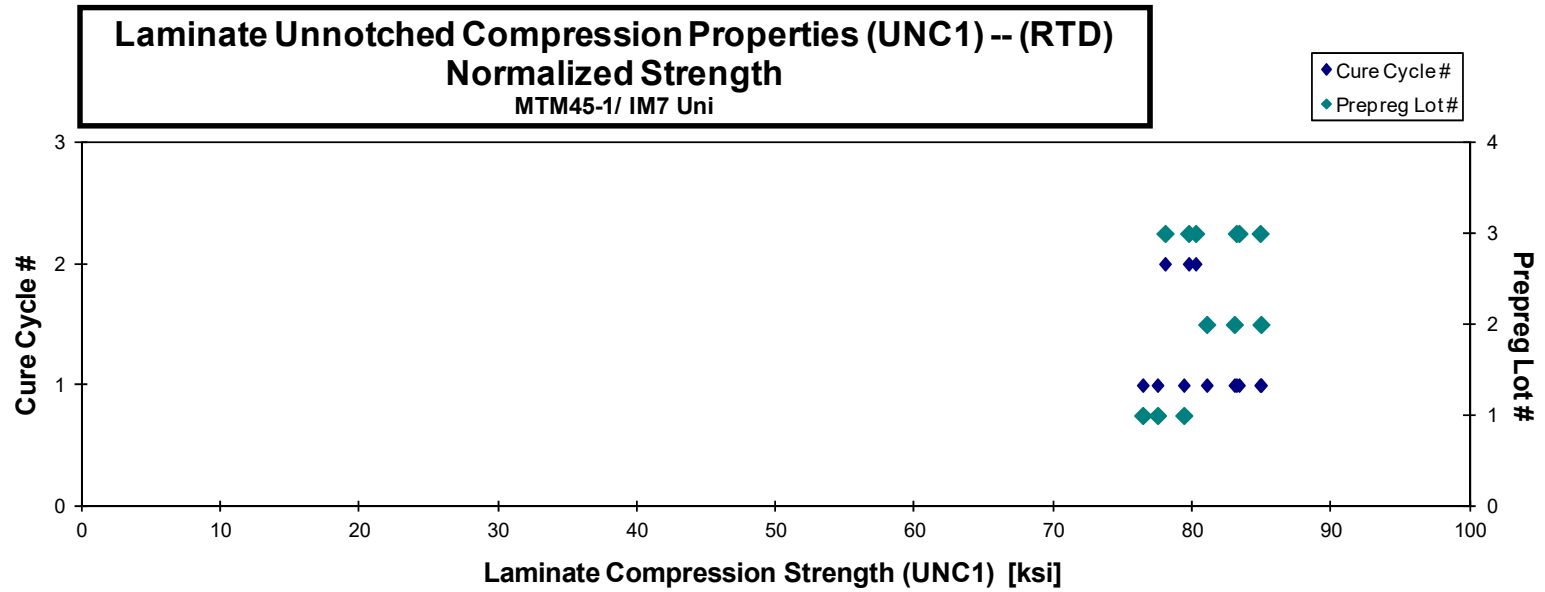
Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	76.384	7.874
0.0057	77.449	7.605
0.0056	79.342	8.013
0.0055		7.227
0.0055	80.992	7.325
0.0055	84.899	7.940
0.0055	82.985	7.495
0.0055	83.318	7.648
0.0055	84.841	7.513
0.0055	83.127	7.415
0.0055	79.690	7.511
0.0055	80.193	7.540
0.0055	77.990	7.540

* Compressive strength is not reported due to unacceptable failure mode.

Batch A and B cure cycle 2 - Data is omitted due to incorrect panel processing.

Average	80.240	7.523	0.292
Standard Dev.	3.696	0.189	0.062
Coeff. of Var. [%]	4.607	2.517	21.294
Min.	73.650	7.216	0.155
Max.	84.970	7.904	0.346
Number of Spec.	12	13	13

Average _{norm}	0.0055	80.934	7.588
Standard Dev. _{norm}		2.889	0.232
Coeff. of Var. [%] _{norm}		3.570	3.055
Min.	0.0055	76.384	7.227
Max.	0.0057	84.899	8.013
Number of Spec.		12	13



Laminate Unnotched Compression Properties (UNC1) -- (ETW)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

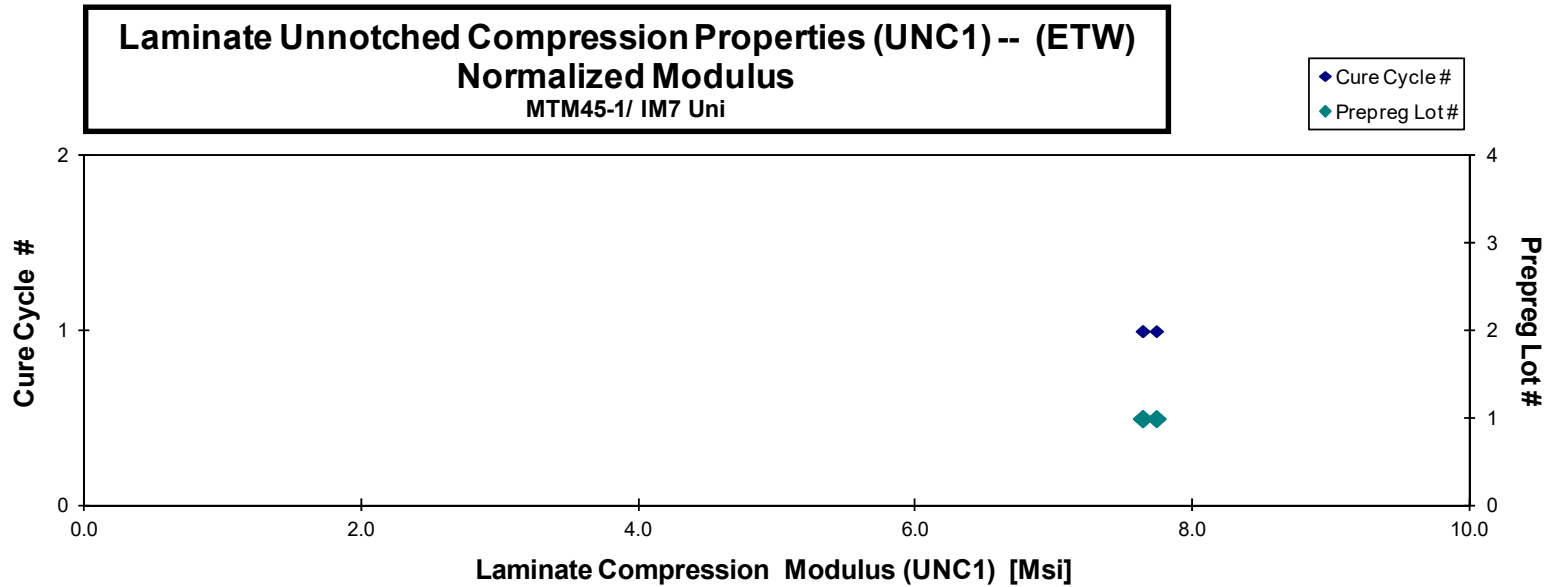
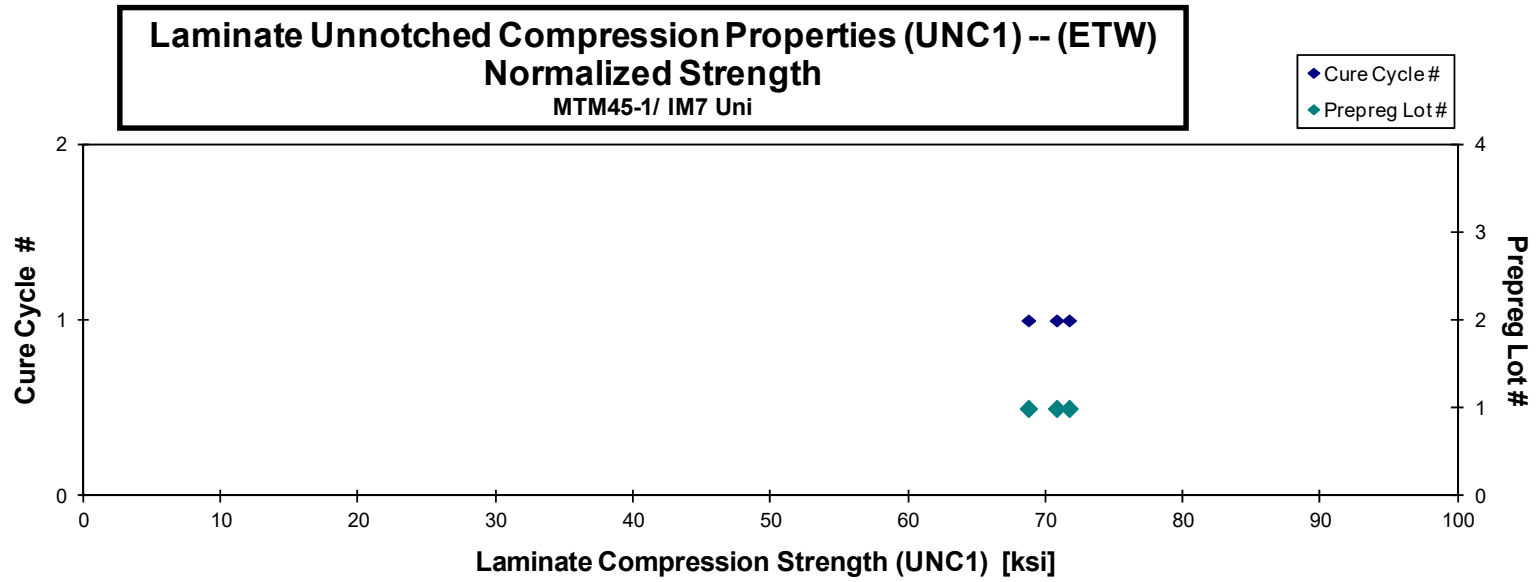
Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNC1-A-MH1-ETW-2	AF0A112N	A	MH1	1	1	68.097	7.445	0.309	0.137	24	HAB
IMU-UNC1-A-MH1-ETW-3	AF0A113N	A	MH1	1	1	66.218	7.361	0.338	0.137	24	HAB
IMU-UNC1-A-MH1-ETW-4	AF0A114N	A	MH1	1	1	69.207	7.374	0.310	0.137	24	HAB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	70.797	7.740
0.0057	68.743	7.642
0.0057	71.707	7.640

Batch A cure cycle 2 - Data is omitted due to incorrect panel processing.

Average	67.841	7.393	0.319
Standard Dev.	1.511	0.045	0.017
Coeff. of Var. [%]	2.227	0.608	5.188
Min.	66.218	7.361	0.309
Max.	69.207	7.445	0.338
Number of Spec.	3	3	3

Average _{norm}	0.0057	70.416	7.674
Standard Dev. _{norm}		1.518	0.057
Coeff. of Var. [%] _{norm}		2.156	0.743
Min.	0.0057	68.743	7.640
Max.	0.0057	71.707	7.740
Number of Spec.		3	3



Laminate Unnotched Compression Properties (UNC1) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

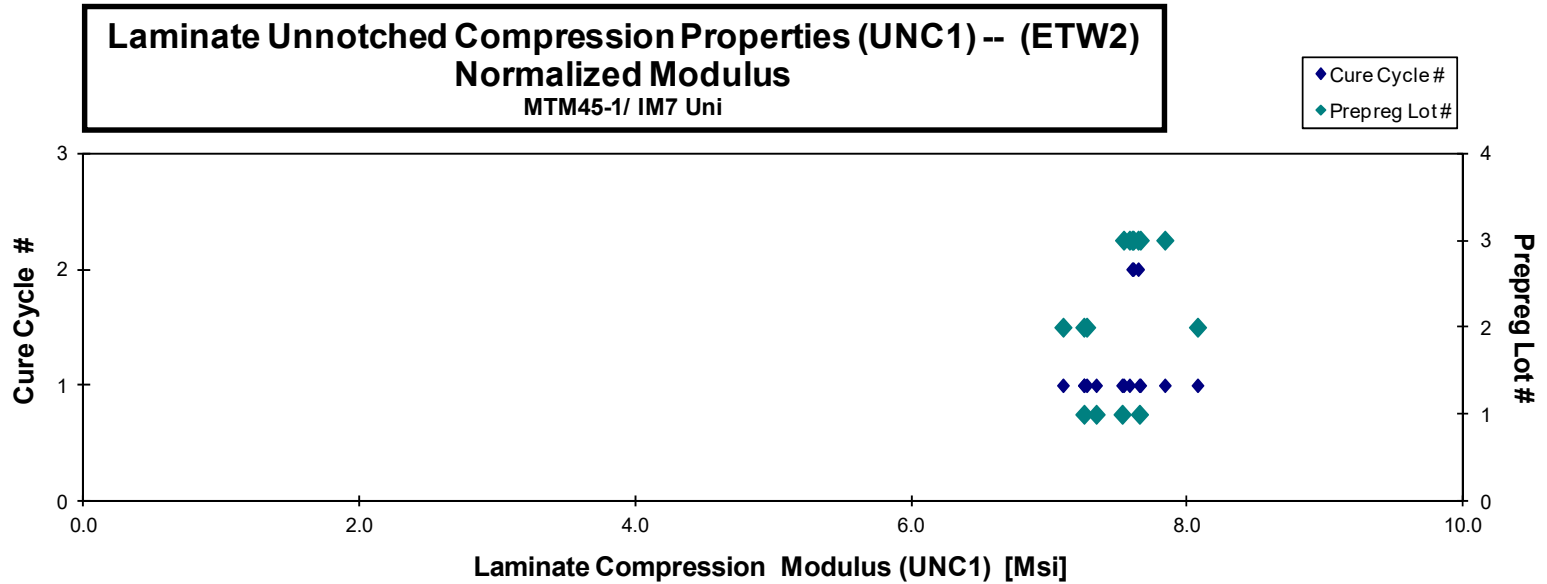
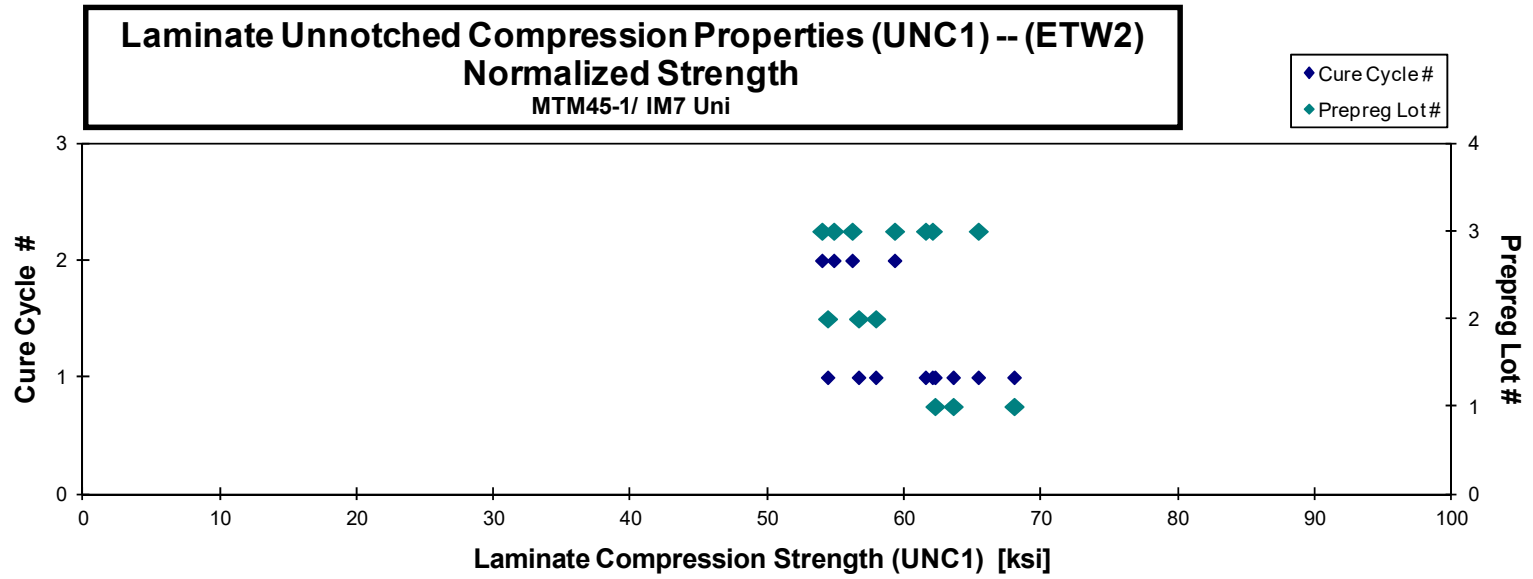
Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode
IMU-UNC1-A-MH1-ETW2-1	AF0A111D	A	MH1	1	1	*	7.289	0.336	0.136	24	HIB
IMU-UNC1-A-MH1-ETW2-2	AF0A112D	A	MH1	1	1	61.745	7.418	0.345	0.136	24	HAT
IMU-UNC1-A-MH1-ETW2-3	AF0A113D	A	MH1	1	1	59.684	7.023	0.304	0.138	24	HGM / HAT
IMU-UNC1-A-MH1-ETW2-4	AF0A114D	A	MH1	1	1	65.412	6.959	0.299	0.137	24	HGM / HAT
IMU-UNC1-B-MH1-ETW2-1	AF0B111D	B	MH1	2	1	55.073	7.345	0.284	0.131	24	HGM
IMU-UNC1-B-MH1-ETW2-2	AF0B112D	B	MH1	2	1	58.631	7.324	0.289	0.131	24	BGM
IMU-UNC1-B-MH1-ETW2-3	AF0B113D	B	MH1	2	1	*	8.105	0.290	0.131	24	HIT
IMU-UNC1-B-MH1-ETW2-4	AF0B114D	B	MH1	2	1	57.121	7.141	0.324	0.131	24	BAB
IMU-UNC1-C-MH1-ETW2-1	AF0C111D	C	MH1	3	1	*	7.525	0.330	0.133	24	HIB
IMU-UNC1-C-MH1-ETW2-2	AF0C112D	C	MH1	3	1	62.104	7.529	0.337	0.132	24	HGM/HAT
IMU-UNC1-C-MH1-ETW2-3	AF0C113D	C	MH1	3	1	65.267	7.628	0.350	0.132	24	HAB
IMU-UNC1-C-MH1-ETW2-4	AF0C114D	C	MH1	3	1	61.098	7.764	0.339	0.133	24	BAB
IMU-UNC1-C-MH2-ETW2-1	AF0C211D	C	MH2	3	2	59.409	7.643	0.149	0.132	24	HGM
IMU-UNC1-C-MH2-ETW2-2	AF0C212D	C	MH2	3	2	55.583	7.694	0.204	0.130	24	HGM
IMU-UNC1-C-MH2-ETW2-3	AF0C213D	C	MH2	3	2	56.197	**	**	0.132	24	HAB
IMU-UNC1-C-MH2-ETW2-4	AF0C214D	C	MH2	3	2	53.785	7.558	0.207	0.133	24	HAB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057		7.520
0.0057	63.632	7.645
0.0057	62.299	7.331
0.0057	68.080	7.243
0.0054	54.454	7.262
0.0054	57.973	7.242
0.0055		8.066
0.0055	56.717	7.091
0.0055		7.573
0.0055	62.112	7.530
0.0055	65.464	7.651
0.0055	61.607	7.829
0.0055	59.349	7.635
0.0054	54.902	7.600
0.0055	56.247	
0.0055	54.036	7.593

*Compressive strength is not reported due to unacceptable failure mode.
 **Compressive modulus and poisson's ratio not reported due to strain gauge failed prematurely.
 Batch A and B cure cycle 2 - Data is omitted due to incorrect panel processing.

Average	59.316	7.463	0.292
Standard Dev.	3.732	0.299	0.060
Coeff. of Var. [%]	6.291	4.003	20.569
Min.	53.785	6.959	0.149
Max.	65.412	8.105	0.350
Number of Spec.	13	15	15

Average _{norm}	0.0055	59.759	7.521
Standard Dev. _{norm}		4.487	0.253
Coeff. of Var. [%] _{norm}		7.509	3.362
Min.	0.0054	54.036	7.091
Max.	0.0057	68.080	8.066
Number of Spec.		13	15



4.12 “10/80/10” Unnotched Compression 2 Properties (UNC2)

Laminate Unnotched Compression Properties (UNC2) -- (RTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

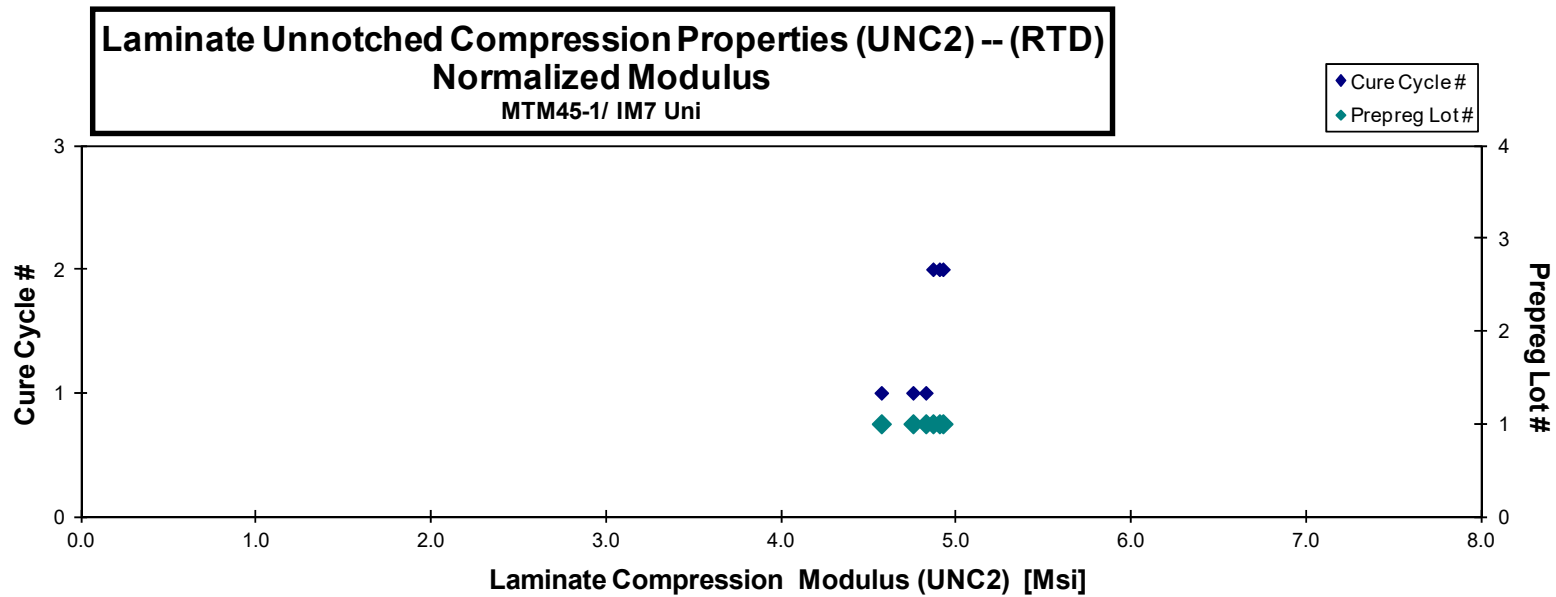
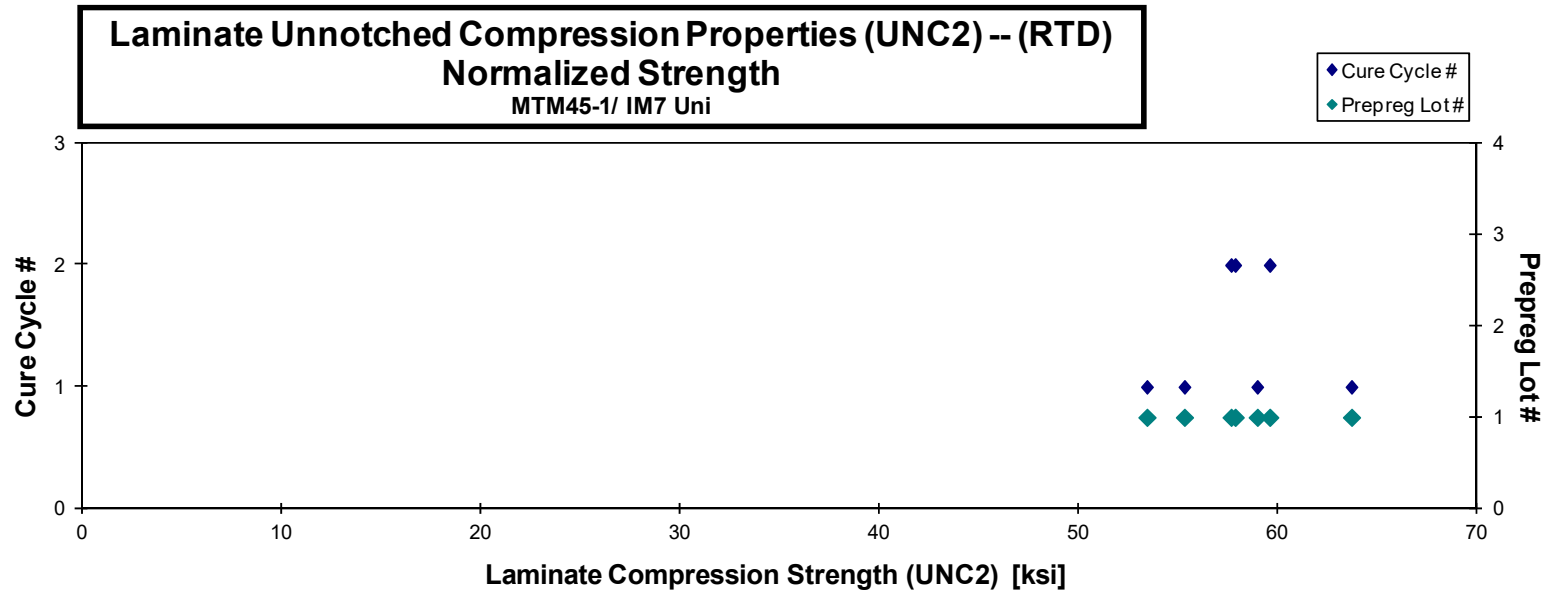
Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode
IMU-UNC2-A-MH1-RTD-1	AFXA111A	A	MH1	1	1	62.964	4.520	0.523	0.111	20	BGM
IMU-UNC2-A-MH1-RTD-2	AFXA112A	A	MH1	1	1	57.719	4.725	0.554	0.112	20	BGM
IMU-UNC2-A-MH1-RTD-3	AFXA113A	A	MH1	1	1	52.911	4.708	0.566	0.111	20	BAB
IMU-UNC2-A-MH1-RTD-4	AFXA114A	A	MH1	1	1	54.872	*	*	0.111	20	BAT
IMU-UNC2-A-MH2-RTD-2	AFXA212A	A	MH2	1	2	57.347	4.881	0.594	0.111	20	HGM
IMU-UNC2-A-MH2-RTD-3	AFXA213A	A	MH2	1	2	57.970	4.771	0.589	0.113	20	HGM
IMU-UNC2-A-MH2-RTD-4	AFXA214A	A	MH2	1	2	56.232	4.748	0.616	0.113	20	HGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0056	63.708	4.574
0.0056	58.978	4.828
0.0056	53.440	4.755
0.0055	55.321	
0.0056	57.869	4.926
0.0057	59.603	4.905
0.0056	57.664	4.869

*Compressive modulus and poisson's ratio is not reported because strain gauge failed prematurely.

Average	57.145	4.726
Standard Dev.	3.131	0.118
Coeff. of Var. [%]	5.480	2.492
Min.	52.911	4.520
Max.	62.964	4.881
Number of Spec.	7	6

Average _{norm}	0.0056	58.083	4.809
Standard Dev. _{norm}		3.270	0.131
Coeff. of Var. [%] _{norm}		5.630	2.714
Min.	0.0055	53.440	4.574
Max.	0.0057	63.708	4.926
Number of Spec.		7	6



Laminate Unnotched Compression Properties (UNC2) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

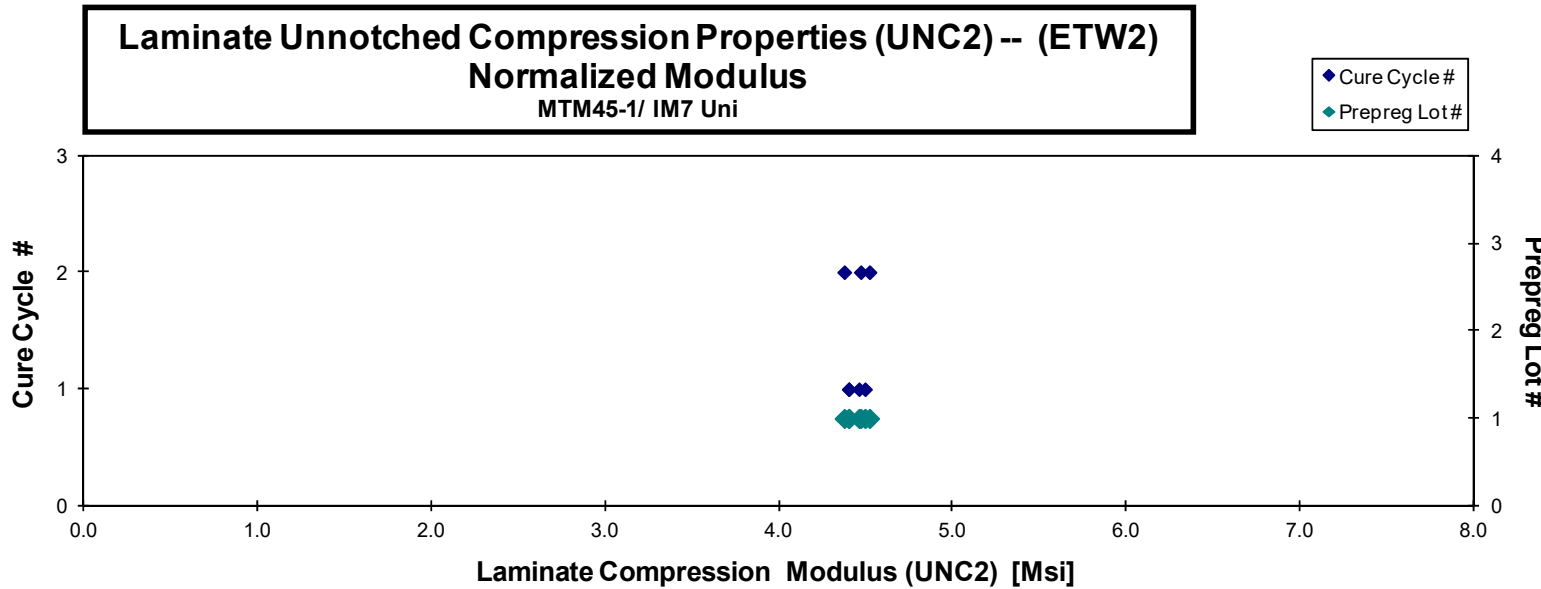
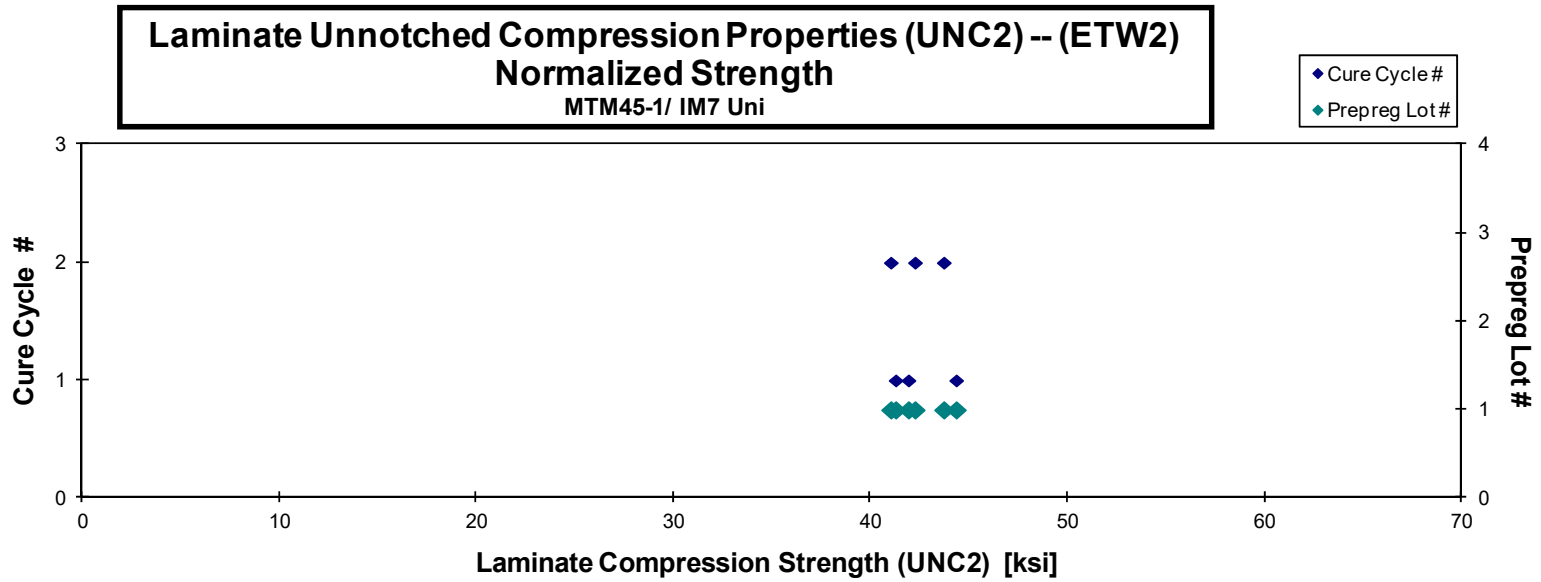
Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNC2-A-MH1-ETW2-1	AFXA111D	A	MH1	1	1	40.494	4.317	0.584	0.112	20	HAT
IMU-UNC2-A-MH1-ETW2-2	AFXA112D	A	MH1	1	1	*	4.360	0.584	0.113	20	END BLOOM
IMU-UNC2-A-MH1-ETW2-3	AFXA113D	A	MH1	1	1	41.246	4.329	0.546	0.112	20	DAB
IMU-UNC2-A-MH1-ETW2-4	AFXA114D	A	MH1	1	1	43.568	4.415	0.530	0.112	20	DAB
IMU-UNC2-A-MH2-ETW2-2	AFXA212D	A	MH2	1	2	43.093	4.311	0.610	0.112	20	HAB
IMU-UNC2-A-MH2-ETW2-3	AFXA213D	A	MH2	1	2	40.521	4.414	0.607	0.112	20	HAB
IMU-UNC2-A-MH2-ETW2-4	AFXA214D	A	MH2	1	2	41.672	4.457	0.629	0.112	20	HGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0056	41.322	4.405
0.0056	41.971	4.405
0.0056	44.393	4.498
0.0056	43.766	4.379
0.0056	41.074	4.474
0.0056	42.303	4.524

*Compressive strength is not reported due to unacceptable failure.

Average 41.766 4.372
 Standard Dev. 1.300 0.057
 Coeff. of Var. [%] 3.113 1.303
 Min. 40.494 4.311
 Max. 43.568 4.457
 Number of Spec. 6 7

Average_{norm} 0.0056 42.472 4.450
 Standard Dev._{norm} 1.336 0.054
 Coeff. of Var. [%]_{norm} 3.145 1.221
 Min. 0.0056 41.074 4.379
 Max. 0.0056 44.393 4.524
 Number of Spec. 6 7



4.13 “50/40/10” Unnotched Compression 3 Properties (UNC3)

Laminate Unnotched Compression Properties (UNC3) -- (RTD)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

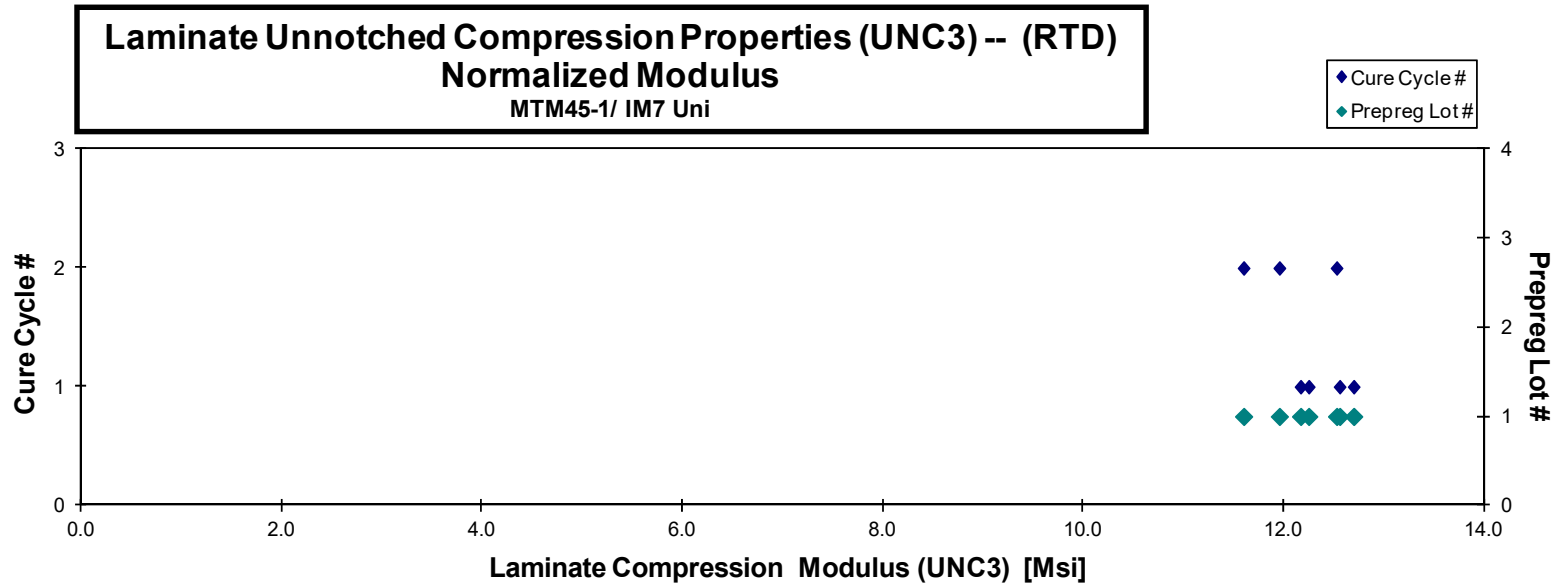
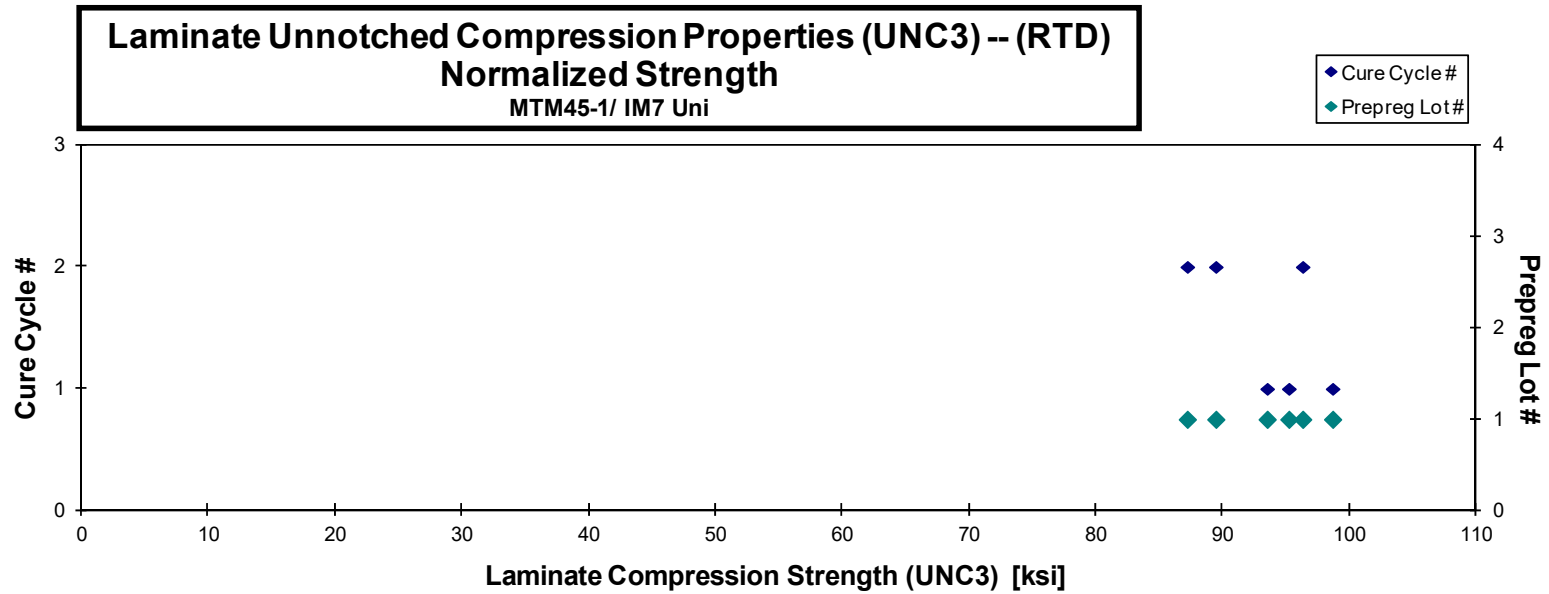
Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNC3-A-MH1-RTD-1	AFYA111A	A	MH1	1	1	95.831	11.891	0.465	0.113	20	HGM
IMU-UNC3-A-MH1-RTD-2	AFYA112A	A	MH1	1	1	91.790	11.939	0.458	0.112	20	HGM
IMU-UNC3-A-MH1-RTD-3	AFYA113A	A	MH1	1	1	*	12.273	0.455	0.114	20	HIT
IMU-UNC3-A-MH1-RTD-4	AFYA114A	A	MH1	1	1	93.055	12.267	0.436	0.113	20	BAT
IMU-UNC3-A-MH2-RTD-2	AFYA212A	A	MH2	1	2	90.563	11.737	0.449	0.109	20	HAT
IMU-UNC3-A-MH2-RTD-3	AFYA213A	A	MH2	1	2	84.404	11.566	0.447	0.114	20	BGM
IMU-UNC3-A-MH2-RTD-4	AFYA214A	A	MH2	1	2	94.539	12.292	0.418	0.112	20	BAB

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	98.706	12.248
0.0056	93.542	12.167
0.0057		12.697
0.0056	95.254	12.557
0.0054	89.493	11.598
0.0057	87.243	11.955
0.0056	96.344	12.527

*Compressive strength is not reported due to unacceptable failure mode.

Average	91.697	11.995	0.447
Standard Dev.	4.037	0.290	0.016
Coeff. of Var. [%]	4.403	2.416	3.479
Min.	84.404	11.566	0.418
Max.	95.831	12.292	0.465
Number of Spec.	6	7	7

Average _{norm}	0.0056	93.430	12.250
Standard Dev. _{norm}		4.323	0.385
Coeff. of Var. [%] _{norm}		4.627	3.143
Min.	0.0054	87.243	11.598
Max.	0.0057	98.706	12.697
Number of Spec.		6	7



Laminate Unnotched Compression Properties (UNC3) -- (ETW2)
Strength & Modulus
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

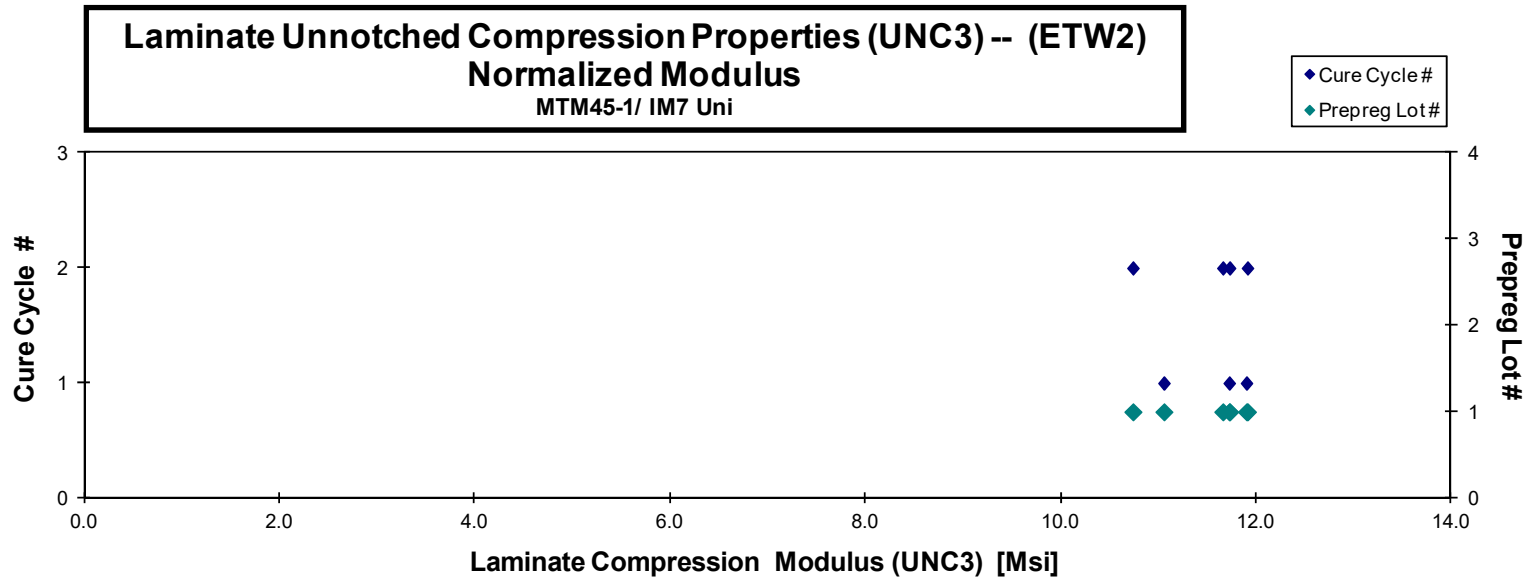
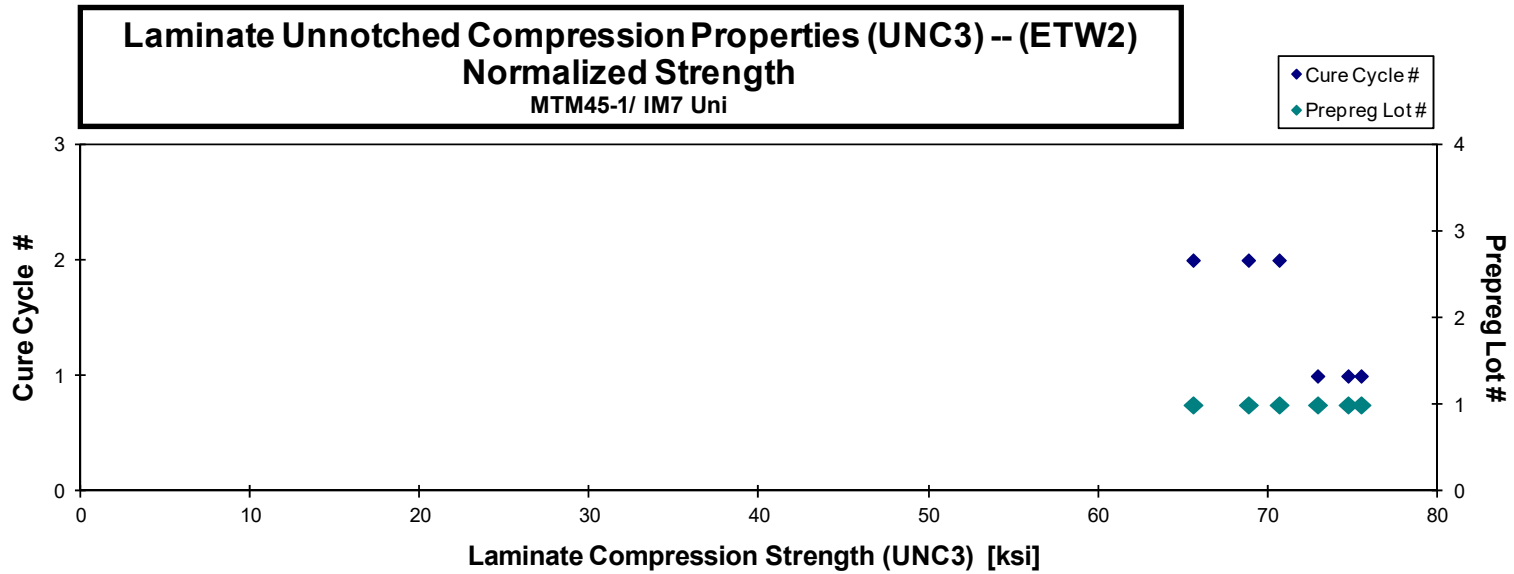
Specimen Number	NIAR Naming	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Modulus [Msi]	Poisson's Ratio	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-UNC3-A-MH1-ETW2-2	AFYA112D	A	MH1	1	1	72.736	10.753	0.425	0.113	20	HAT
IMU-UNC3-A-MH1-ETW2-3	AFYA113D	A	MH1	1	1	71.868	11.545	0.451	0.112	20	HAB
IMU-UNC3-A-MH1-ETW2-4	AFYA114D	A	MH1	1	1	73.844	11.632	0.450	0.113	20	HAB
IMU-UNC3-A-MH2-ETW2-1	AFYA211D	A	MH2	1	2	68.390	11.519	0.449	0.114	20	HAB
IMU-UNC3-A-MH2-ETW2-2	AFYA212D	A	MH2	1	2	67.614	11.441	0.439	0.112	20	BAB/HAB
IMU-UNC3-A-MH2-ETW2-3	AFYA213D	A	MH2	1	2	*	11.426	0.444	0.113	20	HIT
IMU-UNC3-A-MH2-ETW2-4	AFYA214D	A	MH2	1	2	66.024	10.801	0.425	0.109	20	HAT

Avg. t_{ply} [in]	Strength _{norm} [ksi]	Modulus _{norm} [Msi]
0.0057	74.753	11.051
0.0056	72.957	11.720
0.0056	75.523	11.896
0.0057	70.690	11.906
0.0056	68.874	11.654
0.0056		11.724
0.0055	65.614	10.734

*Compressive strength is not reported due to unacceptable failure mode.

Average	70.079	11.302	0.440
Standard Dev.	3.157	0.366	0.011
Coeff. of Var. [%]	4.504	3.235	2.568
Min.	66.024	10.753	0.425
Max.	73.844	11.632	0.451
Number of Spec.	6	7	7

Average _{norm}	0.0056	71.402	11.527
Standard Dev. _{norm}		3.769	0.452
Coeff. of Var. [%] _{norm}		5.279	3.925
Min.	0.0055	65.614	10.734
Max.	0.0057	75.523	11.906
Number of Spec.		6	7



4.14 Lamina Short-Beam Strength Properties (SBS)

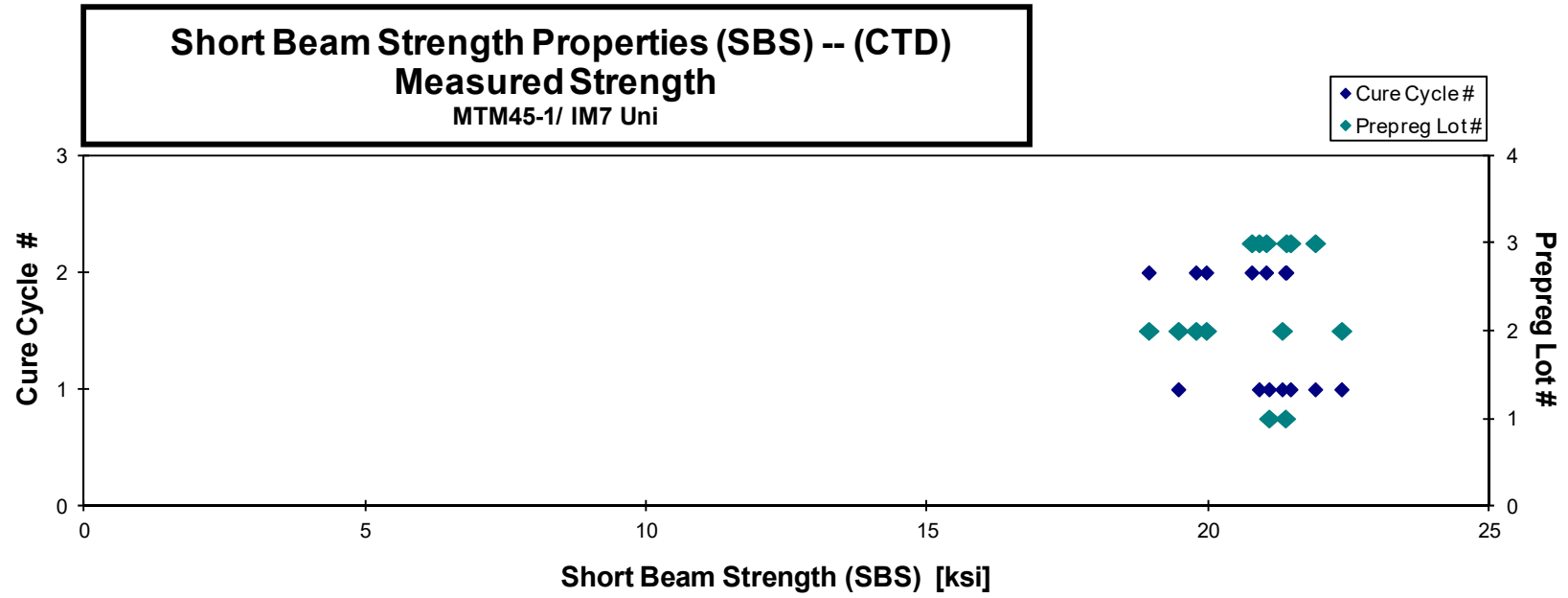
Short Beam Strength Properties (SBS) -- (CTD)
Strength
MTM45-1/ IM7 Uni

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
IMU-SBS-A-MH1-CTD-1*	AFQA111B	A	MH1	1	1		0.091	16	0.0057	COMPRESSION
IMU-SBS-A-MH1-CTD-2*	AFQA112B	A	MH1	1	1		0.091	16	0.0057	COMPRESSION
IMU-SBS-A-MH1-CTD-3*	AFQA113B	A	MH1	1	1		0.088	16	0.0055	COMPRESSION
IMU-SBS-A-MH1-CTD-4	AFQA114B	A	MH1	1	1	21.095	0.090	16	0.0056	ILS
IMU-SBS-A-MH2-CTD-1*	AFQA211B	A	MH2	1	2		0.091	16	0.0057	COMPRESSION
IMU-SBS-A-MH2-CTD-2*	AFQA212B	A	MH2	1	2		0.092	16	0.0057	COMPRESSION
IMU-SBS-A-MH2-CTD-3*	AFQA213B	A	MH2	1	2		0.090	16	0.0056	COMPRESSION
IMU-SBS-A-MH2-CTD-4	AFQA214B	A	MH2	1	2	21.386	0.088	16	0.0055	ILS
IMU-SBS-B-MH1-CTD-1	AFQB111B	B	MH1	2	1	21.329	0.093	16	0.0058	ILS
IMU-SBS-B-MH1-CTD-2	AFQB112B	B	MH1	2	1	19.482	0.093	16	0.0058	ILS
IMU-SBS-B-MH1-CTD-3	AFQB113B	B	MH1	2	1	22.386	0.093	16	0.0058	ILS
IMU-SBS-B-MH2-CTD-1	AFQB211B	B	MH2	2	2	19.979	0.088	16	0.0055	ILS
IMU-SBS-B-MH2-CTD-2	AFQB212B	B	MH2	2	2	19.795	0.088	16	0.0055	ILS
IMU-SBS-B-MH2-CTD-3	AFQB213B	B	MH2	2	2	18.954	0.088	16	0.0055	ILS
IMU-SBS-C-MH1-CTD-1	AFQC111B	C	MH1	3	1	21.918	0.088	16	0.0055	ILS
IMU-SBS-C-MH1-CTD-2	AFQC112B	C	MH1	3	1	21.477	0.087	16	0.0054	ILS
IMU-SBS-C-MH1-CTD-3	AFQC113B	C	MH1	3	1	20.917	0.087	16	0.0054	ILS
IMU-SBS-C-MH2-CTD-1	AFQC211B	C	MH2	3	2	20.788	0.088	16	0.0055	ILS
IMU-SBS-C-MH2-CTD-2	AFQC212B	C	MH2	3	2	21.045	0.087	16	0.0054	ILS
IMU-SBS-C-MH2-CTD-4	AFQC214B	C	MH2	3	2	21.403	0.087	16	0.0054	ILS

* Strength data is omitted for those that failed in compression.

Average 20.854
Standard Dev. 0.967
Coeff. of Var. [%] 4.638
Min. 18.954
Max. 22.386
Number of Spec. 14

Average 0.0056
Standard Dev.
Coeff. of Var. [%]
Min. 0.0054
Max. 0.0058
Number of Spec. 20



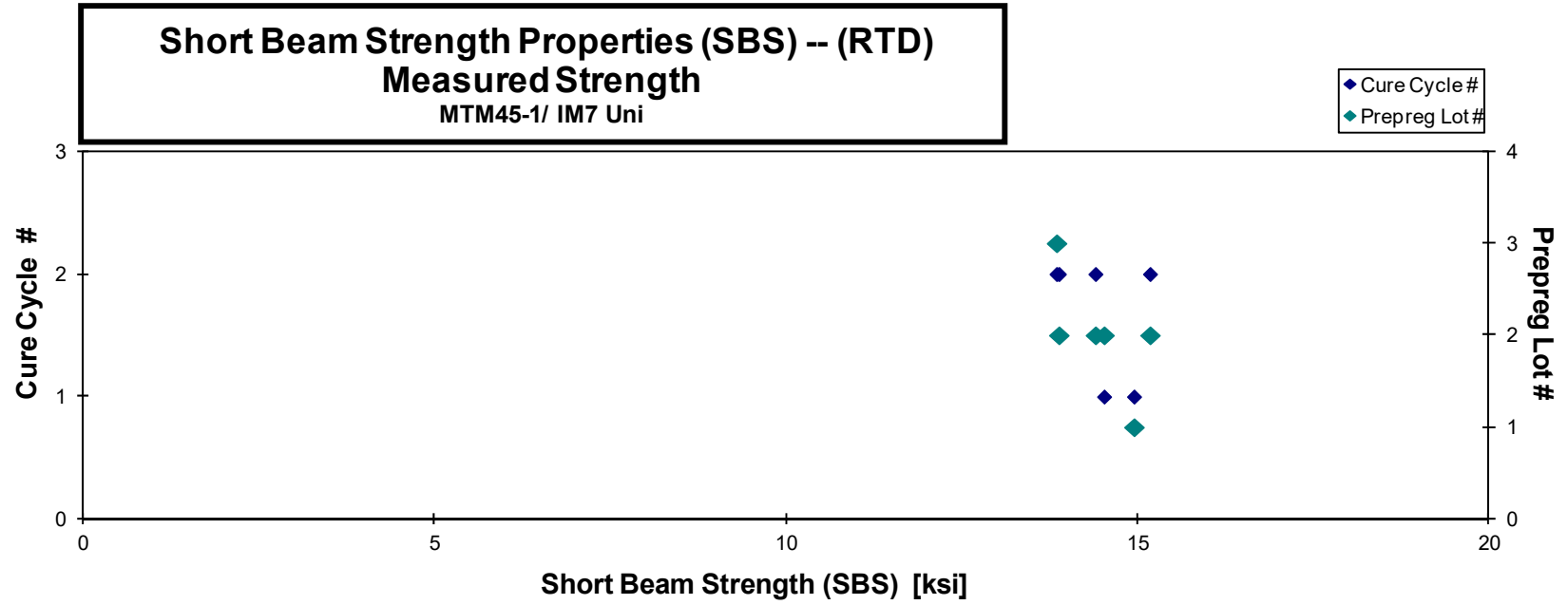
**Short Beam Strength Properties (SBS) -- (RTD)
Strength
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle	Strength	Avg. Specimen	# Plies in Laminate	Avg. tply [in]	Failure Mode
IMU-SBS-A-MH1-RTD-1	AFQA111A	A	MH1	1	1	14.952	0.089	16	0.0056	COMPRESSION/ILS
IMU-SBS-A-MH1-RTD-2*	AFQA112A	A	MH1	1	1		0.090	16	0.0056	COMPRESSION
IMU-SBS-A-MH1-RTD-3*	AFQA113A	A	MH1	1	1		0.090	16	0.0056	COMPRESSION
IMU-SBS-A-MH2-RTD-1*	AFQA211A	A	MH2	1	2		0.091	16	0.0057	COMPRESSION
IMU-SBS-A-MH2-RTD-2*	AFQA212A	A	MH2	1	2		0.091	16	0.0057	COMPRESSION
IMU-SBS-A-MH2-RTD-3*	AFQA213A	A	MH2	1	2		0.091	16	0.0057	COMPRESSION
IMU-SBS-A-MH2-RTD-4*	AFQA214A	A	MH2	1	2		0.091	16	0.0057	COMPRESSION
IMU-SBS-B-MH1-RTD-1*	AFQB111A	B	MH1	2	1		0.093	16	0.0058	COMPRESSION
IMU-SBS-B-MH1-RTD-2*	AFQB112A	B	MH1	2	1		0.092	16	0.0058	COMPRESSION
IMU-SBS-B-MH1-RTD-3*	AFQB113A	B	MH1	2	1		0.093	16	0.0058	COMPRESSION
IMU-SBS-B-MH1-RTD-4	AFQB114A	B	MH1	2	1	14.526	0.094	16	0.0058	ILS
IMU-SBS-B-MH2-RTD-1*	AFQB211A	B	MH2	2	2		0.086	16	0.0054	COMPRESSION
IMU-SBS-B-MH2-RTD-2	AFQB212A	B	MH2	2	2	14.404	0.087	16	0.0055	ILS
IMU-SBS-B-MH2-RTD-3	AFQB213A	B	MH2	2	2	13.883	0.087	16	0.0054	ILS
IMU-SBS-B-MH2-RTD-4	AFQB214A	B	MH2	2	2	15.180	0.087	16	0.0054	ILS
IMU-SBS-C-MH1-RTD-1*	AFQC111A	C	MH1	3	1		0.087	16	0.0054	COMPRESSION
IMU-SBS-C-MH1-RTD-2*	AFQC112A	C	MH1	3	1		0.087	16	0.0054	COMPRESSION
IMU-SBS-C-MH1-RTD-3*	AFQC113A	C	MH1	3	1		0.087	16	0.0054	COMPRESSION
IMU-SBS-C-MH2-RTD-1*	AFQC211A	C	MH2	3	2		0.088	16	0.0055	COMPRESSION
IMU-SBS-C-MH2-RTD-2*	AFQC212A	C	MH2	3	2		0.087	16	0.0054	COMPRESSION
IMU-SBS-C-MH2-RTD-3	AFQC213A	C	MH2	3	2	13.851	0.086	16	0.0054	ILS
IMU-SBS-C-MH2-RTD-4*	AFQC214A	C	MH2	3	2		0.086	16	0.0054	COMPRESSION

* Strength data is omitted for those that failed in compression.

Average 14.466
Standard Dev. 0.542
Coeff. of Var. [%] 3.750
Min. 13.851
Max. 15.180
Number of Spec. 6

Average 0.0056
Standard Dev. 0.0001
Coeff. of Var. [%] 1.923
Min. 0.0054
Max. 0.0058
Number of Spec. 22



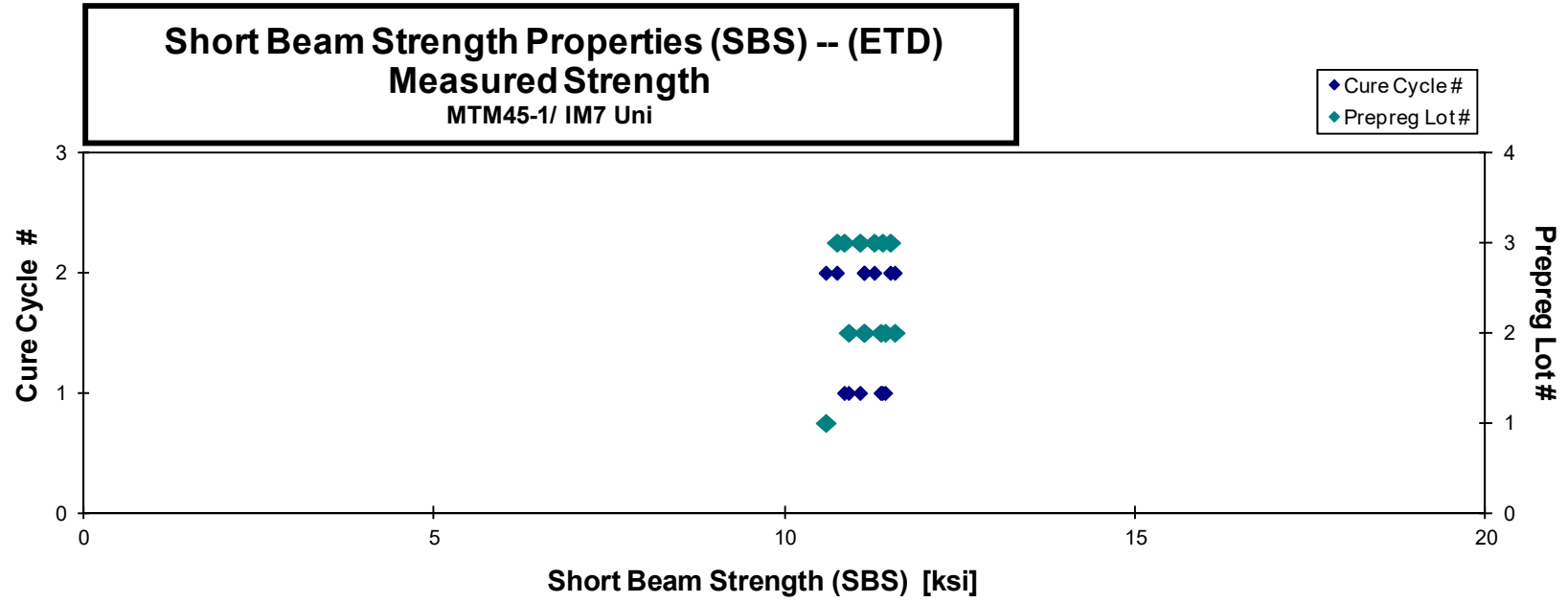
**Short Beam Strength Properties (SBS) -- (ETD)
Strength
MTM45-1/ IM7 Uni**

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
IMU-SBS-A-MH1-ETD-1*	AFQA111C	A	MH1	1	1		0.089	16	0.0056	COMPRESSION
IMU-SBS-A-MH1-ETD-2*	AFQA112C	A	MH1	1	1		0.090	16	0.0056	COMPRESSION
IMU-SBS-A-MH1-ETD-3*	AFQA113C	A	MH1	1	1		0.090	16	0.0056	COMPRESSION
IMU-SBS-A-MH1-ETD-4*	AFQA114C	A	MH1	1	1		0.090	16	0.0056	COMPRESSION
IMU-SBS-A-MH2-ETD-1*	AFQA211C	A	MH2	1	2		0.091	16	0.0057	COMPRESSION
IMU-SBS-A-MH2-ETD-2	AFQA212C	A	MH2	1	2	10.586	0.093	16	0.0058	ILS/COMPRESSION
IMU-SBS-A-MH2-ETD-3*	AFQA213C	A	MH2	1	2		0.092	16	0.0058	COMPRESSION
IMU-SBS-A-MH2-ETD-4*	AFQA214C	A	MH2	1	2		0.092	16	0.0058	COMPRESSION
IMU-SBS-B-MH1-ETD-1	AFQB111C	B	MH1	2	1	11.369	0.093	16	0.0058	ILS
IMU-SBS-B-MH1-ETD-2	AFQB112C	B	MH1	2	1	11.433	0.093	16	0.0058	ILS
IMU-SBS-B-MH1-ETD-3	AFQB113C	B	MH1	2	1	10.911	0.093	16	0.0058	ILS
IMU-SBS-B-MH2-ETD-1	AFQB211C	B	MH2	2	2	11.569	0.087	16	0.0055	ILS
IMU-SBS-B-MH2-ETD-2	AFQB212C	B	MH2	2	2	11.128	0.087	16	0.0054	ILS
IMU-SBS-B-MH2-ETD-3	AFQB213C	B	MH2	2	2	11.135	0.087	16	0.0055	ILS
IMU-SBS-C-MH1-ETD-1	AFQC111C	C	MH1	3	1	11.394	0.087	16	0.0054	ILS
IMU-SBS-C-MH1-ETD-2	AFQC112C	C	MH1	3	1	10.848	0.087	16	0.0054	ILS
IMU-SBS-C-MH1-ETD-3	AFQC113C	C	MH1	3	1	11.073	0.087	16	0.0054	ILS
IMU-SBS-C-MH2-ETD-1	AFQC211C	C	MH2	3	2	11.506	0.087	16	0.0054	ILS
IMU-SBS-C-MH2-ETD-2	AFQC212C	C	MH2	3	2	10.744	0.087	16	0.0054	ILS
IMU-SBS-C-MH2-ETD-3	AFQC213C	C	MH2	3	2	11.276	0.087	16	0.0054	ILS

* Strength data is omitted for those that failed in compression.

Average 11.152
 Standard Dev. 0.309
 Coeff. of Var. [%] 2.768
 Min. 10.586
 Max. 11.569
 Number of Spec. 13

Average 0.0056
 Standard Dev. 0.0001
 Coeff. of Var. [%] 1.961
 Min. 0.0054
 Max. 0.0058
 Number of Spec. 20

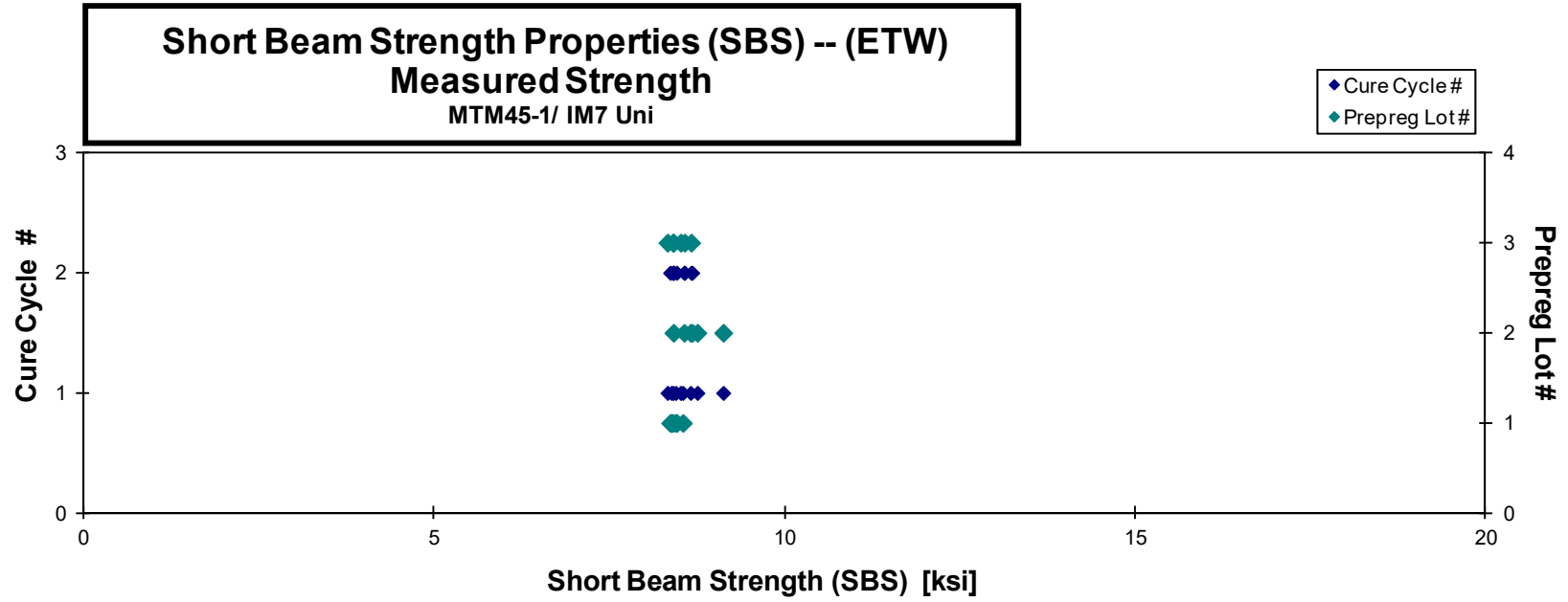


Short Beam Strength Properties (SBS) -- (ETW)
Strength
 MTM45-1/ IM7 Uni

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thckn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
IMU-SBS-A-MH1-ETW-2	AFQA112N	A	MH1	1	1	8.383	0.088	16	0.0055	ILS
IMU-SBS-A-MH1-ETW-3	AFQA113N	A	MH1	1	1	8.548	0.089	16	0.0055	ILS
IMU-SBS-A-MH1-ETW-4	AFQA114N	A	MH1	1	1	8.446	0.091	16	0.0057	ILS
IMU-SBS-A-MH2-ETW-1	AFQA211N	A	MH2	1	2	8.368	0.090	16	0.0056	ILS
IMU-SBS-A-MH2-ETW-2	AFQA212N	A	MH2	1	2	8.405	0.089	16	0.0056	ILS
IMU-SBS-A-MH2-ETW-3	AFQA213N	A	MH2	1	2	8.460	0.091	16	0.0057	ILS
IMU-SBS-B-MH1-ETW-2	AFQB112N	B	MH1	2	1	9.124	0.095	16	0.0059	ILS
IMU-SBS-B-MH1-ETW-3	AFQB113N	B	MH1	2	1	8.657	0.094	16	0.0059	IN-ELASTIC
IMU-SBS-B-MH1-ETW-4	AFQB114N	B	MH1	2	1	8.754	0.094	16	0.0059	IN-ELASTIC
IMU-SBS-B-MH2-ETW-1	AFQB211N	B	MH2	2	2	8.566	0.088	16	0.0055	ILS
IMU-SBS-B-MH2-ETW-2	AFQB212N	B	MH2	2	2	8.682	0.088	16	0.0055	ILS
IMU-SBS-B-MH2-ETW-3	AFQB213N	B	MH2	2	2	8.413	0.088	16	0.0055	ILS
IMU-SBS-C-MH1-ETW-1	AFQC111N	C	MH1	3	1	8.408	0.086	16	0.0053	INTERLAMINAR SHEAR
IMU-SBS-C-MH1-ETW-2	AFQC112N	C	MH1	3	1	8.517	0.082	16	0.0051	INTERLAMINAR SHEAR
IMU-SBS-C-MH1-ETW-3	AFQC113N	C	MH1	3	1	8.329	0.086	16	0.0054	INTERLAMINAR SHEAR
IMU-SBS-C-MH2-ETW-1	AFQC211N	C	MH2	3	2	8.667	0.086	16	0.0054	INTERLAMINAR SHEAR
IMU-SBS-C-MH2-ETW-2	AFQC211N	C	MH2	3	2	8.572	0.084	16	0.0053	INTERLAMINAR SHEAR
IMU-SBS-C-MH2-ETW-3	AFQC211N	C	MH2	3	2	8.413	0.086	16	0.0054	INTERLAMINAR SHEAR

Average 8.540
Standard Dev. 0.191
Coeff. of Var. [%] 2.238
Min. 8.329
Max. 9.124
Number of Spec. 18

Average 0.0055
Standard Dev.
Coeff. of Var. [%]
Min. 0.0051
Max. 0.0059
Number of Spec. 18

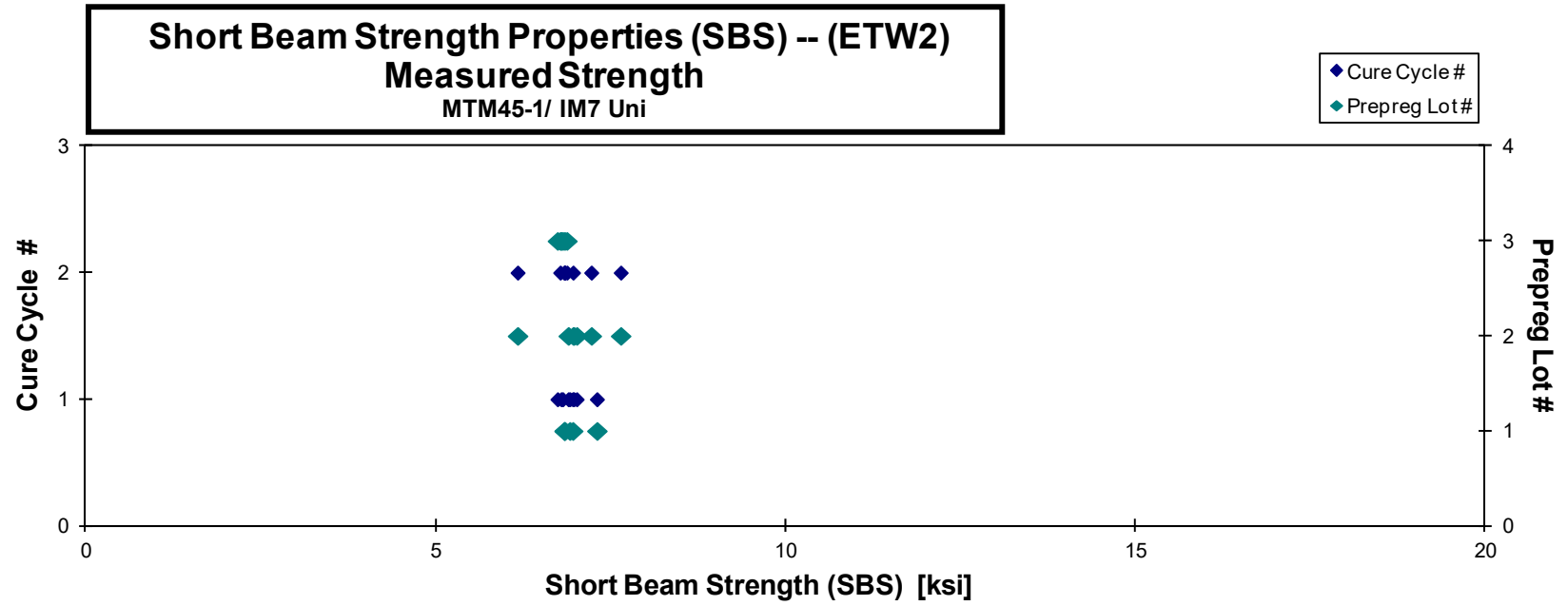


Short Beam Strength Properties (SBS) -- (ETW2)
Strength
MTM45-1/ IM7 Uni

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode
IMU-SBS-A-MH1-ETW2-1	AFQA111D	A	MH1	1	1	7.309	0.089	16	0.0056	IN-ELASTIC
IMU-SBS-A-MH1-ETW2-2	AFQA112D	A	MH1	1	1	6.922	0.091	16	0.0057	IN-ELASTIC
IMU-SBS-A-MH1-ETW2-3	AFQA113D	A	MH1	1	1	6.964	0.089	16	0.0055	IN-ELASTIC
IMU-SBS-A-MH2-ETW2-1	AFQA211D	A	MH2	1	2	6.841	0.091	16	0.0057	IN-ELASTIC
IMU-SBS-A-MH2-ETW2-2	AFQA212D	A	MH2	1	2	6.847	0.090	16	0.0056	IN-ELASTIC
IMU-SBS-A-MH2-ETW2-3	AFQA213D	A	MH2	1	2	6.847	0.090	16	0.0056	IN-ELASTIC
IMU-SBS-B-MH1-ETW2-1	AFQB111D	B	MH1	2	1	6.979	0.095	16	0.0059	IN-ELASTIC
IMU-SBS-B-MH1-ETW2-2	AFQB112D	B	MH1	2	1	6.900	0.094	16	0.0059	IN-ELASTIC
IMU-SBS-B-MH1-ETW2-3	AFQB113D	B	MH1	2	1	7.020	0.092	16	0.0058	ILS
IMU-SBS-B-MH2-ETW2-1	AFQB211D	B	MH2	2	2	7.229	0.088	16	0.0055	IN-ELASTIC
IMU-SBS-B-MH2-ETW2-2	AFQB212D	B	MH2	2	2	6.968	0.087	16	0.0054	IN-ELASTIC
IMU-SBS-B-MH2-ETW2-3	AFQB213D	B	MH2	2	2	6.176	0.088	16	0.0055	IN-ELASTIC
IMU-SBS-B-MH2-ETW2-4	AFQB214D	B	MH2	2	2	7.650	0.083	16	0.0052	IN-ELASTIC
IMU-SBS-C-MH1-ETW2-1	AFQC111D	C	MH1	3	1	6.820	0.086	16	0.0053	INTERLAMINAR SHEAR
IMU-SBS-C-MH1-ETW2-2	AFQC112D	C	MH1	3	1	6.745	0.086	16	0.0053	INTERLAMINAR SHEAR
IMU-SBS-C-MH1-ETW2-3	AFQC113D	C	MH1	3	1	6.798	0.086	16	0.0054	INTERLAMINAR SHEAR
IMU-SBS-C-MH2-ETW2-1	AFQC211D	C	MH2	3	2	6.848	0.086	16	0.0054	INTERLAMINAR SHEAR
IMU-SBS-C-MH2-ETW2-2	AFQC212D	C	MH2	3	2	6.785	0.086	16	0.0054	INTERLAMINAR SHEAR
IMU-SBS-C-MH2-ETW2-3	AFQC213D	C	MH2	3	2	6.880	0.086	16	0.0054	INTERLAMINAR SHEAR

Average 6.923
Standard Dev. 0.284
Coeff. of Var. [%] 4.099
Min. 6.176
Max. 7.650
Number of Spec. 19

Average 0.0055
Standard Dev.
Coeff. of Var. [%]
Min. 0.0052
Max. 0.0059
Number of Spec. 19



4.15 Laminate Short-Beam Strength Properties (SBS1)

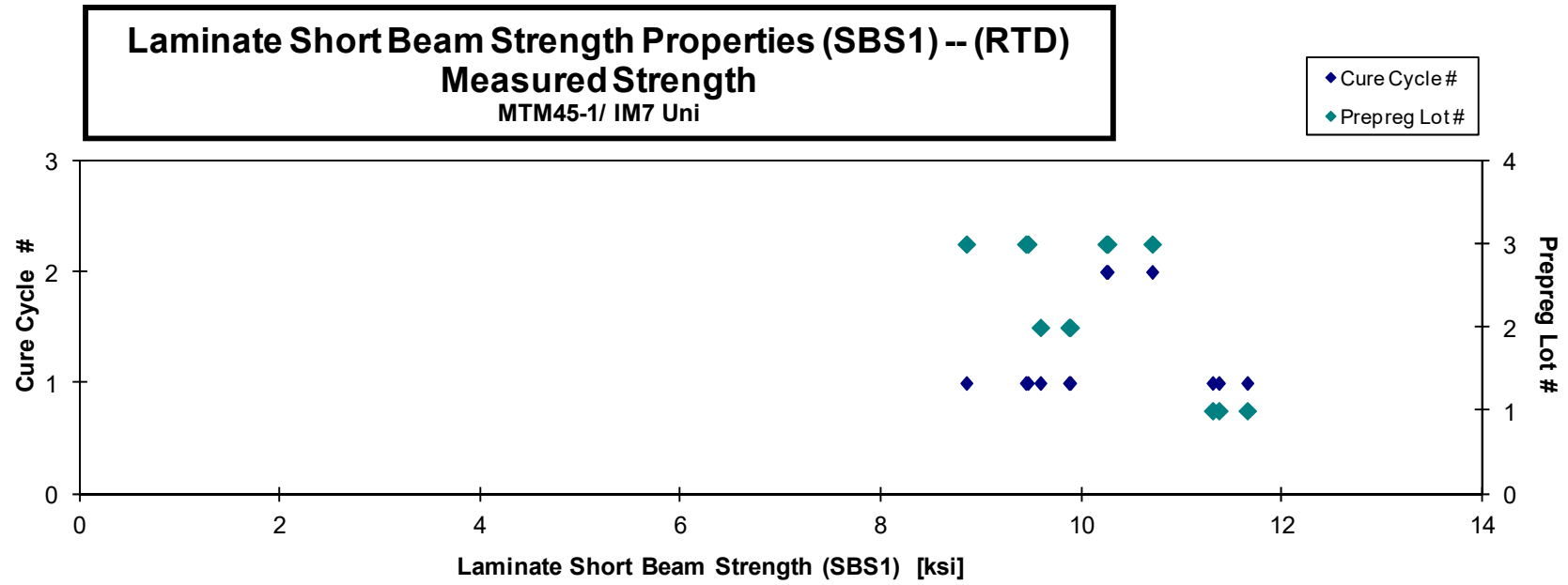
Laminate Short Beam Strength Properties (SBS1) -- (RTD)
Strength
MTM45-1/ IM7 Uni

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t _{ply} [in]	Failure Mode
IMU-SBS1-A-MH1-RTD-1	AFqA111A	A	MH1	1	1	11.306	0.135	24	0.0056	ILS
IMU-SBS1-A-MH1-RTD-2	AFqA112A	A	MH1	1	1	11.651	0.136	24	0.0057	ILS
IMU-SBS1-A-MH1-RTD-3	AFqA113A	A	MH1	1	1	11.367	0.135	24	0.0056	ILS
IMU-SBS1-B-MH1-RTD-1	AFqB111A	B	MH1	2	1	9.872	0.132	24	0.0055	ILS
IMU-SBS1-B-MH1-RTD-2	AFqB112A	B	MH1	2	1	9.883	0.134	24	0.0056	ILS
IMU-SBS1-B-MH1-RTD-3	AFqB113A	B	MH1	2	1	9.586	0.132	24	0.0055	ILS
IMU-SBS1-C-MH1-RTD-1	AFqC111A	C	MH1	3	1	9.460	0.132	24	0.0055	ILS
IMU-SBS1-C-MH1-RTD-2	AFqC112A	C	MH1	3	1	9.440	0.131	24	0.0055	ILS
IMU-SBS1-C-MH1-RTD-3	AFqC113A	C	MH1	3	1	8.847	0.132	24	0.0055	ILS
IMU-SBS1-C-MH2-RTD-1	AFqC211A	C	MH2	3	2	10.258	0.132	24	0.0055	ILS
IMU-SBS1-C-MH2-RTD-2	AFqC212A	C	MH2	3	2	10.702	0.133	24	0.0055	ILS
IMU-SBS1-C-MH2-RTD-3	AFqC213A	C	MH2	3	2	10.243	0.132	24	0.0055	ILS

Batch A and B cure cycle 2 - Data is omitted due to incorrect panel processing.

Average 10.218
Standard Dev. 0.878
Coeff. of Var. [%] 8.595
Min. 8.847
Max. 11.651
Number of Spec. 12

Average 0.0055
Standard Dev. 0.0001
Coeff. of Var. [%] 2.000
Min. 0.0055
Max. 0.0057
Number of Spec. 12

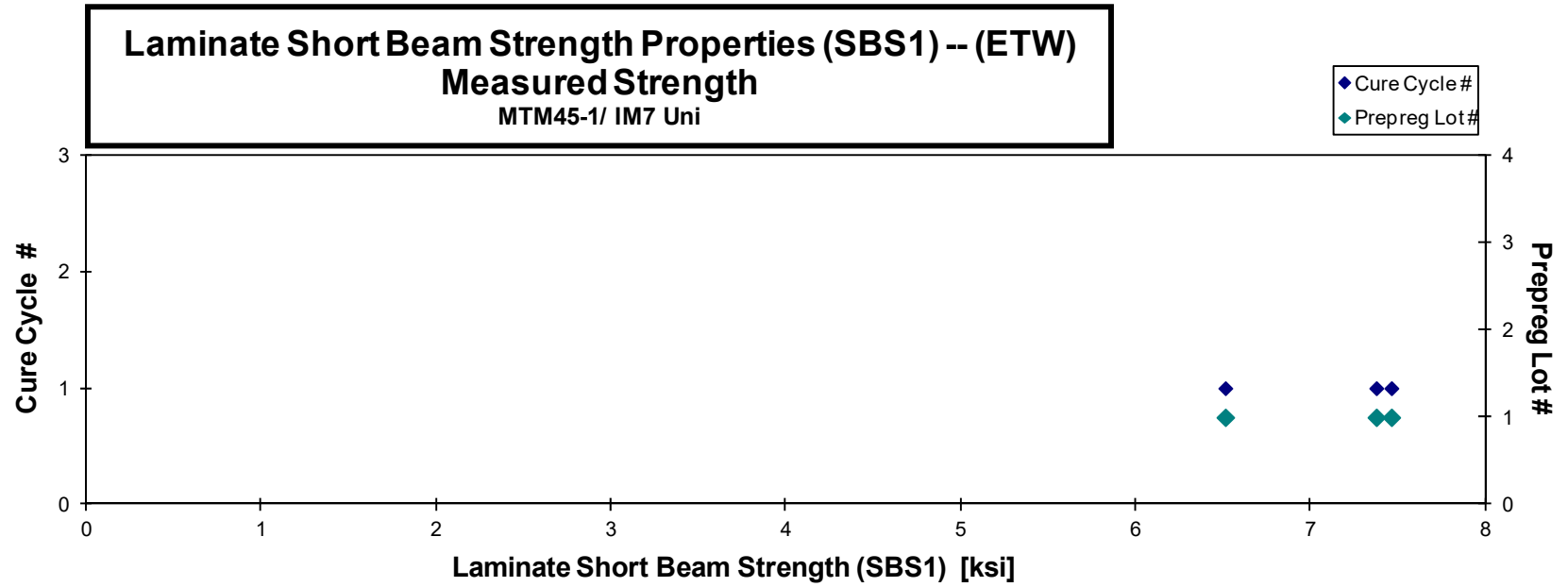


Laminate Short Beam Strength Properties (SBS1) -- (ETW)
Strength
 MTM45-1/ IM7 Uni

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
IMU-SBS1-A-MH1-ETW-1	AFqA111N	A	MH1	1	1	7.377	0.136	24	0.0057	ILS
IMU-SBS1-A-MH1-ETW-2	AFqA112N	A	MH1	1	1	7.464	0.135	24	0.0056	ILS
IMU-SBS1-A-MH1-ETW-3	AFqA113N	A	MH1	1	1	6.514	0.135	24	0.0056	ILS

Batch A cure cycle 2 - data is omitted due to incorrect panel processing.

Average	7.118	Average	0.0056
Standard Dev.	0.525	Standard Dev.	
Coeff. of Var. [%]	7.376	Coeff. of Var. [%]	
Min.	6.514	Min.	0.0056
Max.	7.464	Max.	0.0057
Number of Spec.	3	Number of Spec.	3

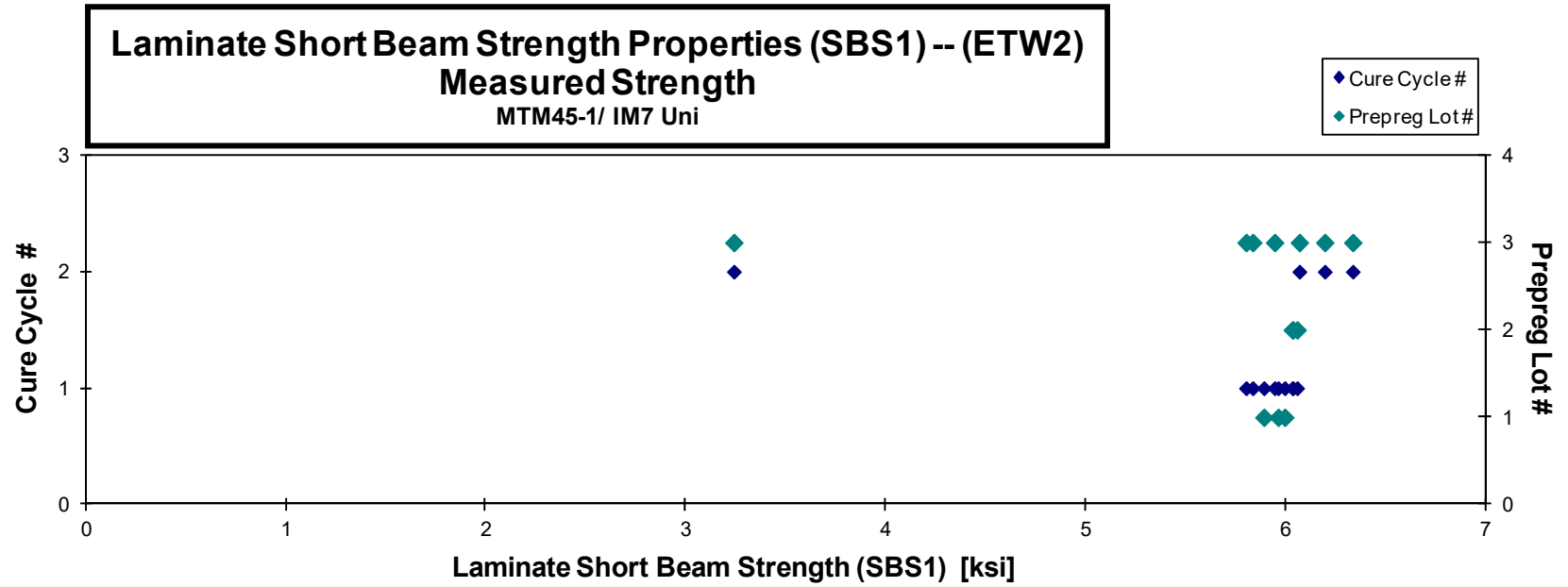


Laminate Short Beam Strength Properties (SBS1) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Mode
IMU-SBS1-A-MH1-ETW2-1	AFqA111D	A	MH1	1	1	5.997	0.136	24	0.0057	ILS
IMU-SBS1-A-MH1-ETW2-2	AFqA112D	A	MH1	1	1	5.893	0.135	24	0.0056	ILS
IMU-SBS1-A-MH1-ETW2-3	AFqA113D	A	MH1	1	1	5.964	0.134	24	0.0056	ILS
IMU-SBS1-B-MH1-ETW2-1	AFqB111D	B	MH1	2	1	6.059	0.131	24	0.0055	ILS
IMU-SBS1-B-MH1-ETW2-2	AFqB112D	B	MH1	2	1	6.035	0.132	24	0.0055	ILS
IMU-SBS1-B-MH1-ETW2-3	AFqB113D	B	MH1	2	1	6.038	0.133	24	0.0056	ILS
IMU-SBS1-C-MH1-ETW2-1	AFqC111D	C	MH1	3	1	5.804	0.132	24	0.0055	ILS
IMU-SBS1-C-MH1-ETW2-2	AFqC112D	C	MH1	3	1	5.947	0.133	24	0.0055	ILS
IMU-SBS1-C-MH1-ETW2-3	AFqC113D	C	MH1	3	1	5.837	0.131	24	0.0055	ILS
IMU-SBS1-C-MH2-ETW2-1	AFqC211D	C	MH2	3	2	6.338	0.132	24	0.0055	ILS
IMU-SBS1-C-MH2-ETW2-2	AFqC212D	C	MH2	3	2	3.241	0.131	24	0.0055	ILS
IMU-SBS1-C-MH2-ETW2-3	AFqC213D	C	MH2	3	2	6.198	0.130	24	0.0054	ILS
IMU-SBS1-C-MH2-ETW2-4	AFqC214D	C	MH2	3	2	6.070	0.131	24	0.0055	ILS

Batch A and B cure cycle 2 - Data is omitted due to incorrect panel processing.

Average	5.802	Average	0.0055
Standard Dev.	0.782	Standard Dev.	
Coeff. of Var. [%]	13.484	Coeff. of Var. [%]	
Min.	3.241	Min.	0.0054
Max.	6.338	Max.	0.0057
Number of Spec.	13	Number of Spec.	13



4.16 “25/50/25” Open Hole Tension 1 Properties (OHT1)

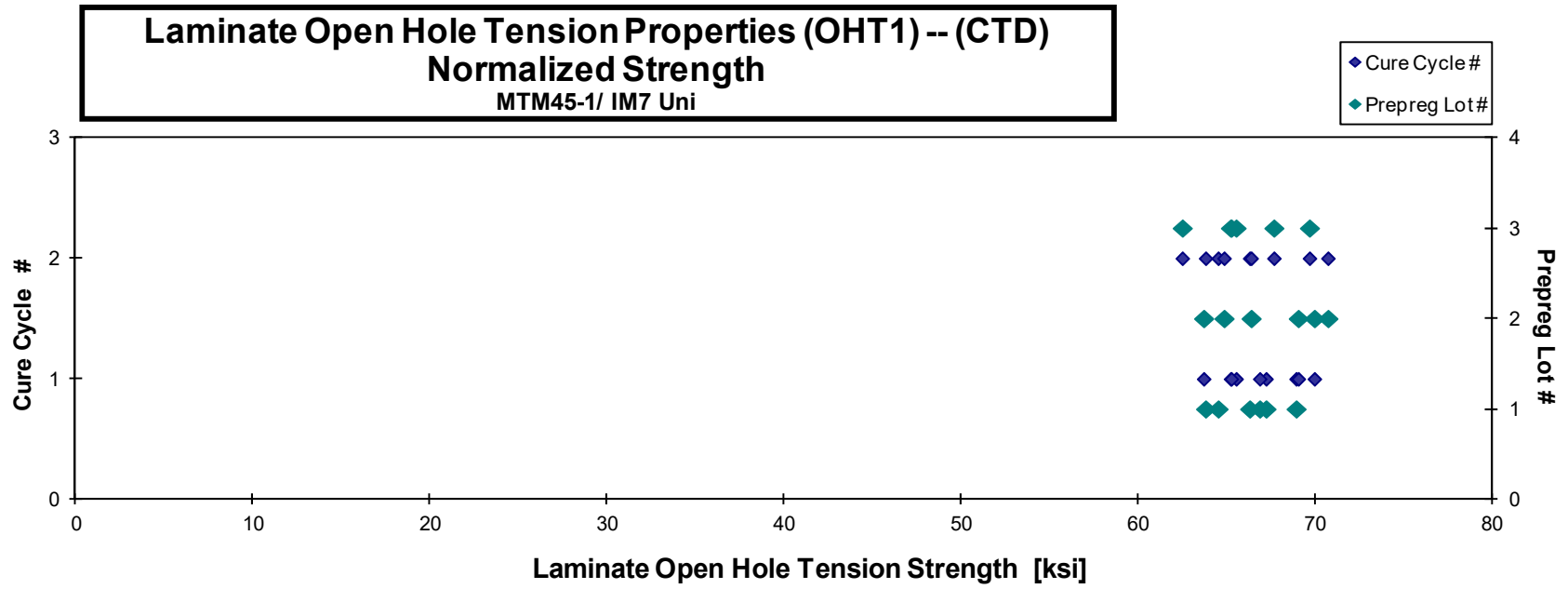
Laminate Open Hole Tension Properties (OHT1) -- (CTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHT1-A-MH1-CTD-1	AFDA111B	A	MH1	1	1	67.924	0.134	24	AGM	0.0056	68.953
IMU-OHT1-A-MH1-CTD-2	AFDA112B	A	MH1	1	1	66.051	0.134	24	LGM	0.0056	67.252
IMU-OHT1-A-MH1-CTD-3	AFDA113B	A	MH1	1	1	65.699	0.134	24	LGM	0.0056	66.894
IMU-OHT1-A-MH2-CTD-1	AFDA211B	A	MH2	1	2	61.507	0.137	24	LGM	0.0057	63.836
IMU-OHT1-A-MH2-CTD-2	AFDA212B	A	MH2	1	2	64.519	0.136	24	LGM	0.0057	66.327
IMU-OHT1-A-MH2-CTD-3	AFDA213B	A	MH2	1	2	62.926	0.135	24	LGM	0.0056	64.547
IMU-OHT1-B-MH1-CTD-1	AFDB111B	B	MH1	2	1	62.965	0.134	24	LGM	0.0056	63.728
IMU-OHT1-B-MH1-CTD-2	AFDB112B	B	MH1	2	1	69.250	0.133	24	LGM	0.0056	69.984
IMU-OHT1-B-MH1-CTD-3	AFDB113B	B	MH1	2	1	67.791	0.135	24	LGM	0.0056	69.075
IMU-OHT1-B-MH2-CTD-1	AFDB211B	B	MH2	2	2	66.210	0.132	24	LGM	0.0055	66.411
IMU-OHT1-B-MH2-CTD-2	AFDB212B	B	MH2	2	2	64.297	0.133	24	LGM	0.0056	64.881
IMU-OHT1-B-MH2-CTD-3	AFDB213B	B	MH2	2	2	69.384	0.135	24	LGM	0.0056	70.751
IMU-OHT1-C-MH1-CTD-1	AFDC111B	C	MH1	3	1	65.263	0.133	24	LGM	0.0055	65.560
IMU-OHT1-C-MH1-CTD-2	AFDC112B	C	MH1	3	1	65.395	0.132	24	LGM	0.0055	65.246
IMU-OHT1-C-MH1-CTD-3	AFDC113B	C	MH1	3	1	65.043	0.133	24	LGM	0.0055	65.289
IMU-OHT1-C-MH2-CTD-1	AFDC211B	C	MH2	3	2	60.593	0.136	24	LGM	0.0057	62.521
IMU-OHT1-C-MH2-CTD-2	AFDC212B	C	MH2	3	2	67.456	0.136	24	AGM	0.0057	69.705
IMU-OHT1-C-MH2-CTD-3	AFDC213B	C	MH2	3	2	65.321	0.137	24	LGM	0.0057	67.696

Average **65.422**
 Standard Dev. **2.433**
 Coeff. of Var. [%] **3.719**
 Min. **60.593**
 Max. **69.384**
 Number of Spec. **18**

Average_{norm} **0.0056** **66.592**
 Standard Dev._{norm} **2.378**
 Coeff. of Var. [%]_{norm} **3.571**
 Min. **0.0055** **62.521**
 Max. **0.0057** **70.751**
 Number of Spec. **18**



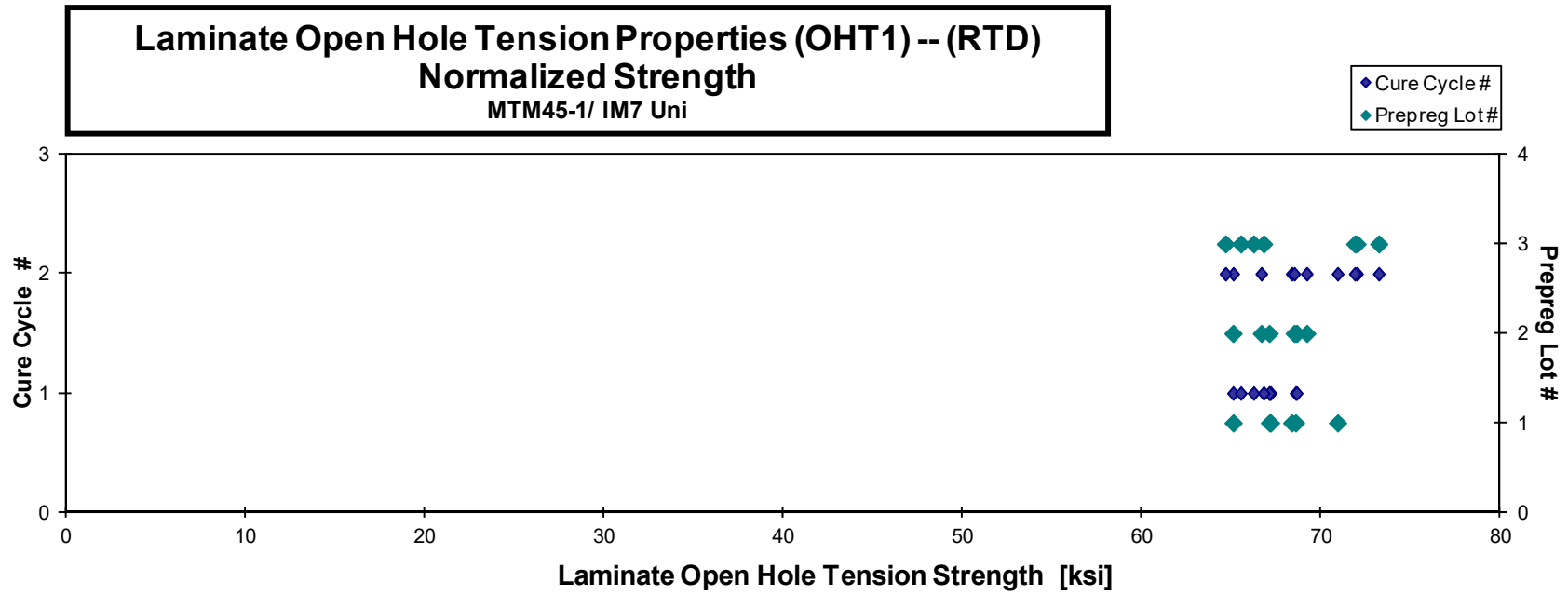
Laminate Open Hole Tension Properties (OHT1) -- (RTD)
Strength
MTM45-1/ IM7 Uni

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHT1-A-MH1-RTD-1	AFDA111A	A	MH1	1	1	66.830	0.135	24	AGM	0.0056	68.551
IMU-OHT1-A-MH1-RTD-2	AFDA112A	A	MH1	1	1	66.351	0.134	24	AGM	0.0056	67.155
IMU-OHT1-A-MH1-RTD-3	AFDA113A	A	MH1	1	1	65.312	0.136	24	AGM	0.0057	67.094
IMU-OHT1-A-MH2-RTD-1	AFDA211A	A	MH2	1	2	63.671	0.135	24	AGM	0.0056	65.070
IMU-OHT1-A-MH2-RTD-2	AFDA212A	A	MH2	1	2	69.111	0.135	24	AGM	0.0056	70.891
IMU-OHT1-A-MH2-RTD-3	AFDA213A	A	MH2	1	2	66.669	0.135	24	AGM	0.0056	68.336
IMU-OHT1-B-MH1-RTD-1	AFDB111A	B	MH1	2	1	67.992	0.133	24	AGM	0.0056	68.610
IMU-OHT1-B-MH1-RTD-2	AFDB112A	B	MH1	2	1	66.473	0.133	24	AGM	0.0056	67.077
IMU-OHT1-B-MH1-RTD-3	AFDB113A	B	MH1	2	1	64.334	0.134	24	AGM	0.0056	65.065
IMU-OHT1-B-MH2-RTD-1	AFDB211A	B	MH2	2	2	65.157	0.135	24	AGM	0.0056	66.638
IMU-OHT1-B-MH2-RTD-2	AFDB212A	B	MH2	2	2	67.503	0.134	24	AGM	0.0056	68.475
IMU-OHT1-B-MH2-RTD-3	AFDB213A	B	MH2	2	2	68.343	0.134	24	AGM	0.0056	69.171
IMU-OHT1-C-MH1-RTD-1	AFDC111A	C	MH1	3	1	66.765	0.132	24	AGM	0.0055	66.765
IMU-OHT1-C-MH1-RTD-2	AFDC112A	C	MH1	3	1	65.957	0.133	24	AGM	0.0055	66.207
IMU-OHT1-C-MH1-RTD-3	AFDC113A	C	MH1	3	1	64.952	0.133	24	AGM	0.0055	65.493
IMU-OHT1-C-MH2-RTD-1	AFDC211A	C	MH2	3	2	63.395	0.135	24	LGM	0.0056	64.644
IMU-OHT1-C-MH2-RTD-2	AFDC212A	C	MH2	3	2	69.605	0.137	24	AGM	0.0057	71.978
IMU-OHT1-C-MH2-RTD-3	AFDC213A	C	MH2	3	2	71.295	0.136	24	LGM	0.0056	73.185
IMU-OHT1-C-MH2-RTD-4	AFDC214A	C	MH2	3	2	69.281	0.137	24	AGM	0.0057	71.853

Average 66.789
Standard Dev. 2.117
Coeff. of Var. [%] 3.170
Min. 63.395
Max. 71.295
Number of Spec. 19

Average_{norm} 0.0056 **68.014**
Standard Dev._{norm} **2.495**
Coeff. of Var. [%]_{norm} **3.668**
Min. 0.0055 **64.644**
Max. 0.0057 **73.185**
Number of Spec. 19



**Laminate Open Hole Tension Properties (OHT1) -- (ETW)
Strength
MTM45-1/ IM7 Uni**

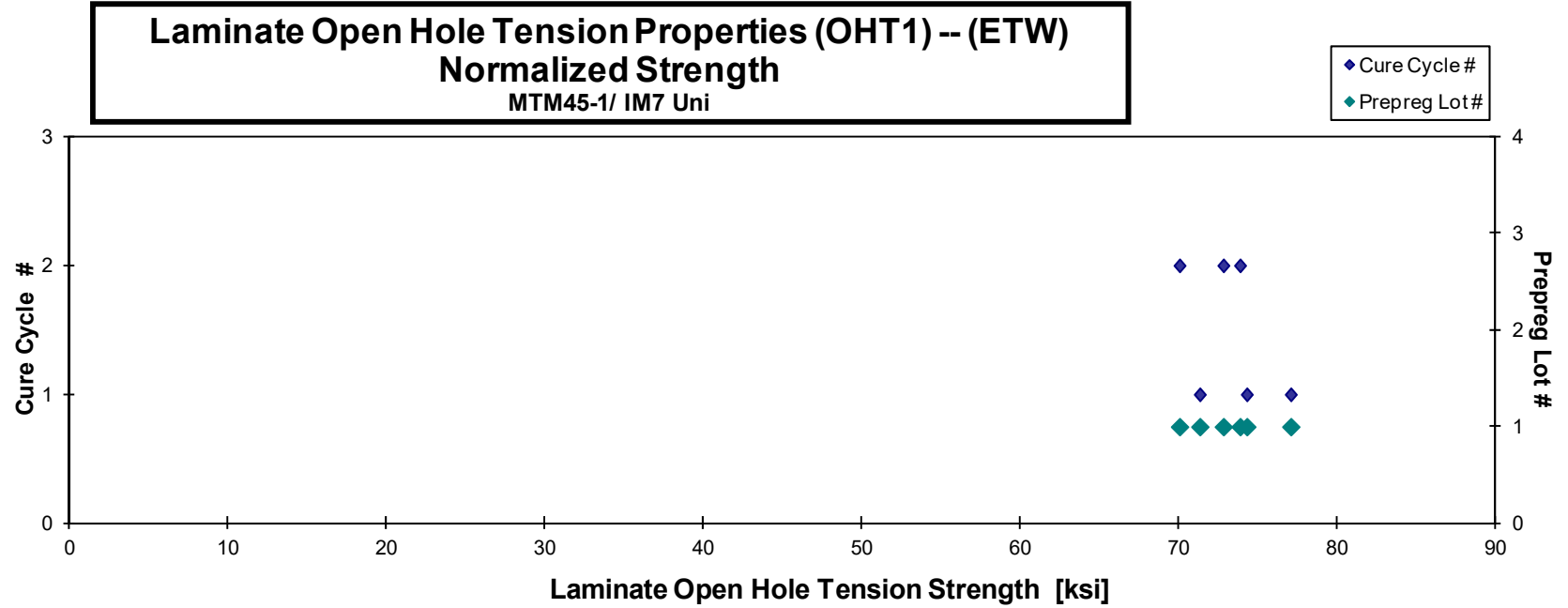
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Modes
IMU-OHT1-A-MH1-ETW-1	AFDA111N	A	MH1	1	1	75.732	0.134	24	AGM
IMU-OHT1-A-MH1-ETW-2	AFDA112N	A	MH1	1	1	70.255	0.134	24	AGM
IMU-OHT1-A-MH1-ETW-3	AFDA113N	A	MH1	1	1	72.716	0.135	24	AGM
IMU-OHT1-A-MH2-ETW-1	AFDA211N	A	MH2	1	2	70.723	0.136	24	AGM
IMU-OHT1-A-MH2-ETW-2	AFDA212N	A	MH2	1	2	67.649	0.137	24	AGM
IMU-OHT1-A-MH2-ETW-3	AFDA213N	A	MH2	1	2	71.632	0.136	24	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	77.071
0.0056	71.329
0.0056	74.295
0.0057	72.813
0.0057	70.049
0.0057	73.866

Average 71.451
Standard Dev. 2.697
Coeff. of Var. [%] 3.775
Min. 67.649
Max. 75.732
Number of Spec. 6

Average_{norm} 0.0056 73.237
Standard Dev._{norm} 2.458
Coeff. of Var. [%]_{norm} 3.356
Min. 0.0056 70.049
Max. 0.0057 77.071
Number of Spec. 6



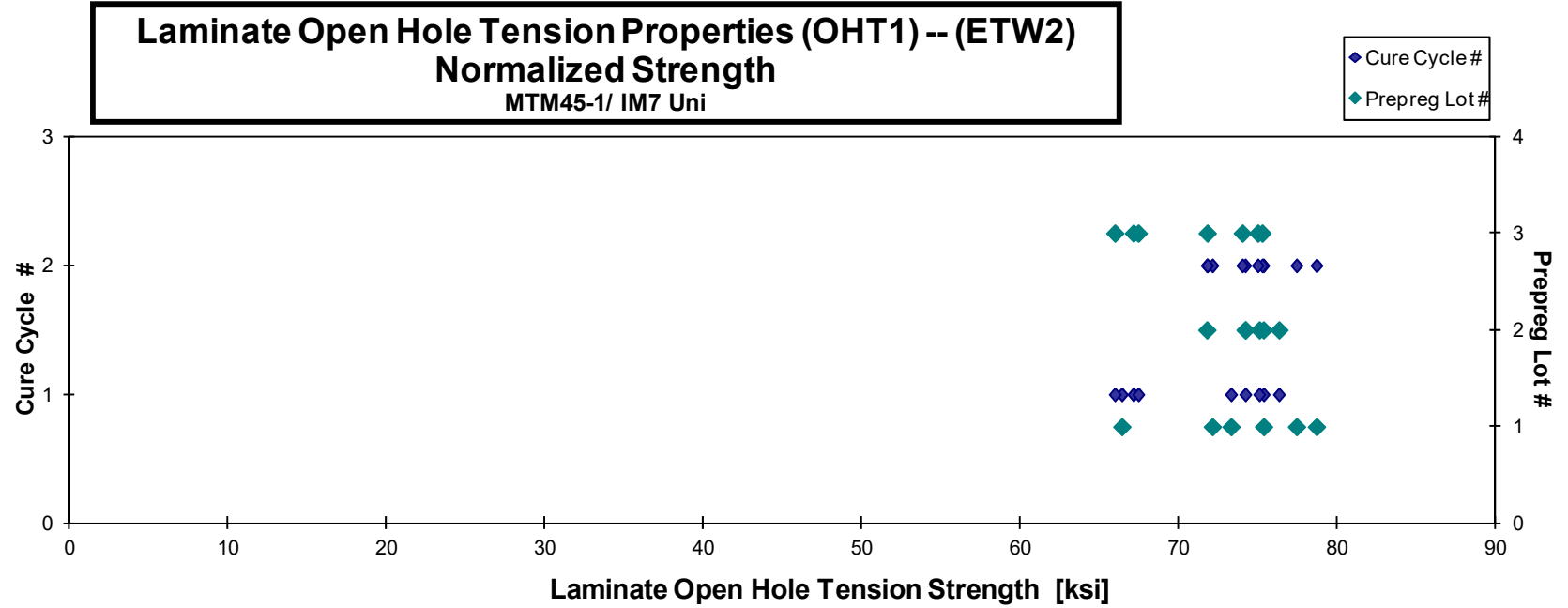
Laminate Open Hole Tension Properties (OHT1) -- (ETW2)
Strength
MTM45-1/ IM7 Uni

normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thckn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHT1-A-MH1-ETW2-1	AFDA111D	A	MH1	1	1	71.027	0.136	24	AGM	0.0057	73.296
IMU-OHT1-A-MH1-ETW2-2	AFDA112D	A	MH1	1	1	65.381	0.134	24	AGM	0.0056	66.405
IMU-OHT1-A-MH1-ETW2-3	AFDA113D	A	MH1	1	1	73.226	0.136	24	AGM	0.0057	75.353
IMU-OHT1-A-MH2-ETW2-1	AFDA211D	A	MH2	1	2	70.178	0.136	24	AGM	0.0057	72.118
IMU-OHT1-A-MH2-ETW2-2	AFDA212D	A	MH2	1	2	74.767	0.137	24	AGM	0.0057	77.430
IMU-OHT1-A-MH2-ETW2-3	AFDA213D	A	MH2	1	2	75.953	0.137	24	AGM	0.0057	78.686
IMU-OHT1-B-MH1-ETW2-1	AFDB111D	B	MH1	2	1	74.634	0.135	24	AGM	0.0056	76.321
IMU-OHT1-B-MH1-ETW2-2	AFDB112D	B	MH1	2	1	74.878	0.132	24	AGM	0.0055	75.076
IMU-OHT1-B-MH1-ETW2-3	AFDB113D	B	MH1	2	1	73.753	0.133	24	AGM	0.0055	74.200
IMU-OHT1-B-MH2-ETW2-1	AFDB211D	B	MH2	2	2	72.548	0.135	24	AGM	0.0056	74.188
IMU-OHT1-B-MH2-ETW2-2	AFDB212D	B	MH2	2	2	75.140	0.132	24	AGM	0.0055	75.339
IMU-OHT1-B-MH2-ETW2-3	AFDB213D	B	MH2	2	2	71.340	0.133	24	AGM	0.0055	71.773
IMU-OHT1-C-MH1-ETW2-1	AFDC111D	C	MH1	3	1	66.713	0.133	24	AGM	0.0055	67.134
IMU-OHT1-C-MH1-ETW2-2	AFDC112D	C	MH1	3	1	66.045	0.132	24	AGM	0.0055	65.961
IMU-OHT1-C-MH1-ETW2-3	AFDC113D	C	MH1	3	1	67.504	0.132	24	AGM	0.0055	67.445
IMU-OHT1-C-MH2-ETW2-1	AFDC211D	C	MH2	3	2	73.150	0.136	24	AGM	0.0057	75.256
IMU-OHT1-C-MH2-ETW2-2	AFDC212D	C	MH2	3	2	69.872	0.136	24	AGM	0.0057	71.795
IMU-OHT1-C-MH2-ETW2-3	AFDC213D	C	MH2	3	2	73.091	0.135	24	AGM	0.0056	74.983
IMU-OHT1-C-MH2-ETW2-4	AFDC214D	C	MH2	3	2	72.712	0.134	24	AGM	0.0056	74.006

Average 71.680
Standard Dev. 3.257
Coeff. of Var. [%] 4.544
Min. 65.381
Max. 75.953
Number of Spec. 19

Average_{norm} 0.0056 **72.988**
Standard Dev._{norm} 3.751
Coeff. of Var. [%]_{norm} 5.140
Min. 0.0055 **65.961**
Max. 0.0057 **78.686**
Number of Spec. 19



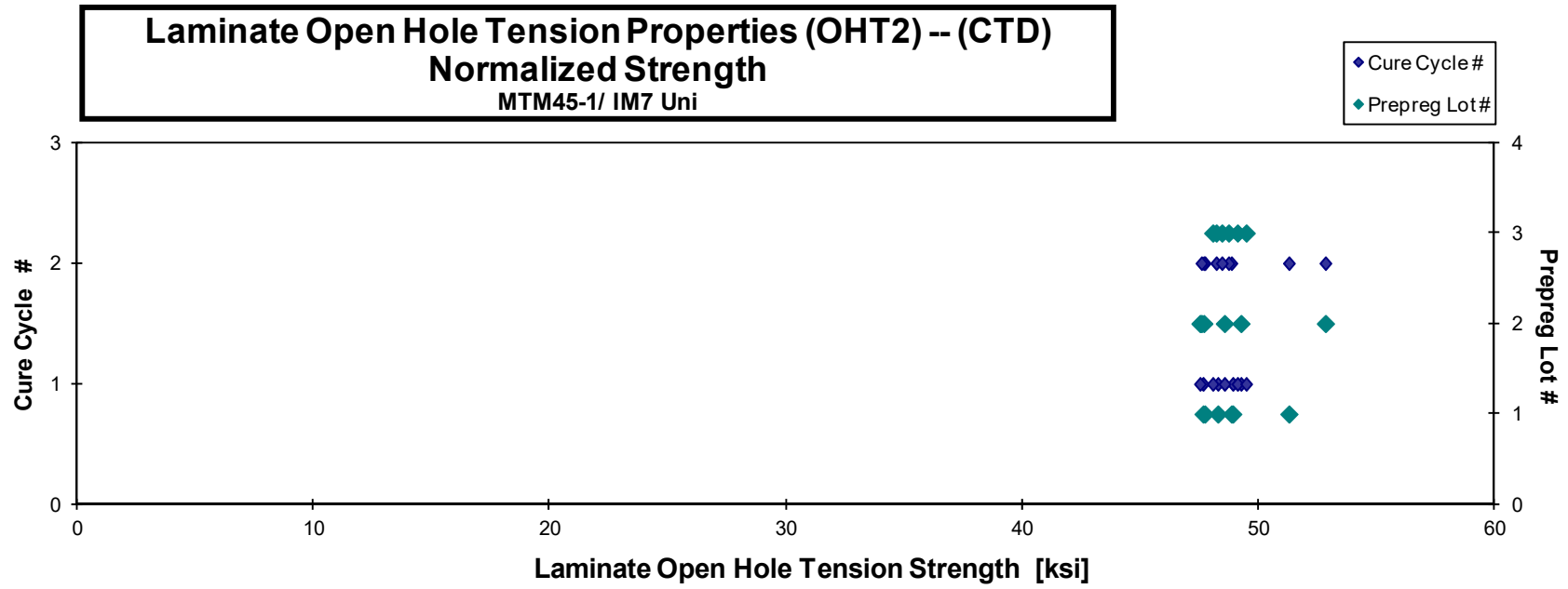
4.17 “10/80/10” Open Hole Tension 2 Properties (OHT2)

Laminate Open Hole Tension Properties (OHT2) -- (CTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thckn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHT2-A-MH1-CTD-1	AFEA111B	A	MH1	1	1	48.388	0.110	20	AGM	0.0055	48.256
IMU-OHT2-A-MH1-CTD-2	AFEA112B	A	MH1	1	1	48.890	0.110	20	AGM	0.0055	48.890
IMU-OHT2-A-MH1-CTD-3	AFEA113B	A	MH1	1	1	48.112	0.109	20	AGM	0.0054	47.630
IMU-OHT2-A-MH2-CTD-1	AFEA211B	A	MH2	1	2	46.853	0.112	20	AGM	0.0056	47.705
IMU-OHT2-A-MH2-CTD-2	AFEA212B	A	MH2	1	2	47.829	0.112	20	AGM	0.0056	48.829
IMU-OHT2-A-MH2-CTD-3	AFEA213B	A	MH2	1	2	50.038	0.113	20	AGM	0.0056	51.266
IMU-OHT2-B-MH1-CTD-1	AFEB111B	B	MH1	2	1	46.117	0.113	20	AGM	0.0057	47.501
IMU-OHT2-B-MH1-CTD-2	AFEB112B	B	MH1	2	1	48.487	0.112	20	AGM	0.0056	49.236
IMU-OHT2-B-MH1-CTD-3	AFEB113B	B	MH1	2	1	47.083	0.113	20	AGM	0.0057	48.538
IMU-OHT2-B-MH2-CTD-1	AFEB211B	B	MH2	2	2	47.318	0.111	20	AGM	0.0055	47.662
IMU-OHT2-B-MH2-CTD-2	AFEB212B	B	MH2	2	2	52.194	0.111	20	AGM	0.0056	52.811
IMU-OHT2-B-MH2-CTD-3	AFEB213B	B	MH2	2	2	47.049	0.111	20	AGM	0.0056	47.562
IMU-OHT2-C-MH1-CTD-1	AFEC111B	C	MH1	3	1	47.614	0.113	20	AGM	0.0057	49.086
IMU-OHT2-C-MH1-CTD-2	AFEC112B	C	MH1	3	1	48.016	0.113	20	AGM	0.0057	49.456
IMU-OHT2-C-MH1-CTD-3	AFEC113B	C	MH1	3	1	47.099	0.112	20	AGM	0.0056	48.041
IMU-OHT2-C-MH2-CTD-1	AFEC211B	C	MH2	3	2	48.142	0.111	20	AGM	0.0056	48.711
IMU-OHT2-C-MH2-CTD-2	AFEC212B	C	MH2	3	2	48.102	0.110	20	AGM	0.0055	48.189
IMU-OHT2-C-MH2-CTD-3	AFEC213B	C	MH2	3	2	47.818	0.111	20	AGM	0.0056	48.427

Average	48.064	Average_{norm}	0.0056	48.766
Standard Dev.	1.350	Standard Dev._{norm}		1.359
Coeff. of Var. [%]	2.809	Coeff. of Var. [%]_{norm}		2.787
Min.	46.117	Min.	0.0054	47.501
Max.	52.194	Max.	0.0057	52.811
Number of Spec.	18	Number of Spec.		18



Laminate Open Hole Tension Properties (OHT2) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

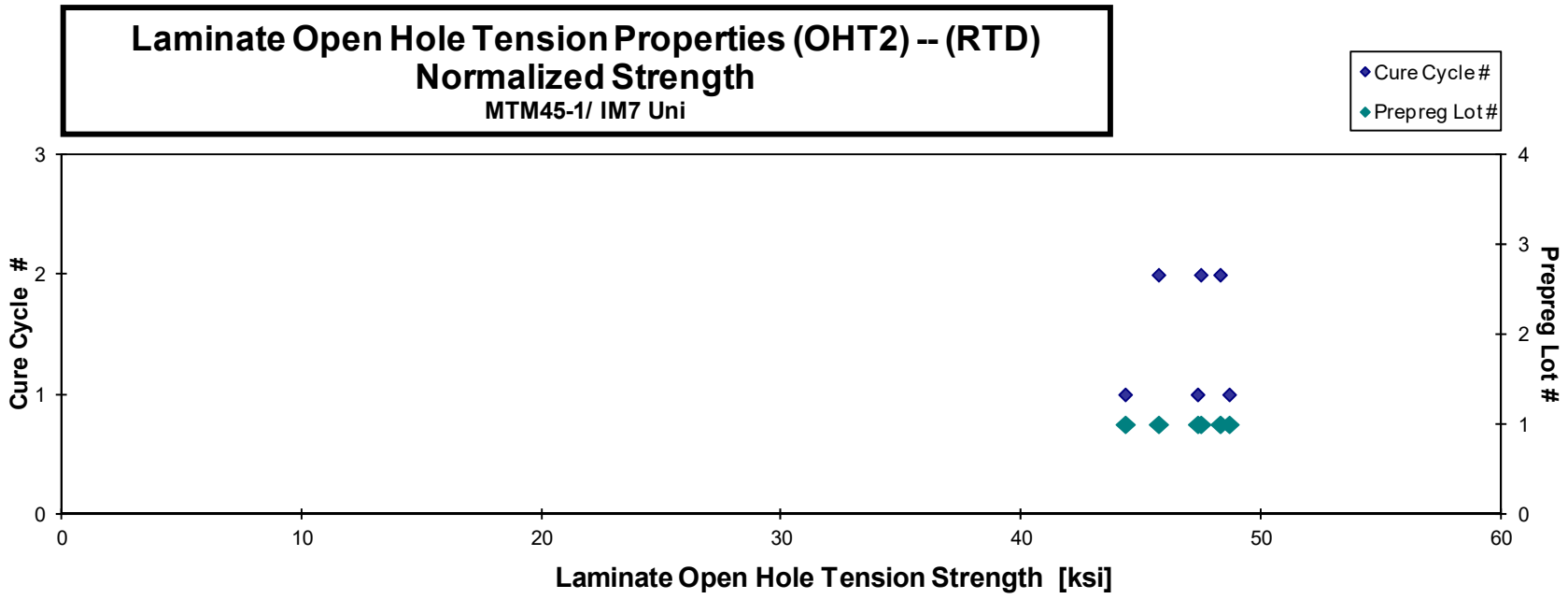
normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes
IMU-OHT2-A-MH1-RTD-1	AFEA111A	A	MH1	1	1	48.898	0.110	20	AGM
IMU-OHT2-A-MH1-RTD-2	AFEA112A	A	MH1	1	1	47.060	0.111	20	AGM
IMU-OHT2-A-MH1-RTD-3	AFEA113A	A	MH1	1	1	44.461	0.110	20	AGM
IMU-OHT2-A-MH2-RTD-1	AFEA211A	A	MH2	1	2	46.850	0.113	20	AGM
IMU-OHT2-A-MH2-RTD-2	AFEA212A	A	MH2	1	2	46.478	0.112	20	AGM
IMU-OHT2-A-MH2-RTD-3	AFEA213A	A	MH2	1	2	44.711	0.113	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0055	48.675
0.0055	47.359
0.0055	44.340
0.0057	48.298
0.0056	47.492
0.0056	45.728

Average 46.410
Standard Dev. 1.643
Coeff. of Var. [%] 3.539
Min. 44.461
Max. 48.898
Number of Spec. 6

Average_{norm} 0.0056 **46.982**
Standard Dev._{norm} **1.647**
Coeff. of Var. [%]_{norm} **3.505**
Min. 0.0055 **44.340**
Max. 0.0057 **48.675**
Number of Spec. **6**



Laminate Open Hole Tension Properties (OHT2) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

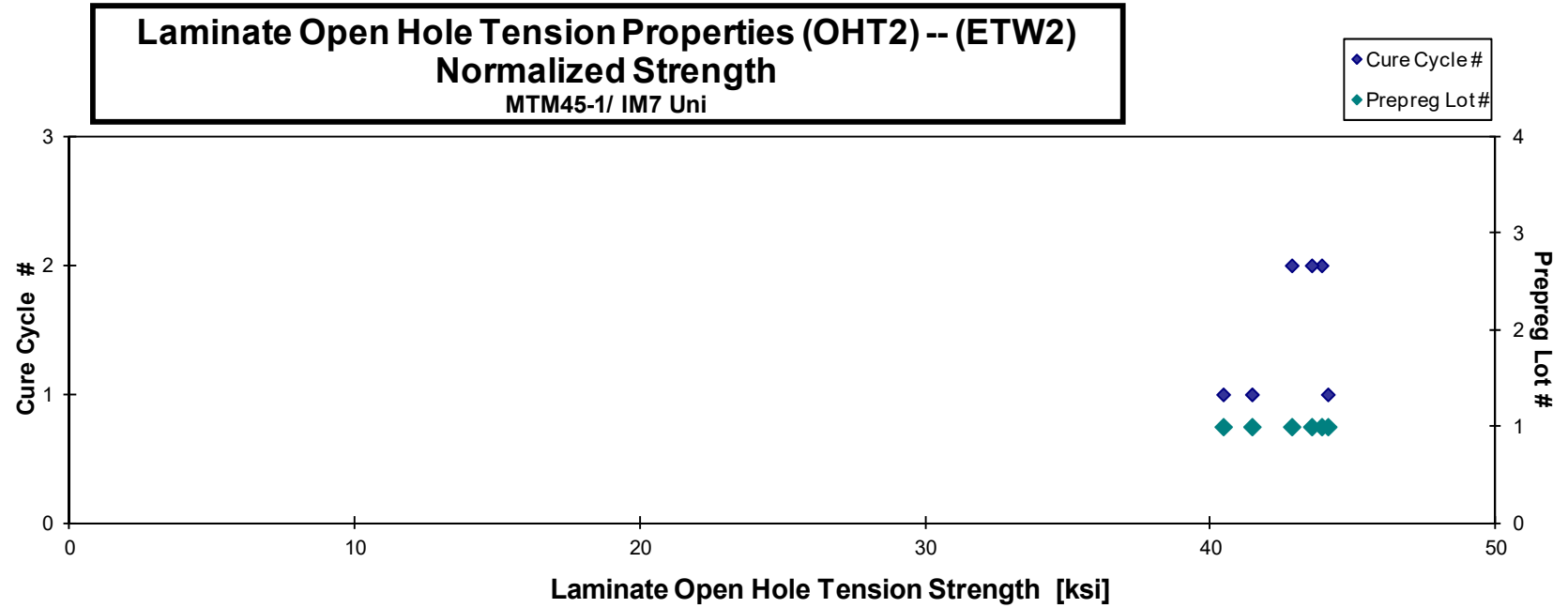
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes
IMU-OHT2-A-MH1-ETW2-1	AFEA111D	A	MH1	1	1	41.510	0.110	20	AGM
IMU-OHT2-A-MH1-ETW2-2	AFEA112D	A	MH1	1	1	43.789	0.111	20	AGM
IMU-OHT2-A-MH1-ETW2-3	AFEA113D	A	MH1	1	1	40.341	0.110	20	AGM
IMU-OHT2-A-MH2-ETW2-1	AFEA211D	A	MH2	1	2	41.716	0.113	20	AGM
IMU-OHT2-A-MH2-ETW2-2	AFEA212D	A	MH2	1	2	42.368	0.114	20	AGM
IMU-OHT2-A-MH2-ETW2-3	AFEA213D	A	MH2	1	2	42.524	0.113	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0055	41.453
0.0055	44.114
0.0055	40.445
0.0056	42.847
0.0057	43.896
0.0056	43.548

Average 42.041
 Standard Dev. 1.155
 Coeff. of Var. [%] 2.748
 Min. 40.341
 Max. 43.789
 Number of Spec. 6

Average_{norm} 0.0056 42.717
 Standard Dev._{norm} 1.470
 Coeff. of Var. [%]_{norm} 3.442
 Min. 0.0055 40.445
 Max. 0.0057 44.114
 Number of Spec. 6



4.18 “50/40/10” Open Hole Tension 3 Properties (OHT3)

Laminate Open Hole Tension Properties (OHT3) -- (CTD)
Strength
 MTM45-1/ IM7 Uni

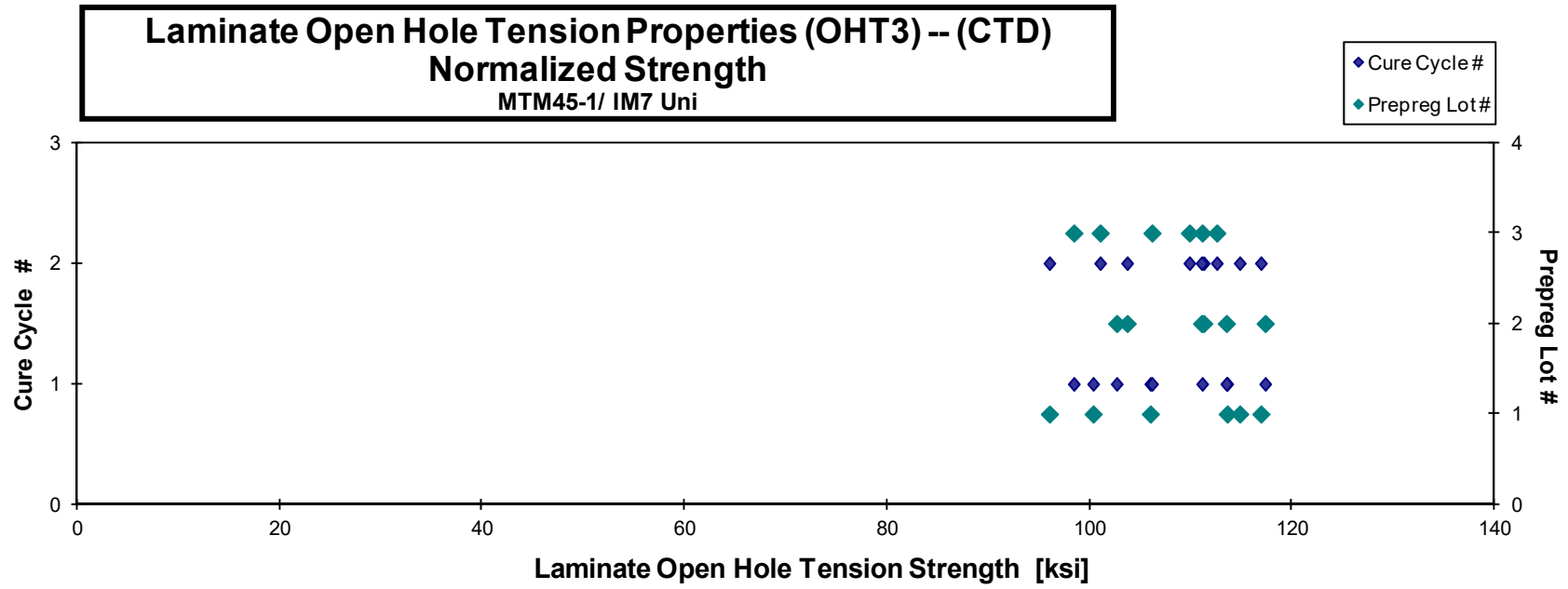
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHT3-A-MH1-CTD-1	AFFA111B	A	MH1	1	1	106.709	0.109	20	SGM / LGM	0.0055	105.933
IMU-OHT3-A-MH1-CTD-2	AFFA112B	A	MH1	1	1	101.392	0.109	20	SGM / LGM	0.0054	100.286
IMU-OHT3-A-MH1-CTD-3	AFFA113B	A	MH1	1	1	114.880	0.109	20	LGM	0.0054	113.523
IMU-OHT3-A-MH2-CTD-1	AFFA211B	A	MH2	1	2	94.084	0.112	20	AGM	0.0056	95.966
IMU-OHT3-A-MH2-CTD-2	AFFA212B	A	MH2	1	2	112.559	0.114	20	AGM / SGM	0.0057	116.857
IMU-OHT3-A-MH2-CTD-3	AFFA213B	A	MH2	1	2	109.294	0.116	20	DGM / SGM	0.0058	114.759
IMU-OHT3-B-MH1-CTD-1	AFFB111B	B	MH1	2	1	103.934	0.109	20	LGM	0.0054	102.611
IMU-OHT3-B-MH1-CTD-2	AFFB112B	B	MH1	2	1	118.679	0.109	20	LGM	0.0054	117.277
IMU-OHT3-B-MH1-CTD-3	AFFB113B	B	MH1	2	1	113.445	0.110	20	LGM	0.0055	113.445
IMU-OHT3-B-MH2-CTD-1	AFFB211B	B	MH2	2	2	98.454	0.116	20	LGM / DGM	0.0058	103.645
IMU-OHT3-B-MH2-CTD-2	AFFB212B	B	MH2	2	2	107.672	0.114	20	LGM / DGM	0.0057	111.196
IMU-OHT3-B-MH2-CTD-3	AFFB213B	B	MH2	2	2	107.386	0.114	20	LGM / DGM	0.0057	110.998
IMU-OHT3-C-MH1-CTD-1	AFFC111B	C	MH1	3	1	110.750	0.110	20	LGM / DGM	0.0055	111.052
IMU-OHT3-C-MH1-CTD-2	AFFC112B	C	MH1	3	1	97.668	0.111	20	LGM / DGM	0.0055	98.379
IMU-OHT3-C-MH1-CTD-3	AFFC113B	C	MH1	3	1	106.099	0.110	20	LGM / DGM	0.0055	106.099
IMU-OHT3-C-MH2-CTD-1*	AFFC211B	C	MH2	3	2	109.397	0.110	20	LGM / DGM	0.0055	109.795
IMU-OHT3-C-MH2-CTD-2	AFFC212B	C	MH2	3	2	100.515	0.111	20	LGM / DGM	0.0055	100.972
IMU-OHT3-C-MH2-CTD-3*	AFFC213B	C	MH2	3	2	112.597	0.110	20	LGM / DGM	0.0055	112.494

* Specimen slipped during testing.

Average 106.973
 Standard Dev. 6.592
 Coeff. of Var. [%] 6.162
 Min. 94.084
 Max. 118.679
 Number of Spec. 18

Average_{norm} 0.0056 108.072
 Standard Dev._{norm} 6.527
 Coeff. of Var. [%]_{norm} 6.040
 Min. 0.0054 95.966
 Max. 0.0058 117.277
 Number of Spec. 18



Laminate Open Hole Tension Properties (OHT3) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
0.0055

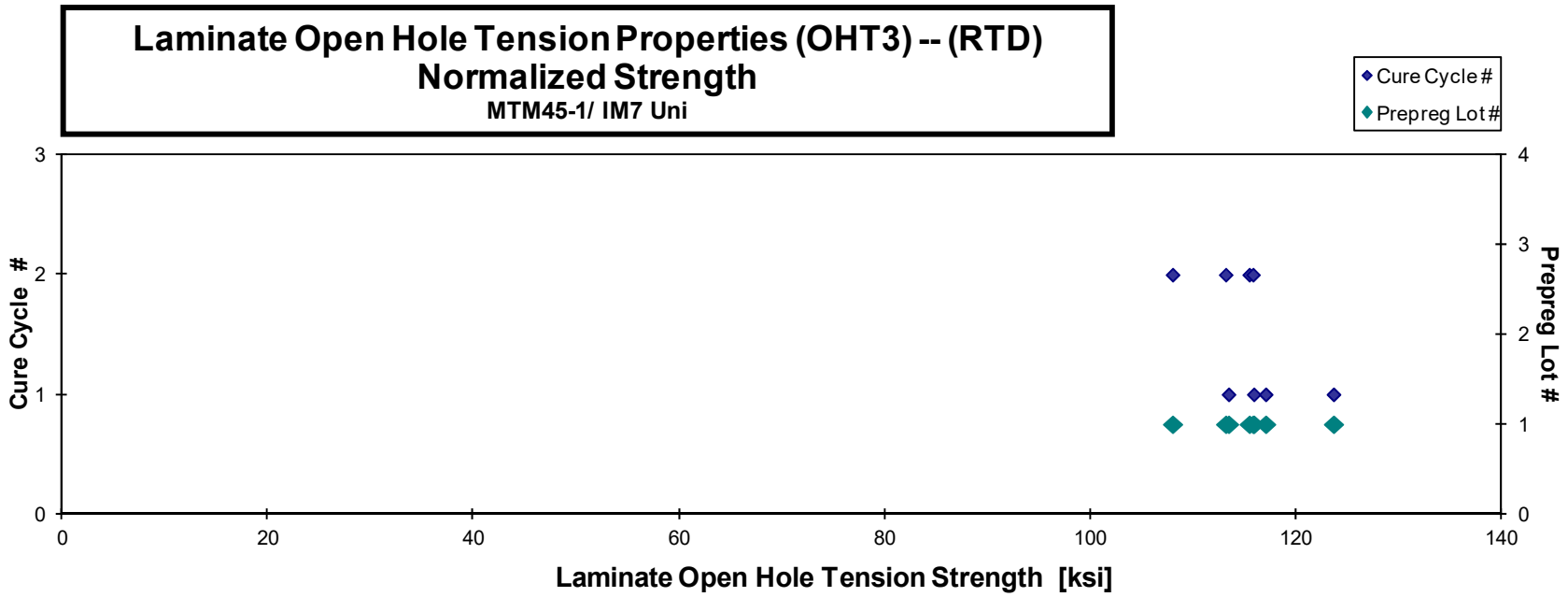
Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Modes
IMU-OHT3-A-MH1-RTD-1*	AFFA111A	A	MH1	1	1	124.068	0.110	20	LGM
IMU-OHT3-A-MH1-RTD-2	AFFA112A	A	MH1	1	1	113.831	0.110	20	LGM / SGM
IMU-OHT3-A-MH1-RTD-3	AFFA113A	A	MH1	1	1	116.293	0.110	20	LGM
IMU-OHT3-A-MH1-RTD-4	AFFA114A	A	MH1	1	1	118.313	0.109	20	LGM
IMU-OHT3-A-MH2-RTD-1	AFFA211A	A	MH2	1	2	109.268	0.114	20	LGM
IMU-OHT3-A-MH2-RTD-2	AFFA212A	A	MH2	1	2	103.462	0.115	20	LGM / DGM
IMU-OHT3-A-MH2-RTD-3	AFFA213A	A	MH2	1	2	110.995	0.115	20	LGM
IMU-OHT3-A-MH2-RTD-4	AFFA214A	A	MH2	1	2	111.143	0.115	20	LGM / DGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0055	123.730
0.0055	113.521
0.0055	115.976
0.0054	117.130
0.0057	113.242
0.0057	108.071
0.0057	115.536
0.0057	115.892

* Specimen slipped during testing.

Average 113.422
 Standard Dev. 6.247
 Coeff. of Var. [%] 5.508
 Min. 103.462
 Max. 124.068
 Number of Spec. 8

Average_{norm} 0.0056 115.387
 Standard Dev._{norm} 4.389
 Coeff. of Var. [%]_{norm} 3.804
 Min. 0.0054 108.071
 Max. 0.0057 123.730
 Number of Spec. 8



Laminate Open Hole Tension Properties (OHT3) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

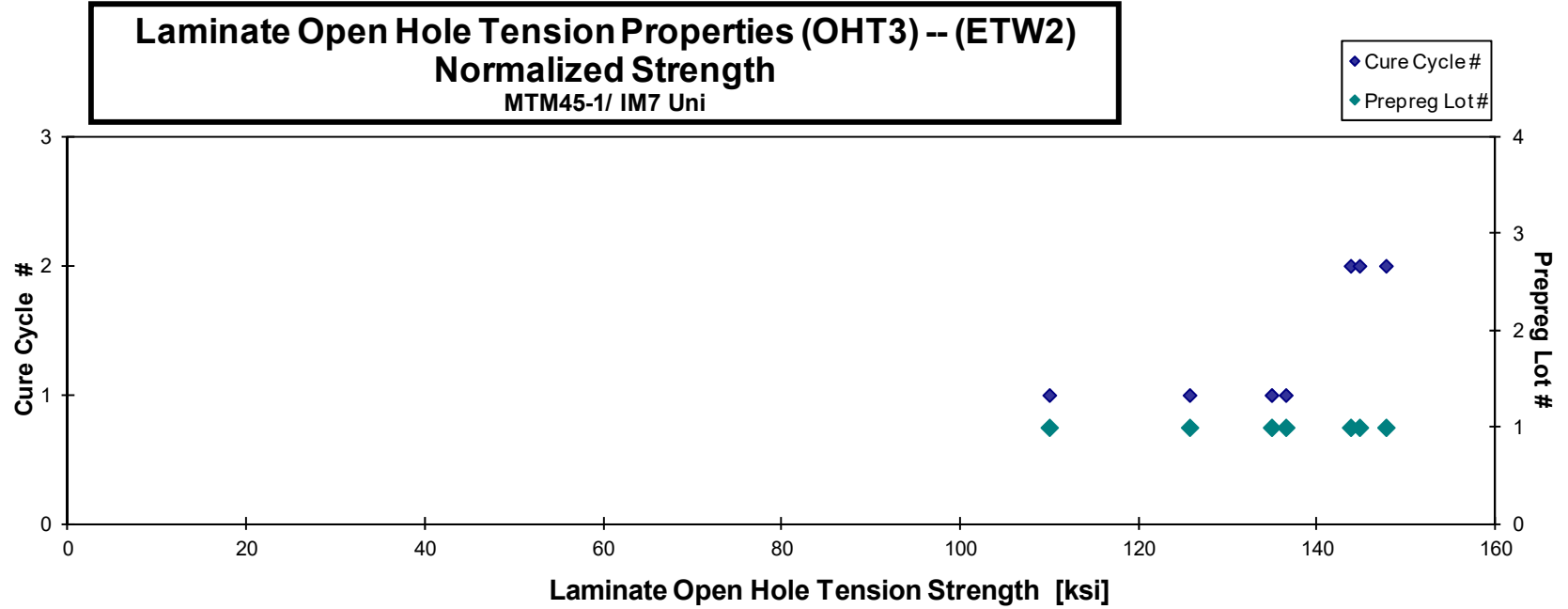
normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes
IMU-OHT3-A-MH1-ETW2-1	AFFA111D	A	MH1	1	1	112.018	0.108	20	AGM
IMU-OHT3-A-MH1-ETW2-2	AFFA112D	A	MH1	1	1	136.210	0.109	20	AGM
IMU-OHT3-A-MH1-ETW2-3	AFFA113D	A	MH1	1	1	137.904	0.109	20	AGM
IMU-OHT3-A-MH1-ETW2-4	AFFA114D	A	MH1	1	1	126.932	0.109	20	AGM
IMU-OHT3-A-MH2-ETW2-2	AFFA212D	A	MH2	1	2	141.013	0.112	20	AGM
IMU-OHT3-A-MH2-ETW2-3	AFFA213D	A	MH2	1	2	143.917	0.113	20	AGM
IMU-OHT3-A-MH2-ETW2-4	AFFA214D	A	MH2	1	2	137.235	0.116	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0054	109.981
0.0054	134.889
0.0054	136.483
0.0054	125.701
0.0056	143.747
0.0056	147.711
0.0058	144.741

Average 133.604
 Standard Dev. 10.880
 Coeff. of Var. [%] 8.143
 Min. 112.018
 Max. 143.917
 Number of Spec. 7

Average_{norm} 0.0055 134.751
 Standard Dev._{norm} 13.211
 Coeff. of Var. [%]_{norm} 9.804
 Min. 0.0054 109.981
 Max. 0.0058 147.711
 Number of Spec. 7



4.19 “25/50/25” Filled-Hole Tension 1 Properties (FHT1)

Laminate Filled Hole Tension Properties (FHT1) -- (CTD)
Strength
MTM45-1/ IM7 Uni

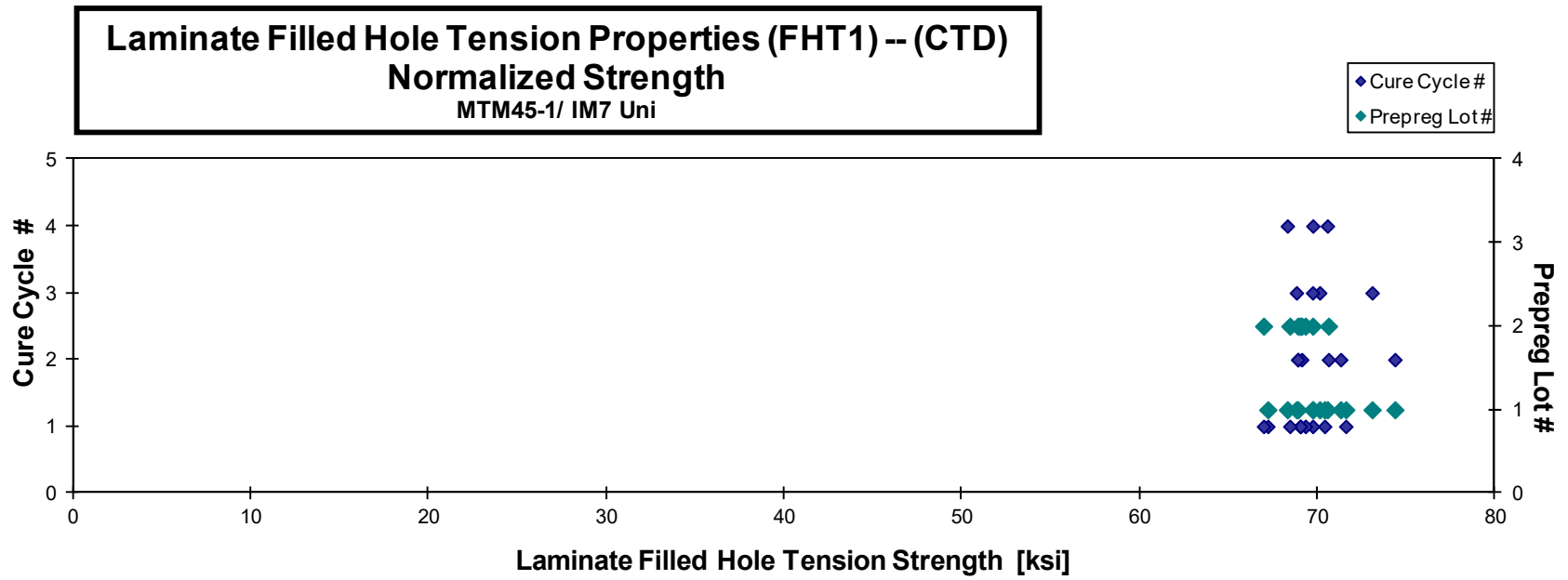
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-FHT1-A-MH1-CTD-1	AF4A111B	A	MH1	1	1	65.913	0.135	24	LGM	0.0056	67.212
IMU-FHT1-A-MH1-CTD-2	AF4A112B	A	MH1	1	1	70.248	0.132	24	AGM	0.0055	70.407
IMU-FHT1-A-MH1-CTD-3	AF4A113B	A	MH1	1	1	70.952	0.133	24	LGM	0.0056	71.597
IMU-FHT1-A-MH2-CTD-1	AF4A211B	A	MH2	1	2	71.096	0.132	24	LGM	0.0055	71.311
IMU-FHT1-A-MH2-CTD-2	AF4A212B	A	MH2	1	2	68.799	0.132	24	AGM	0.0055	68.903
IMU-FHT1-A-MH2-CTD-3	AF4A213B	A	MH2	1	2	73.746	0.133	24	LGM / AGM	0.0055	74.361
IMU-FHT1-B-MH1-CTD-1	AF4B111B	B	MH1	2	1	67.999	0.134	24	LGM	0.0056	69.030
IMU-FHT1-B-MH1-CTD-2	AF4B112B	B	MH1	2	1	68.743	0.134	24	LGM	0.0056	69.733
IMU-FHT1-B-MH1-CTD-3	AF4B113B	B	MH1	2	1	65.535	0.135	24	LGM	0.0056	66.975
IMU-FHT1-B-MH1	AF4B121B*	B	MH1	2	1	68.718	0.133	24	AGM	0.0055	69.325
IMU-FHC1-B-MH1	AF4B171B*	B	MH1	2	1	69.012	0.132	24	AGM	0.0055	69.038
IMU-OHT1-B-MH1	AF4B1D1B*	B	MH1	2	1	68.947	0.131	24	AGM	0.0055	68.451
IMU-FHT1-B-MH2-CTD-1	AF4B211B	B	MH2	2	2	67.829	0.135	24	AGM	0.0056	69.114
IMU-FHT1-B-MH2-CTD-2	AF4B212B	B	MH2	2	2	68.751	0.136	24	LGM	0.0057	70.627
IMU-FHT1-B-MH2-CTD-3	AF4B213B	B	MH2	2	2	67.670	0.134	24	AGM	0.0056	68.900
IMU-FHT1-A-MH3-CTD-1	AF4C111B	A	MH3	1	3	68.418	0.135	24	AGM	0.0056	70.128
IMU-FHT1-A-MH3-CTD-2	AF4C112B	A	MH3	1	3	66.649	0.136	24	LGM	0.0057	68.820
IMU-FHT1-A-MH3-CTD-3	AF4C113B	A	MH3	1	3	67.779	0.136	24	LGM	0.0057	69.730
IMU-FHT1-A-MH3-CTD-4	AF4C114B	A	MH3	1	3	70.825	0.136	24	LGM	0.0057	73.079
IMU-FHT1-A-MH4-CTD-1	AF4C211B	A	MH4	1	4	67.151	0.137	24	AGM	0.0057	69.746
IMU-FHT1-A-MH4-CTD-2	AF4C212B	A	MH4	1	4	65.818	0.137	24	AGM	0.0057	68.311
IMU-FHT1-A-MH4-CTD-3	AF4C213B	A	MH4	1	4	68.792	0.135	24	AGM	0.0056	70.564

* Additional test specimens were machined from respective panel

Average **68.609**
Standard Dev. **1.941**
Coeff. of Var. [%] **2.829**
Min. **65.535**
Max. **73.746**
Number of Spec. **22**

Average_{norm} **0.0056** **69.789**
Standard Dev._{norm} **1.718**
Coeff. of Var. [%]_{norm} **2.462**
Min. **0.0055** **66.975**
Max. **0.0057** **74.361**
Number of Spec. **22**



Laminate Filled Hole Tension Properties (FHT1) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

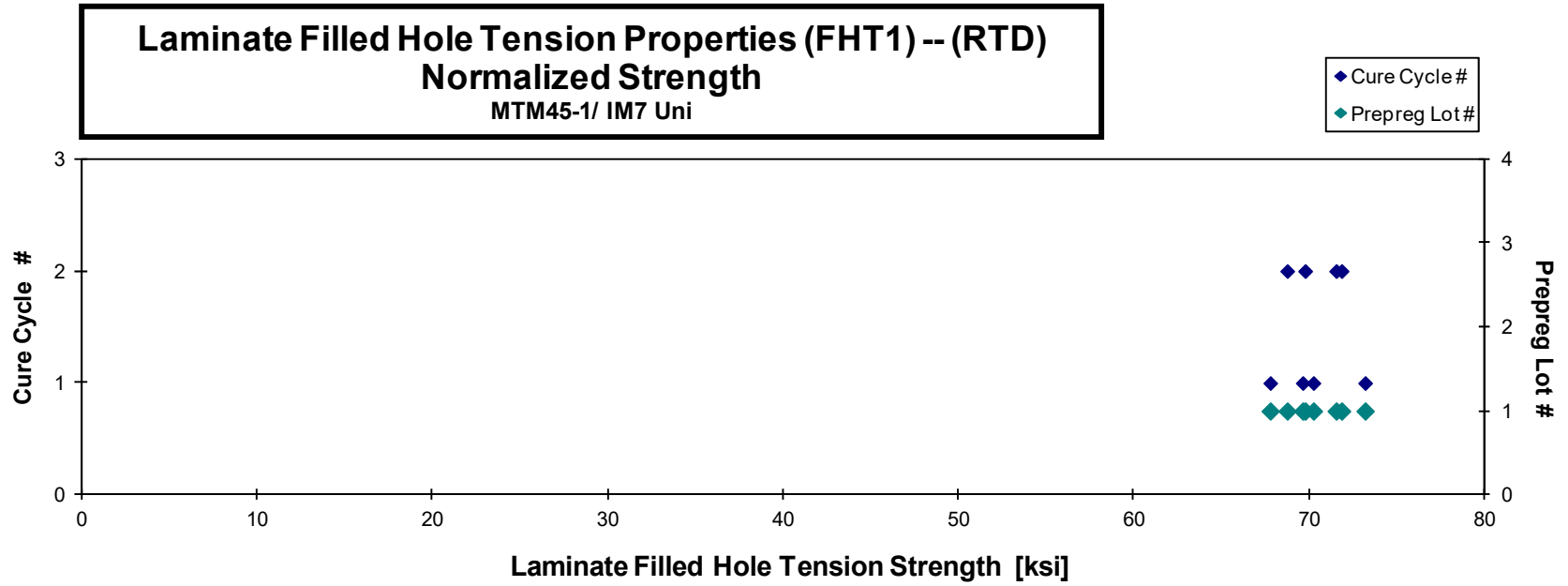
normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-FHT1-A-MH1-RTD-1	AF4A111A	A	MH1	1	1	68.902	0.133	24	AGM
IMU-FHT1-A-MH1-RTD-2	AF4A112A	A	MH1	1	1	72.100	0.134	24	AGM
IMU-FHT1-A-MH1-RTD-3	AF4A113A	A	MH1	1	1	68.683	0.135	24	LGM
IMU-FHT1-A-MH1-RTD-4	AF4A114A	A	MH1	1	1	66.179	0.135	24	LGM
IMU-FHT1-A-MH2-RTD-1	AF4A211A	A	MH1	1	2	68.541	0.132	24	AGM
IMU-FHT1-A-MH2-RTD-2	AF4A212A	A	MH1	1	2	69.985	0.132	24	AGM
IMU-FHT1-A-MH2-RTD-3	AF4A213A	A	MH1	1	2	71.273	0.133	24	AGM
IMU-FHT1-A-MH2-RTD-4	AF4A214A	A	MH1	1	2	71.522	0.133	24	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	69.633
0.0056	73.193
0.0056	70.244
0.0056	67.783
0.0055	68.749
0.0055	69.773
0.0055	71.543
0.0055	71.847

Average 69.648
Standard Dev. 1.965
Coeff. of Var. [%] 2.821
Min. 66.179
Max. 72.100
Number of Spec. 8

Average_{norm} 0.0056 **70.346**
Standard Dev._{norm} **1.763**
Coeff. of Var. [%]_{norm} **2.506**
Min. 0.0055 **67.783**
Max. 0.0056 **73.193**
Number of Spec. **8**



4.20 “10/80/10” Filled-Hole Tension 2 Properties (FHT2)

Laminate Filled Hole Tension Properties (FHT2) -- (CTD)
Strength
 MTM45-1/ IM7 Uni

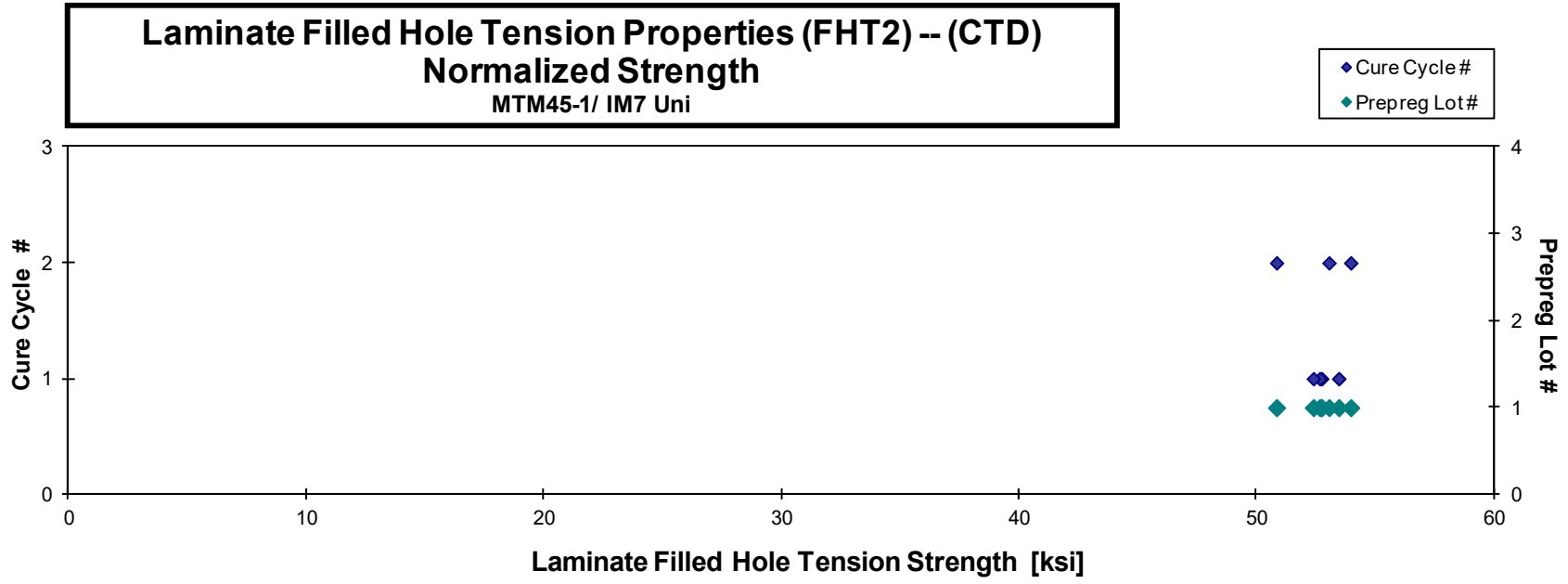
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode
IMU-FHT2-A-MH1-CTD-1	AF5A111B	A	MH1	1	1	50.975	0.114	20	AGM
IMU-FHT2-A-MH1-CTD-2	AF5A112B	A	MH1	1	1	52.130	0.113	20	AGM
IMU-FHT2-A-MH1-CTD-3	AF5A113B	A	MH1	1	1	50.899	0.114	20	AGM
IMU-FHT2-A-MH1-CTD-4	AF5A114B	A	MH1	1	1	50.730	0.114	20	AGM
IMU-FHT2-A-MH2-CTD-1	AF5A211B	A	MH2	1	2	51.007	0.114	20	AGM
IMU-FHT2-A-MH2-CTD-2	AF5A212B	A	MH2	1	2	48.503	0.115	20	AGM
IMU-FHT2-A-MH2-CTD-3	AF5A213B	A	MH2	1	2	51.480	0.115	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0057	52.736
0.0056	53.457
0.0057	52.657
0.0057	52.390
0.0057	53.048
0.0058	50.840
0.0058	53.961

Average 50.818
 Standard Dev. 1.125
 Coeff. of Var. [%] 2.214
 Min. 48.503
 Max. 52.130
 Number of Spec. 7

Average_{norm} 0.0057 52.727
 Standard Dev._{norm} 0.986
 Coeff. of Var. [%]_{norm} 1.871
 Min. 0.0056 50.840
 Max. 0.0058 53.961
 Number of Spec. 7



Laminate Filled Hole Tension Properties (FHT2) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

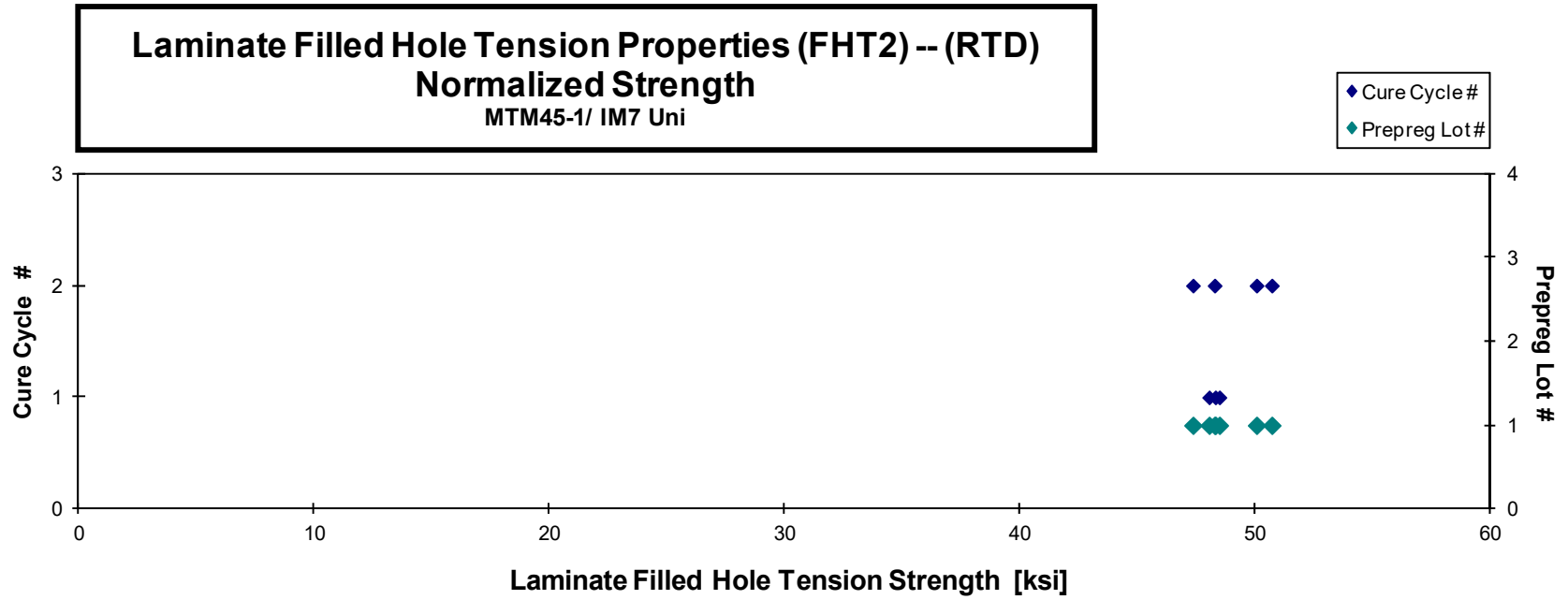
normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-FHT2-A-MH1-RTD-1	AF5A111A	A	MH1	1	1	47.285	0.113	20	AGM
IMU-FHT2-A-MH1-RTD-2	AF5A112A	A	MH1	1	1	46.954	0.113	20	AGM
IMU-FHT2-A-MH1-RTD-3	AF5A113A	A	MH1	1	1	46.860	0.113	20	AGM
IMU-FHT2-A-MH2-RTD-1	AF5A211A	A	MH2	1	2	46.672	0.114	20	LGM
IMU-FHT2-A-MH2-RTD-2	AF5A212A	A	MH2	1	2	45.464	0.115	20	AGM
IMU-FHT2-A-MH2-RTD-3	AF5A213A	A	MH2	1	2	48.898	0.114	20	AGM
IMU-FHT2-A-MH2-RTD-4	AF5A214A	A	MH2	1	2	48.311	0.114	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	48.488
0.0057	48.320
0.0056	48.053
0.0057	48.284
0.0057	47.365
0.0057	50.720
0.0057	50.068

Average 47.206
 Standard Dev. 1.125
 Coeff. of Var. [%] 2.383
 Min. 45.464
 Max. 48.898
 Number of Spec. 7

Average_{norm} 0.0057 48.757
 Standard Dev._{norm} 1.190
 Coeff. of Var. [%]_{norm} 2.440
 Min. 0.0056 47.365
 Max. 0.0057 50.720
 Number of Spec. 7



Laminate Filled Hole Tension Properties (FHT2) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

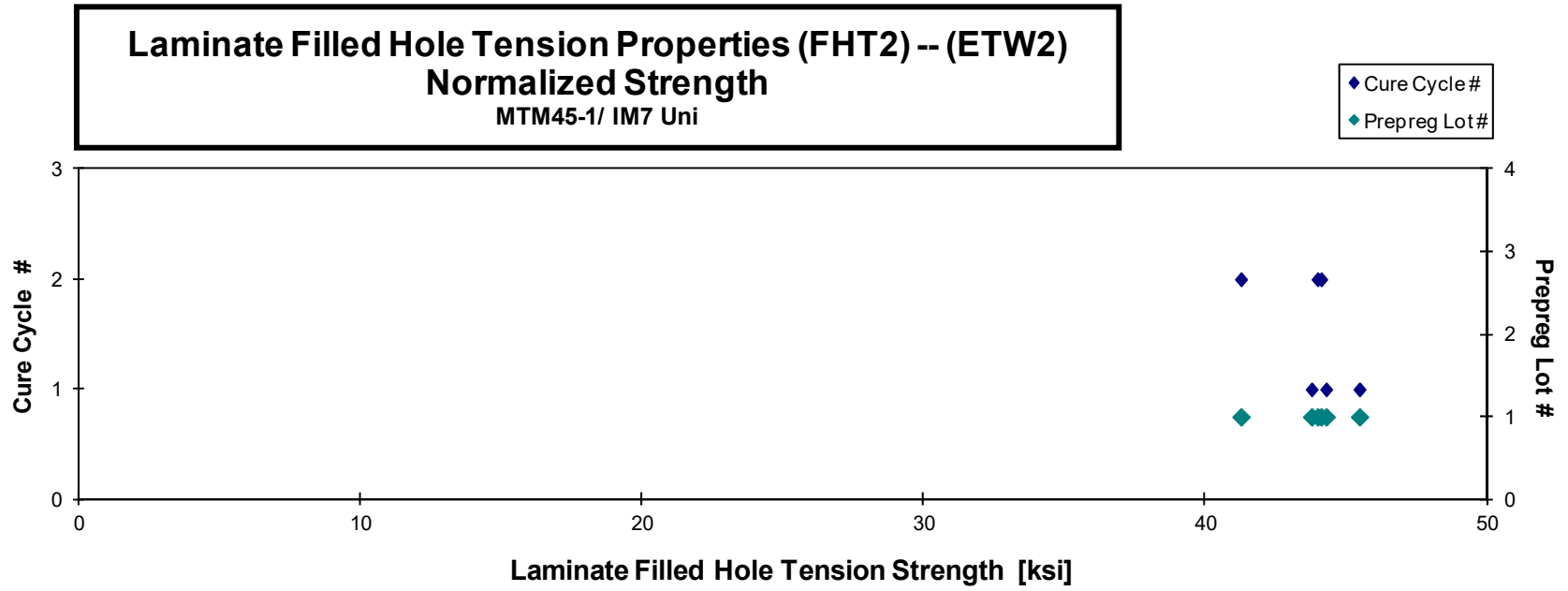
normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode
IMU-FHT2-A-MH1-ETW2-1	AF5A111D	A	MH1	1	1	41.597	0.116	20	AGM
IMU-FHT2-A-MH1-ETW2-2	AF5A112D	A	MH1	1	1	42.572	0.114	20	AGM
IMU-FHT2-A-MH1-ETW2-3	AF5A113D	A	MH1	1	1	43.362	0.115	20	AGM
IMU-FHT2-A-MH2-ETW2-1	AF5A211D	A	MH2	1	2	42.593	0.114	20	AGM
IMU-FHT2-A-MH2-ETW2-2	AF5A212D	A	MH2	1	2	40.003	0.113	20	AGM
IMU-FHT2-A-MH2-ETW2-3	AF5A213D	A	MH2	1	2	42.088	0.115	20	AGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0058	43.759
0.0057	44.275
0.0058	45.458
0.0057	44.096
0.0057	41.251
0.0057	43.969

Average 42.036
 Standard Dev. 1.156
 Coeff. of Var. [%] 2.751
 Min. 40.003
 Max. 43.362
 Number of Spec. 6

Average_{norm} 0.0057 43.801
 Standard Dev._{norm} 1.385
 Coeff. of Var. [%]_{norm} 3.162
 Min. 0.0057 41.251
 Max. 0.0058 45.458
 Number of Spec. 6



4.21 “50/40/10” Filled-Hole Tension 3 Properties (FHT3)

Laminate Filled Hole Tension Properties (FHT3) -- (CTD)
Strength
 MTM45-1/ IM7 Uni

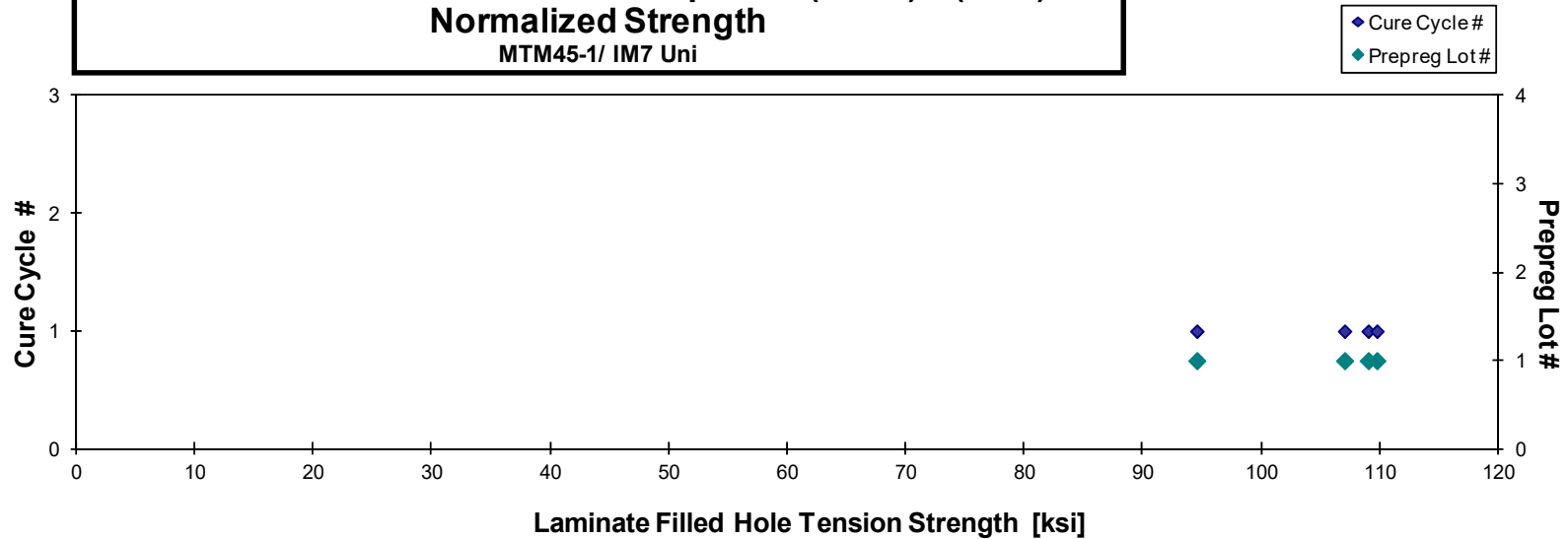
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-FHT3-A-MH1-CTD-1	AF6A121B	A	MH1	1	1	102.370	0.115	20	LGM	0.0058	107.023
IMU-FHT3-A-MH1-CTD-2	AF6A122B	A	MH1	1	1	104.730	0.115	20	AGM/SGM	0.0057	109.014
IMU-FHT3-A-MH1-CTD-3	AF6A123B	A	MH1	1	1	90.445	0.115	20	LGM	0.0058	94.556
IMU-FHT3-A-MH1-CTD-4	AF6A124B	A	MH1	1	1	103.532	0.117	20	LGM	0.0058	109.744

*Data for IMU-FHT3-A-MH2 was not included, refer to Section 9.0 Deviations for further explanation.

Average	100.269	Average _{norm}	0.0058	105.084
Standard Dev.	6.620	Standard Dev. _{norm}		7.112
Coeff. of Var. [%]	6.602	Coeff. of Var. [%] _{norm}		6.768
Min.	90.445	Min.	0.0057	94.556
Max.	104.730	Max.	0.0058	109.744
Number of Spec.	4	Number of Spec.		4

Laminate Filled Hole Tension Properties (FHT3) -- (CTD)
Normalized Strength
 MTM45-1/ IM7 Uni



Laminate Filled Hole Tension Properties (FHT3) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

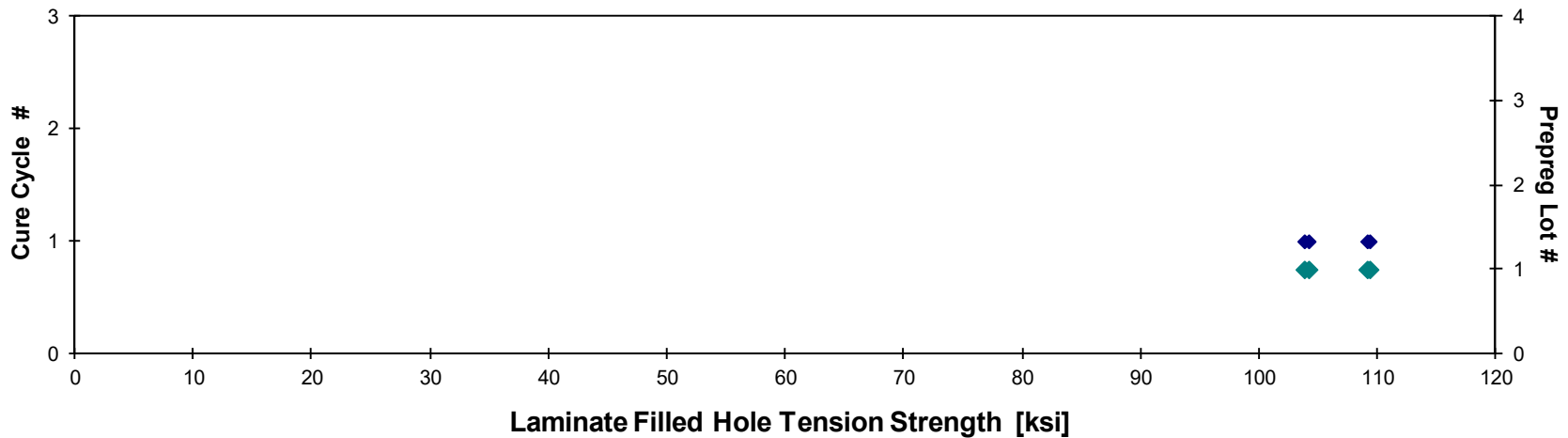
Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-FHT3-A-MH1-RTD-1	AF6A111A	A	MH1	1	1	103.560	0.116	20	LGM
IMU-FHT3-A-MH1-RTD-2	AF6A112A	A	MH1	1	1	99.114	0.115	20	LGM
IMU-FHT3-A-MH1-RTD-3	AF6A113A	A	MH1	1	1	104.301	0.115	20	LGM
IMU-FHT3-A-MH1-RTD-4	AF6A114A	A	MH1	1	1	100.517	0.114	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0058	109.115
0.0058	103.799
0.0058	109.326
0.0057	104.172

*Data for IMU-FHT3-A-MH2 was not included, refer to Section 9.0 Deviations for further explanation.

Average	101.873	Average _{norm}	0.0058	106.603
Standard Dev.	2.462	Standard Dev. _{norm}		3.027
Coeff. of Var. [%]	2.417	Coeff. of Var. [%] _{norm}		2.840
Min.	99.114	Min.	0.0057	103.799
Max.	104.301	Max.	0.0058	109.326
Number of Spec.	4	Number of Spec.		4

Laminate Filled Hole Tension Properties (FHT3) -- (RTD)
Normalized Strength
 MTM45-1/ IM7 Uni



4.22 “25/50/25” Open-Hole Compression 1 Properties (OHC1)

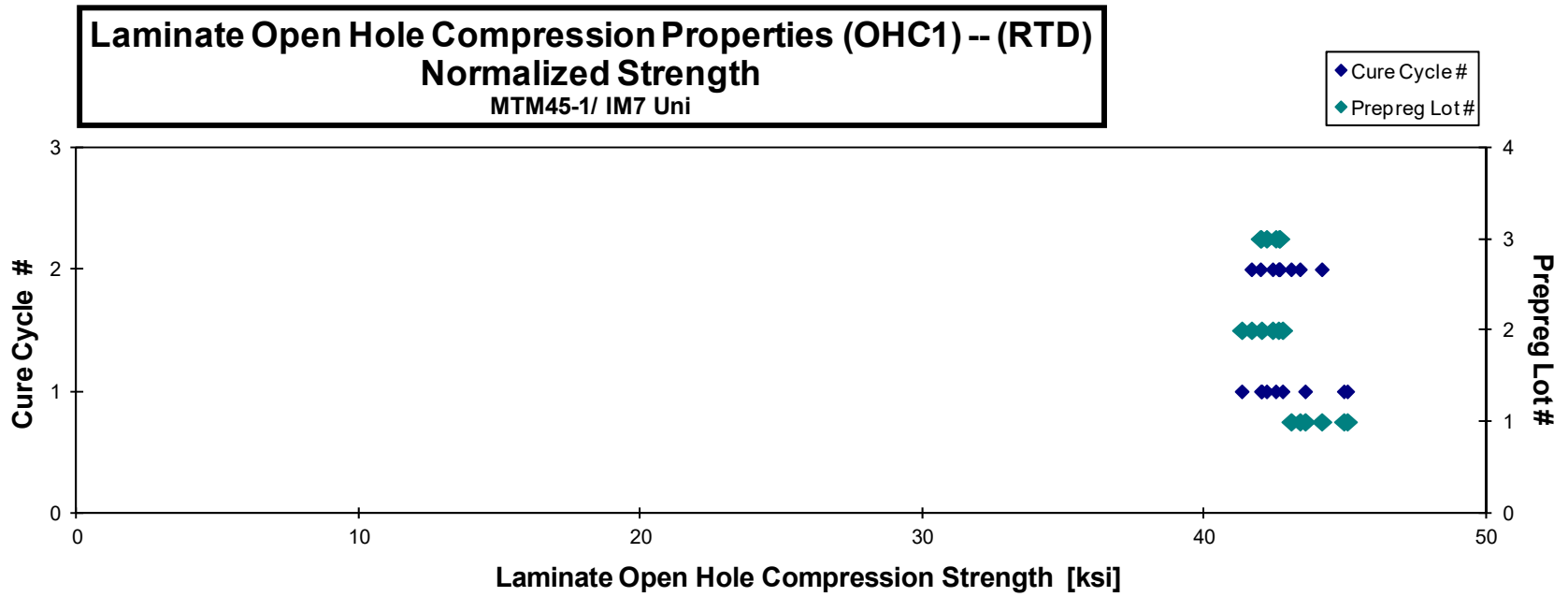
Laminate Open Hole Compression Properties (OHC1) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHC1-A-MH1-RTD-1	AFGA111A	A	MH1	1	1	43.428	0.137	24	LGM	0.0057	44.974
IMU-OHC1-A-MH1-RTD-2	AFGA112A	A	MH1	1	1	43.357	0.137	24	LGM	0.0057	45.098
IMU-OHC1-A-MH1-RTD-3	AFGA113A	A	MH1	1	1	42.476	0.136	24	LGM	0.0056	43.602
IMU-OHC1-A-MH2-RTD-1	AFGA211A	A	MH2	1	2	43.081	0.135	24	LGM	0.0056	44.191
IMU-OHC1-A-MH2-RTD-2	AFGA212A	A	MH2	1	2	42.140	0.136	24	LGM	0.0057	43.417
IMU-OHC1-A-MH2-RTD-3	AFGA213A	A	MH2	1	2	42.113	0.135	24	LGM	0.0056	43.102
IMU-OHC1-B-MH1-RTD-1	AFGB111A	B	MH1	2	1	41.788	0.135	24	LGM	0.0056	42.801
IMU-OHC1-B-MH1-RTD-2	AFGB112A	B	MH1	2	1	40.795	0.134	24	LGM	0.0056	41.351
IMU-OHC1-B-MH1-RTD-3	AFGB113A	B	MH1	2	1	41.000	0.135	24	LGM	0.0056	42.056
IMU-OHC1-B-MH2-RTD-1	AFGB211A	B	MH2	2	2	42.256	0.133	24	LGM	0.0055	42.448
IMU-OHC1-B-MH2-RTD-2	AFGB212A	B	MH2	2	2	41.539	0.133	24	LGM	0.0055	41.696
IMU-OHC1-B-MH2-RTD-3	AFGB213A	B	MH2	2	2	41.956	0.134	24	LGM	0.0056	42.655
IMU-OHC1-C-MH1-RTD-1	AFGC111A	C	MH1	3	1	42.226	0.131	24	LGM	0.0055	42.034
IMU-OHC1-C-MH1-RTD-2	AFGC112A	C	MH1	3	1	42.490	0.131	24	LGM	0.0055	42.232
IMU-OHC1-C-MH1-RTD-3	AFGC113A	C	MH1	3	1	43.113	0.130	24	LGM	0.0054	42.558
IMU-OHC1-C-MH2-RTD-1	AFGC211A	C	MH2	3	2	42.925	0.131	24	LGM	0.0055	42.698
IMU-OHC1-C-MH2-RTD-2	AFGC212A	C	MH2	3	2	42.109	0.132	24	LGM	0.0055	42.013
IMU-OHC1-C-MH2-RTD-3	AFGC213A	C	MH2	3	2	42.938	0.131	24	LGM	0.0055	42.678

Average 42.318
Standard Dev. 0.749
Coeff. of Var. [%] 1.770
Min. 40.795
Max. 43.428
Number of Spec. 18

Average_{norm} 0.0056 **42.867**
Standard Dev._{norm} **1.046**
Coeff. of Var. [%]_{norm} **2.440**
Min. 0.0054 **41.351**
Max. 0.0057 **45.098**
Number of Spec. **18**



Laminate Open Hole Compression Properties (OHC1) -- (ETW)
Strength
 MTM45-1/ IM7 Uni

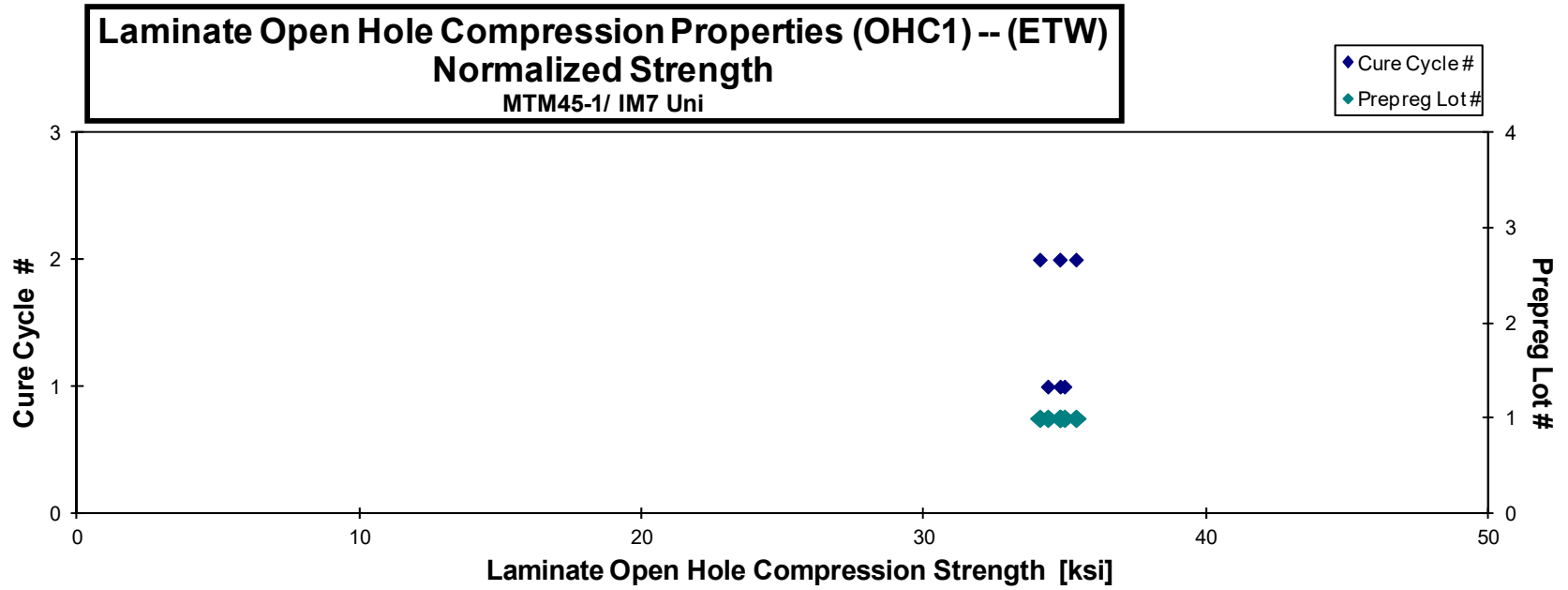
normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes
IMU-OHC1-A-MH1-ETW-1	AFGA111N	A	MH1	1	1	33.677	0.135	24	LGM
IMU-OHC1-A-MH1-ETW-2	AFGA112N	A	MH1	1	1	33.831	0.137	24	LGM
IMU-OHC1-A-MH1-ETW-3	AFGA113N	A	MH1	1	1	33.886	0.136	24	LGM
IMU-OHC1-A-MH2-ETW-1	AFGA211N	A	MH2	1	2	34.890	0.134	24	LGM
IMU-OHC1-A-MH2-ETW-2	AFGA212N	A	MH2	1	2	33.964	0.135	24	LGM
IMU-OHC1-A-MH2-ETW-3	AFGA213N	A	MH2	1	2	33.569	0.134	24	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	34.404
0.0057	34.993
0.0057	34.840
0.0056	35.401
0.0056	34.830
0.0056	34.120

Average 33.970
 Standard Dev. 0.473
 Coeff. of Var. [%] 1.393
 Min. 33.569
 Max. 34.890
 Number of Spec. 6

Average_{norm} 0.0056 34.765
 Standard Dev._{norm} 0.450
 Coeff. of Var. [%]_{norm} 1.295
 Min. 0.0056 34.120
 Max. 0.0057 35.401
 Number of Spec. 6



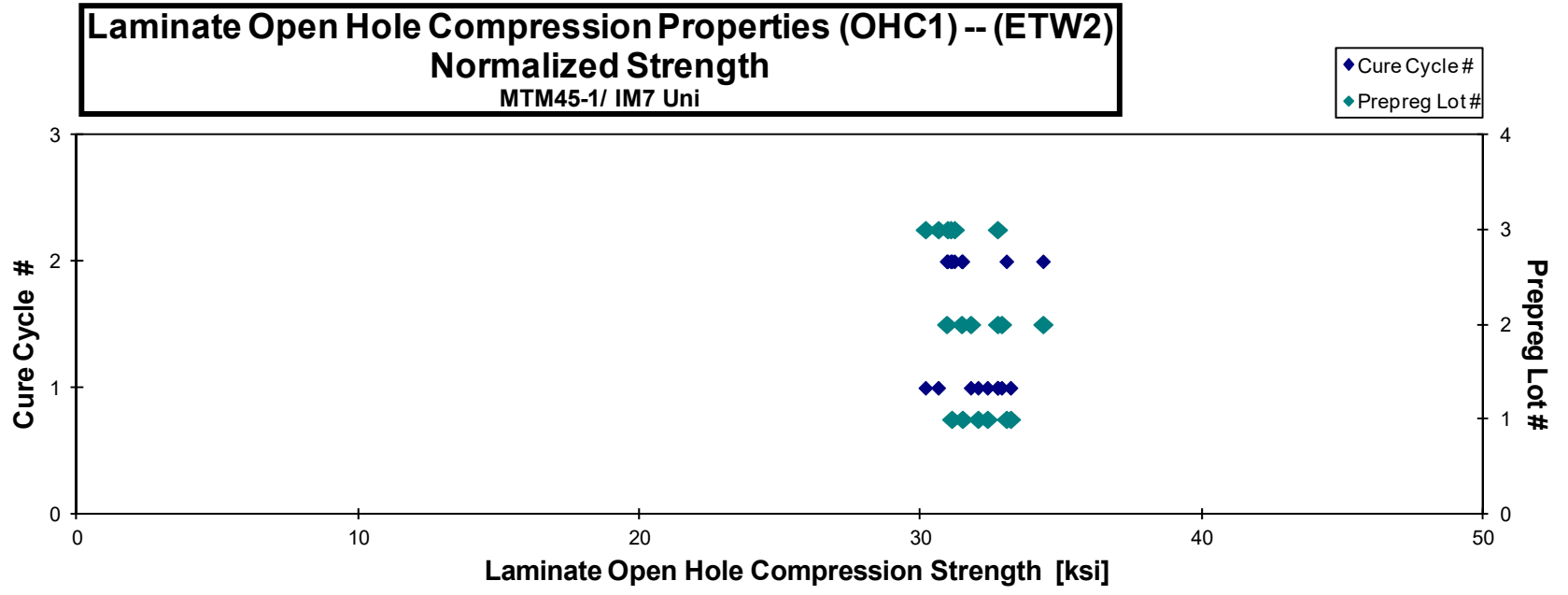
Laminate Open Hole Compression Properties (OHC1) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHC1-A-MH1-ETW2-1	AFGA111D	A	MH1	1	1	31.434	0.136	24	LGM	0.0057	32.386
IMU-OHC1-A-MH1-ETW2-2	AFGA112D	A	MH1	1	1	31.198	0.136	24	LGM	0.0057	32.053
IMU-OHC1-A-MH1-ETW2-3	AFGA113D	A	MH1	1	1	32.289	0.136	24	LGM	0.0057	33.210
IMU-OHC1-A-MH2-ETW2-1	AFGA211D	A	MH2	1	2	30.439	0.135	24	LGM	0.0056	31.119
IMU-OHC1-A-MH2-ETW2-2	AFGA212D	A	MH2	1	2	32.305	0.135	24	LGM	0.0056	33.063
IMU-OHC1-A-MH2-ETW2-3	AFGA213D	A	MH2	1	2	30.776	0.135	24	LGM	0.0056	31.498
IMU-OHC1-B-MH1-ETW2-1	AFGB111D	B	MH1	2	1	31.648	0.133	24	LGM	0.0055	31.792
IMU-OHC1-B-MH1-ETW2-2	AFGB112D	B	MH1	2	1	31.843	0.136	24	LGM	0.0057	32.892
IMU-OHC1-B-MH1-ETW2-3	AFGB113D	B	MH1	2	1	32.979	0.131	24	LGM	0.0055	32.750
IMU-OHC1-B-MH2-ETW2-1	AFGB211D	B	MH2	2	2	31.235	0.131	24	LGM	0.0054	30.939
IMU-OHC1-B-MH2-ETW2-2	AFGB212D	B	MH2	2	2	31.470	0.132	24	LGM	0.0055	31.470
IMU-OHC1-B-MH2-ETW2-3	AFGB213D	B	MH2	2	2	33.465	0.136	24	LGM	0.0056	34.365
IMU-OHC1-C-MH1-ETW2-1	AFGC111D	C	MH1	3	1	30.880	0.131	24	LGM	0.0055	30.638
IMU-OHC1-C-MH1-ETW2-2	AFGC112D	C	MH1	3	1	32.721	0.132	24	LGM	0.0055	32.746
IMU-OHC1-C-MH1-ETW2-3	AFGC113D	C	MH1	3	1	30.717	0.130	24	LGM	0.0054	30.182
IMU-OHC1-C-MH2-ETW2-1	AFGC211D	C	MH2	3	2	31.029	0.132	24	LGM	0.0055	30.970
IMU-OHC1-C-MH2-ETW2-2	AFGC212D	C	MH2	3	2	31.366	0.131	24	LGM	0.0055	31.081
IMU-OHC1-C-MH2-ETW2-3	AFGC213D	C	MH2	3	2	31.166	0.132	24	LGM	0.0055	31.213

Average 31.609
 Standard Dev. 0.837
 Coeff. of Var. [%] 2.647
 Min. 30.439
 Max. 33.465
 Number of Spec. 18

Average_{norm} 0.0056 31.909
 Standard Dev._{norm} 1.092
 Coeff. of Var. [%]_{norm} 3.422
 Min. 0.0054 30.182
 Max. 0.0057 34.365
 Number of Spec. 18



4.23 “10/80/10” Open-Hole Compression 2 Properties (OHC2)

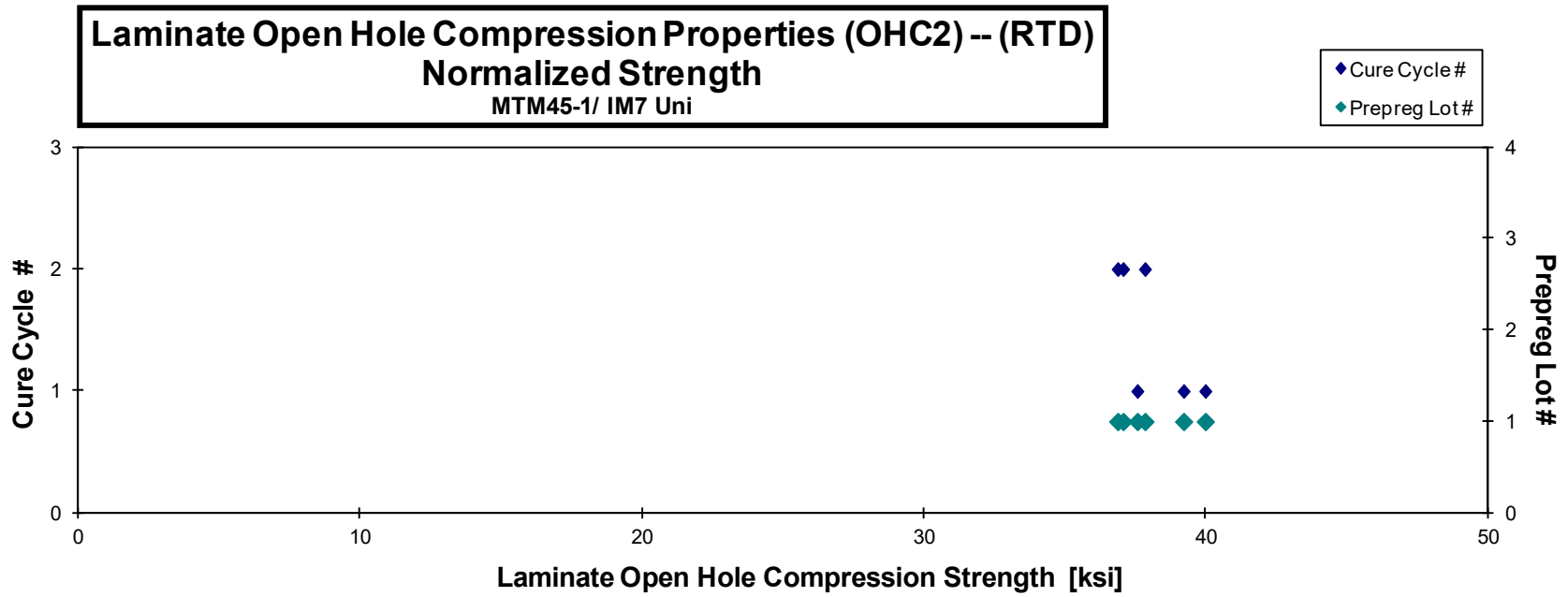
Laminate Open Hole Compression Properties (OHC2) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHC2-A-MH1-RTD-1	AFHA111A	A	MH1	1	1	37.110	0.118	20	LGM	0.0059	39.943
IMU-OHC2-A-MH1-RTD-2	AFHA112A	A	MH1	1	1	36.925	0.117	20	LGM	0.0058	39.174
IMU-OHC2-A-MH1-RTD-3	AFHA113A	A	MH1	1	1	35.899	0.115	20	LGM	0.0058	37.531
IMU-OHC2-A-MH2-RTD-1	AFHA211A	A	MH2	1	2	36.539	0.111	20	LGM	0.0055	36.837
IMU-OHC2-A-MH2-RTD-2	AFHA212A	A	MH2	1	2	37.531	0.111	20	LGM	0.0055	37.804
IMU-OHC2-A-MH2-RTD-3	AFHA213A	A	MH2	1	2	36.531	0.112	20	LGM	0.0056	37.029

Average 36.756
 Standard Dev. 0.563
 Coeff. of Var. [%] 1.533
 Min. 35.899
 Max. 37.531
 Number of Spec. 6

Average_{norm} 0.0057 38.053
 Standard Dev._{norm} 1.240
 Coeff. of Var. [%]_{norm} 3.259
 Min. 0.0055 36.837
 Max. 0.0059 39.943
 Number of Spec. 6



Laminate Open Hole Compression Properties (OHC2) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

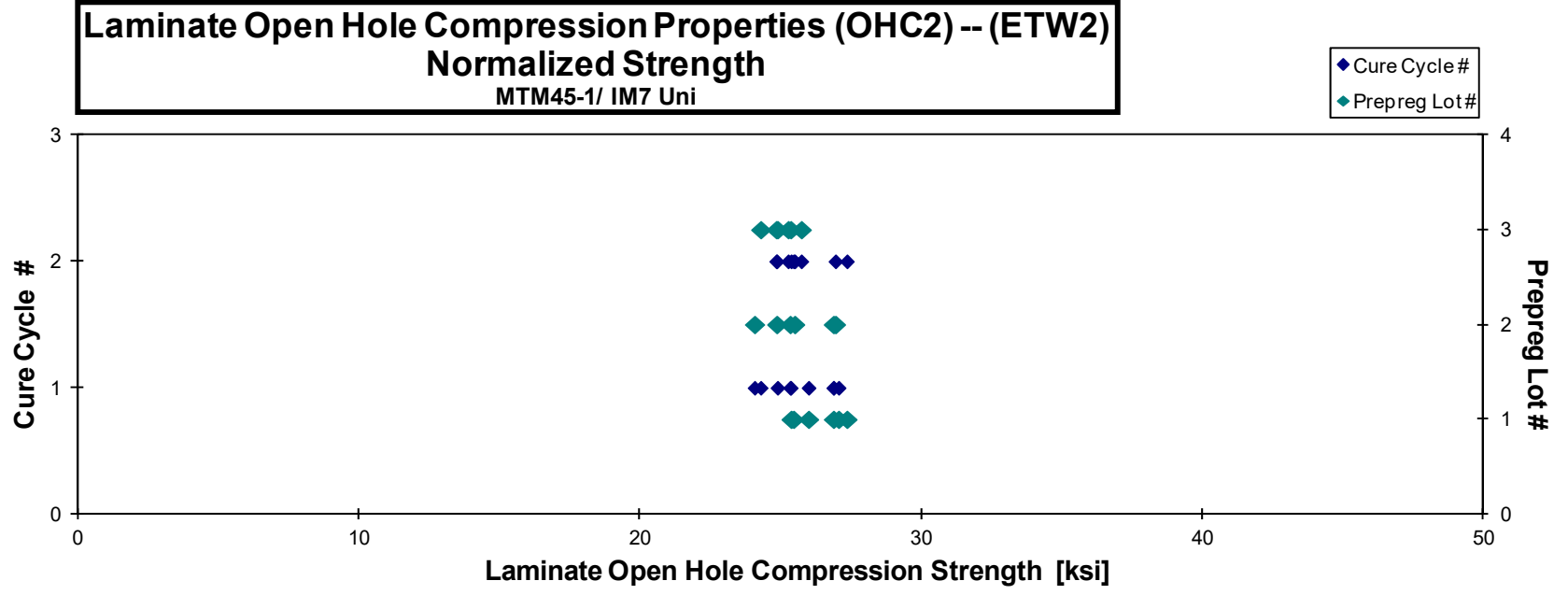
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes
IMU-OHC2-A-MH1-ETW2-1	AFHA111D	A	MH1	1	1	25.974	0.114	20	LGM
IMU-OHC2-A-MH1-ETW2-2	AFHA112D	A	MH1	1	1	26.127	0.114	20	LGM
IMU-OHC2-A-MH1-ETW2-3	AFHA113D	A	MH1	1	1	24.915	0.115	20	LGM
IMU-OHC2-A-MH2-ETW2-1	AFHA211D	A	MH2	1	2	26.781	0.113	20	LGM
IMU-OHC2-A-MH2-ETW2-2	AFHA212D	A	MH2	1	2	24.621	0.114	20	LGM
IMU-OHC2-A-MH2-ETW2-3	AFHA213D	A	MH2	1	2	24.826	0.113	20	LGM
IMU-OHC2-B-MH1-ETW2-1	AFHB111D	B	MH1	2	1	24.727	0.113	20	LGM
IMU-OHC2-B-MH1-ETW2-2	AFHB112D	B	MH1	2	1	23.877	0.111	20	LGM
IMU-OHC2-B-MH1-ETW2-3	AFHB113D	B	MH1	2	1	26.406	0.112	20	LGM
IMU-OHC2-B-MH2-ETW2-1	AFHB211D	B	MH2	2	2	24.420	0.112	20	LGM
IMU-OHC2-B-MH2-ETW2-2	AFHB212D	B	MH2	2	2	24.997	0.112	20	LGM
IMU-OHC2-B-MH2-ETW2-3	AFHB213D	B	MH2	2	2	25.397	0.117	20	LGM
IMU-OHC2-C-MH1-ETW2-1	AFHC111D	C	MH1	3	1	25.124	0.111	20	LGM
IMU-OHC2-C-MH1-ETW2-2	AFHC112D	C	MH1	3	1	24.771	0.111	20	LGM
IMU-OHC2-C-MH1-ETW2-3	AFHC113D	C	MH1	3	1	24.301	0.110	20	LGM
IMU-OHC2-C-MH2-ETW2-1	AFHC211D	C	MH2	3	2	25.952	0.109	20	LGM
IMU-OHC2-C-MH2-ETW2-2	AFHC212D	C	MH2	3	2	25.322	0.110	20	LGM
IMU-OHC2-C-MH2-ETW2-3	AFHC213D	C	MH2	3	2	25.082	0.109	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0057	26.914
0.0057	27.097
0.0057	26.029
0.0056	27.394
0.0057	25.408
0.0056	25.496
0.0056	25.375
0.0056	24.109
0.0056	26.914
0.0056	24.898
0.0056	25.535
0.0058	26.986
0.0056	25.395
0.0055	24.925
0.0055	24.327
0.0055	25.771
0.0055	25.303
0.0055	24.880

Average 25.201
Standard Dev. 0.775
Coeff. of Var. [%] 3.077
Min. 23.877
Max. 26.781
Number of Spec. 18

Average_{norm} 0.0056 **25.709**
Standard Dev._{norm} 0.982
Coeff. of Var. [%]_{norm} 3.818
Min. 0.0055 **24.109**
Max. 0.0058 **27.394**
Number of Spec. 18



4.24 “50/40/10” Open-Hole Compression 3 Properties (OHC3)

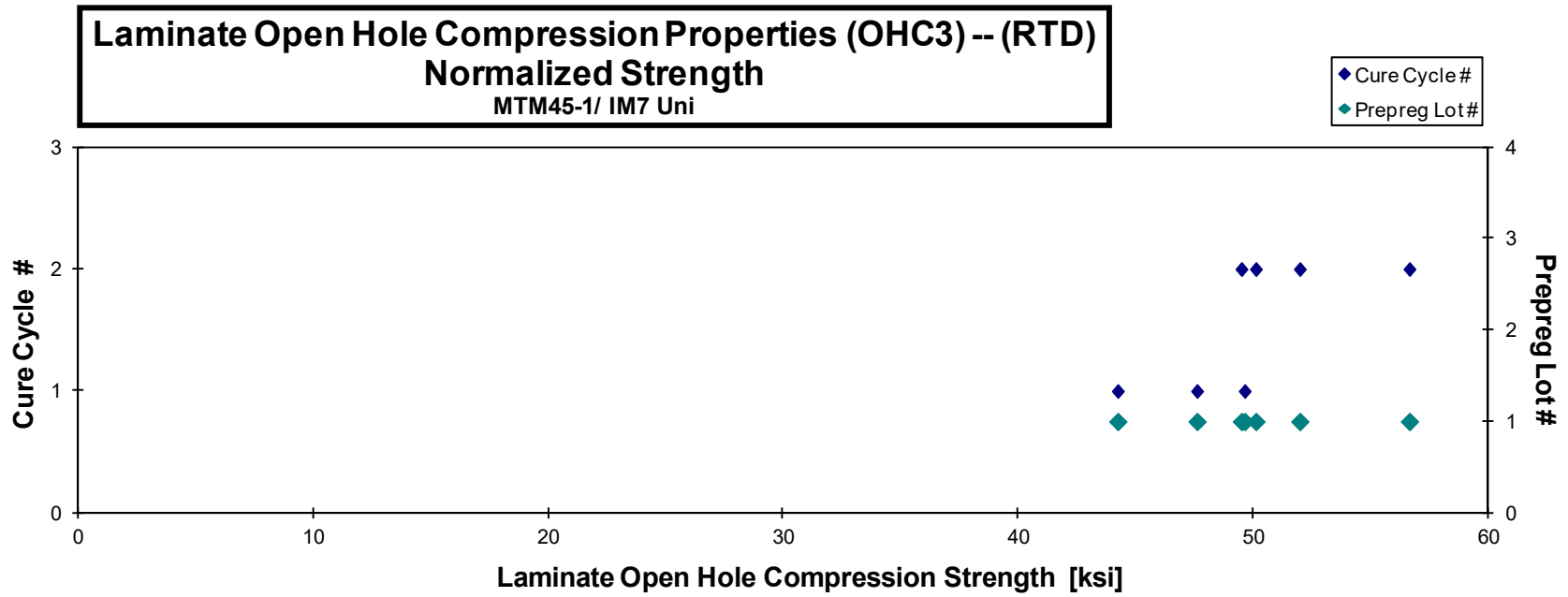
Laminate Open Hole Compression Properties (OHC3) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-OHC3-A-MH1-RTD-1	AFIA111A	A	MH1	1	1	45.080	0.116	20	LGM	0.0058	47.579
IMU-OHC3-A-MH1-RTD-2	AFIA112A	A	MH1	1	1	41.994	0.116	20	LGM	0.0058	44.208
IMU-OHC3-A-MH1-RTD-3	AFIA113A	A	MH1	1	1	47.246	0.116	20	LGM	0.0058	49.608
IMU-OHC3-A-MH2-RTD-1	AFIA211A	A	MH2	1	2	56.771	0.110	20	LGM	0.0055	56.616
IMU-OHC3-A-MH2-RTD-2	AFIA212A	A	MH2	1	2	50.312	0.110	20	LGM	0.0055	50.083
IMU-OHC3-A-MH2-RTD-3	AFIA213A	A	MH2	1	2	50.109	0.109	20	LGM	0.0054	49.471
IMU-OHC3-A-MH2-RTD-4	AFIA214A	A	MH2	1	2	52.335	0.109	20	LGM	0.0055	51.954

Average 49.121
 Standard Dev. 4.863
 Coeff. of Var. [%] 9.900
 Min. 41.994
 Max. 56.771
 Number of Spec. 7

Average_{norm} 0.0056 49.931
 Standard Dev._{norm} 3.817
 Coeff. of Var. [%]_{norm} 7.644
 Min. 0.0054 44.208
 Max. 0.0058 56.616
 Number of Spec. 7



**Laminate Open Hole Compression Properties (OHC3) -- (ETW2)
Strength
MTM45-1/ IM7 Uni**

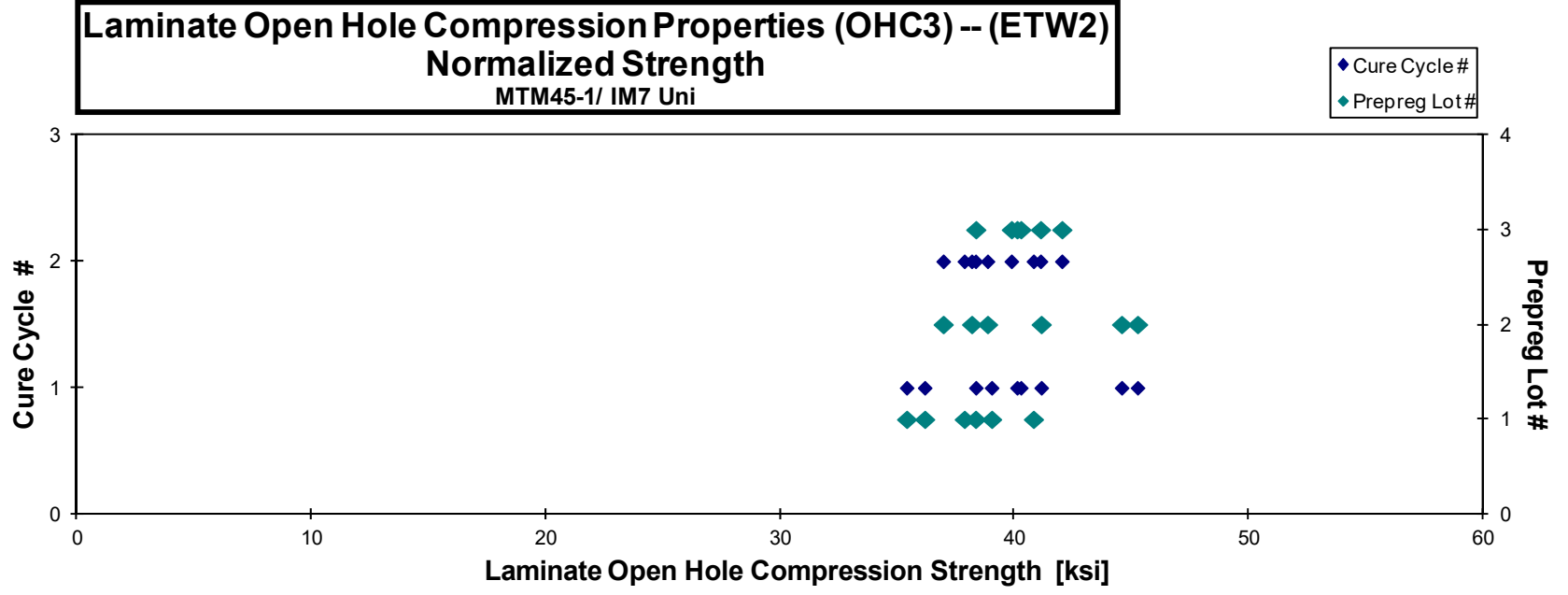
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thckn. [in]	# Plies in Laminate	Failure Modes
IMU-OHC3-A-MH1-ETW2-1	AFIA111D	A	MH1	1	1	35.081	0.113	20	LGM
IMU-OHC3-A-MH1-ETW2-2	AFIA112D	A	MH1	1	1	34.133	0.114	20	LGM
IMU-OHC3-A-MH1-ETW2-3	AFIA113D	A	MH1	1	1	37.623	0.114	20	LGM
IMU-OHC3-A-MH2-ETW2-1	AFIA211D	A	MH2	1	2	37.700	0.111	20	LGM
IMU-OHC3-A-MH2-ETW2-2	AFIA212D	A	MH2	1	2	38.449	0.110	20	LGM
IMU-OHC3-A-MH2-ETW2-3	AFIA213D	A	MH2	1	2	41.112	0.109	20	LGM
IMU-OHC3-B-MH1-ETW2-1	AFIB111D	B	MH1	2	1	44.007	0.111	20	LGM
IMU-OHC3-B-MH1-ETW2-2	AFIB112D	B	MH1	2	1	45.337	0.110	20	LGM
IMU-OHC3-B-MH1-ETW2-3	AFIB113D	B	MH1	2	1	40.355	0.112	20	LGM
IMU-OHC3-B-MH2-ETW2-1	AFIB211D	B	MH2	2	2	38.121	0.112	20	LGM
IMU-OHC3-B-MH2-ETW2-2	AFIB212D	B	MH2	2	2	36.407	0.112	20	LGM
IMU-OHC3-B-MH2-ETW2-3	AFIB213D	B	MH2	2	2	36.957	0.114	20	LGM
IMU-OHC3-C-MH1-ETW2-1	AFIC111D	C	MH1	3	1	40.547	0.109	20	LGM
IMU-OHC3-C-MH1-ETW2-2	AFIC112D	C	MH1	3	1	38.304	0.110	20	LGM
IMU-OHC3-C-MH1-ETW2-3	AFIC113D	C	MH1	3	1	41.064	0.108	20	LGM
IMU-OHC3-C-MH2-ETW2-1	AFIC211D	C	MH2	3	2	41.365	0.109	20	LGM
IMU-OHC3-C-MH2-ETW2-3	AFIC213D	C	MH2	3	2	42.097	0.110	20	LGM
IMU-OHC3-C-MH2-ETW2-4	AFIC214D	C	MH2	3	2	40.642	0.108	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0057	36.192
0.0057	35.421
0.0057	39.048
0.0055	37.882
0.0055	38.361
0.0055	40.832
0.0056	44.593
0.0055	45.275
0.0056	41.163
0.0056	38.872
0.0056	36.981
0.0057	38.194
0.0055	40.295
0.0055	38.373
0.0054	40.131
0.0055	41.133
0.0055	42.046
0.0054	39.890

Average 39.406
Standard Dev. 2.952
Coeff. of Var. [%] 7.492
Min. 34.133
Max. 45.337
Number of Spec. 18

Average_{norm} 0.0055 **39.705**
Standard Dev._{norm} 2.599
Coeff. of Var. [%]_{norm} 6.546
Min. 0.0054 **35.421**
Max. 0.0057 **45.275**
Number of Spec. 18



4.25 “25/50/25” Filled-Hole Compression 1 Properties (FHC1)

Laminate Filled Hole Compression Properties (FHC1) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

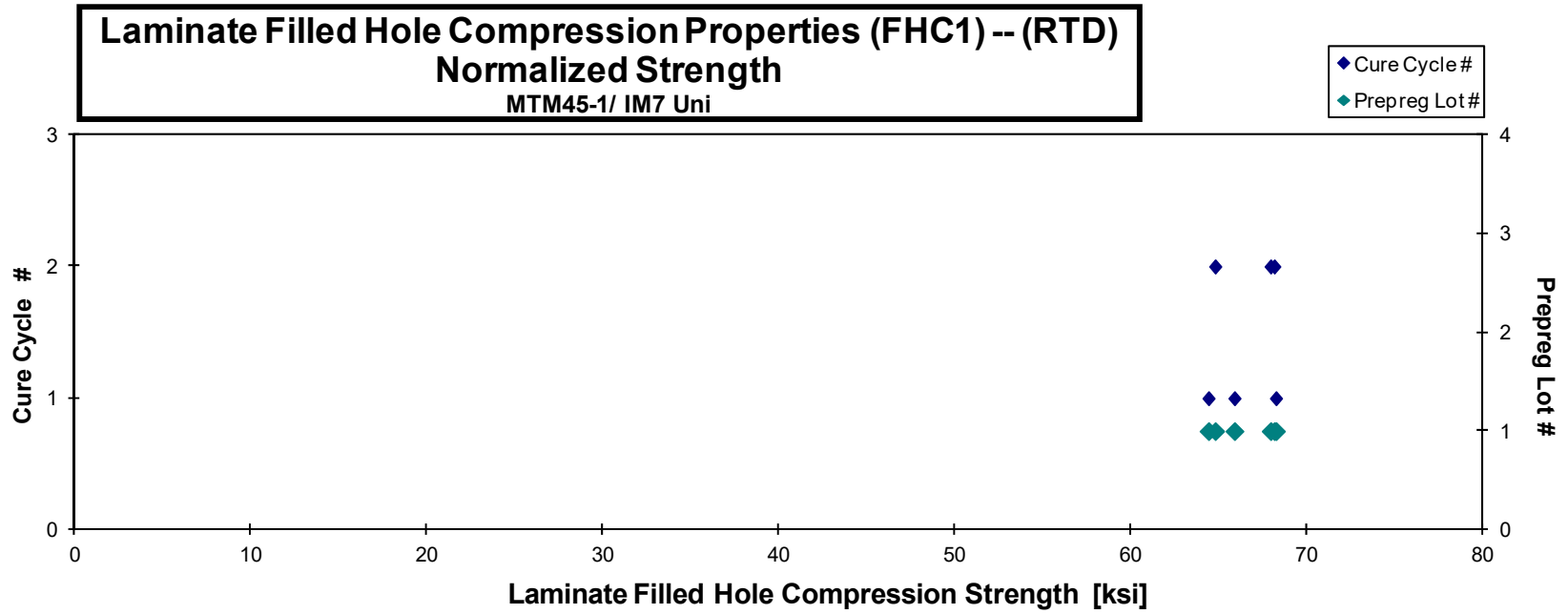
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-FHC1-A-MH1-RTD-1	AF7A111A	A	MH1	1	1	67.078	0.134	24	LGM
IMU-FHC1-A-MH1-RTD-2	AF7A112A	A	MH1	1	1	64.473	0.135	24	LGM
IMU-FHC1-A-MH1-RTD-3	AF7A113A	A	MH1	1	1	63.216	0.135	24	LGM
IMU-FHC1-A-MH2-RTD-1	AF7A211A	A	MH2	1	2	67.180	0.134	24	LGM
IMU-FHC1-A-MH2-RTD-2	AF7A212A	A	MH2	1	2	67.384	0.134	24	LGM
IMU-FHC1-A-MH2-RTD-3	AF7A213A	A	MH2	1	2	64.160	0.133	24	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	68.247
0.0056	65.889
0.0056	64.413
0.0056	67.944
0.0056	68.150
0.0056	64.792

Average 65.582
Standard Dev. 1.838
Coeff. of Var. [%] 2.803
Min. 63.216
Max. 67.384
Number of Spec. 6

Average_{norm} 0.0056 **66.572**
Standard Dev._{norm} **1.759**
Coeff. of Var. [%]_{norm} **2.643**
Min. 0.0056 **64.413**
Max. 0.0056 **68.247**
Number of Spec. 6



Laminate Filled Hole Compression Properties (FHC1) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

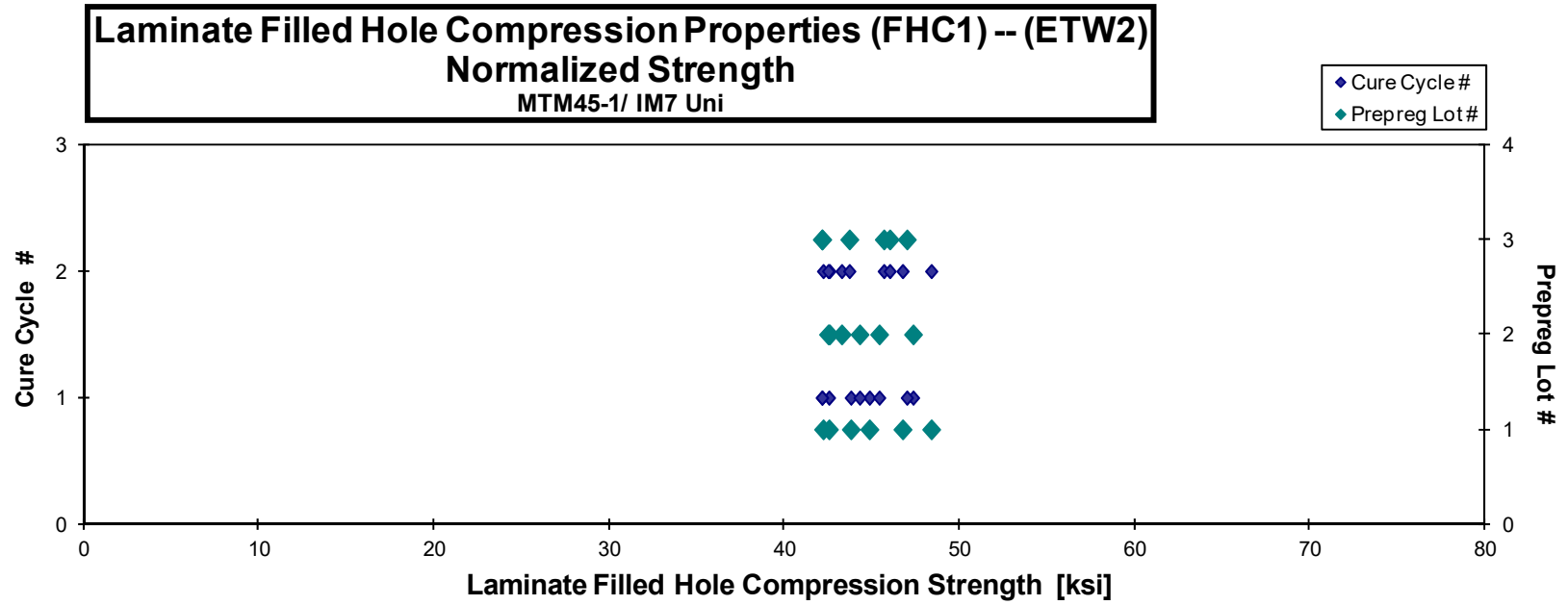
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-FHC1-A-MH1-ETW2-1	AF7A111D	A	MH1	1	1	41.517	0.135	24	LGM
IMU-FHC1-A-MH1-ETW2-2	AF7A112D	A	MH1	1	1	42.873	0.135	24	LGM
IMU-FHC1-A-MH1-ETW2-3	AF7A113D	A	MH1	1	1	43.769	0.135	24	LGM
IMU-FHC1-A-MH2-ETW2-1	AF7A211D	A	MH2	1	2	47.887	0.133	24	LGM
IMU-FHC1-A-MH2-ETW2-2	AF7A212D	A	MH2	1	2	41.347	0.135	24	LGM
IMU-FHC1-A-MH2-ETW2-3	AF7A213D	A	MH2	1	2	45.913	0.134	24	LGM
IMU-FHC1-B-MH1-ETW2-1	AF7B111D	B	MH1	2	1	45.588	0.137	24	LGM
IMU-FHC1-B-MH1-ETW2-2	AF7B112D	B	MH1	2	1	42.098	0.139	24	LGM
IMU-FHC1-B-MH1-ETW2-3	AF7B113D	B	MH1	2	1	44.679	0.134	24	LGM
IMU-FHC1-B-MH2-ETW2-1	AF7B211D	B	MH2	2	2	42.025	0.134	24	LGM
IMU-FHC1-B-MH2-ETW2-2	AF7B212D	B	MH2	2	2	42.152	0.133	24	LGM
IMU-FHC1-B-MH2-ETW2-3	AF7B213D	B	MH2	2	2	42.291	0.135	24	LGM
IMU-FHC1-C-MH1-ETW2-1	AF7C111D	C	MH1	3	1	47.306	0.131	24	LGM
IMU-FHC1-C-MH1-ETW2-2	AF7C112D	C	MH1	3	1	42.375	0.131	24	LGM
IMU-FHC1-C-MH1-ETW2-3	AF7C113D	C	MH1	3	1	42.237	0.132	24	LGM
IMU-FHC1-C-MH2-ETW2-1	AF7C211D	C	MH2	3	2	45.953	0.131	24	LGM
IMU-FHC1-C-MH2-ETW2-2	AF7C212D	C	MH2	3	2	44.183	0.130	24	LGM
IMU-FHC1-C-MH2-ETW2-3	AF7C213D	C	MH2	3	2	46.339	0.131	24	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	42.492
0.0056	43.744
0.0056	44.803
0.0056	48.334
0.0056	42.161
0.0056	46.695
0.0057	47.297
0.0058	44.246
0.0056	45.362
0.0056	42.518
0.0055	42.450
0.0056	43.220
0.0055	46.942
0.0055	42.102
0.0055	42.093
0.0055	45.628
0.0054	43.659
0.0055	45.965

Average 43.918
Standard Dev. 2.115
Coeff. of Var. [%] 4.815
Min. 41.347
Max. 47.887
Number of Spec. 18

Average_{norm} 0.0056 **44.428**
Standard Dev._{norm} **2.024**
Coeff. of Var. [%]_{norm} **4.555**
Min. 0.0054 **42.093**
Max. 0.0058 **48.334**
Number of Spec. **18**



4.26 “10/80/10” Filled-Hole Compression 2 Properties (FHC2)

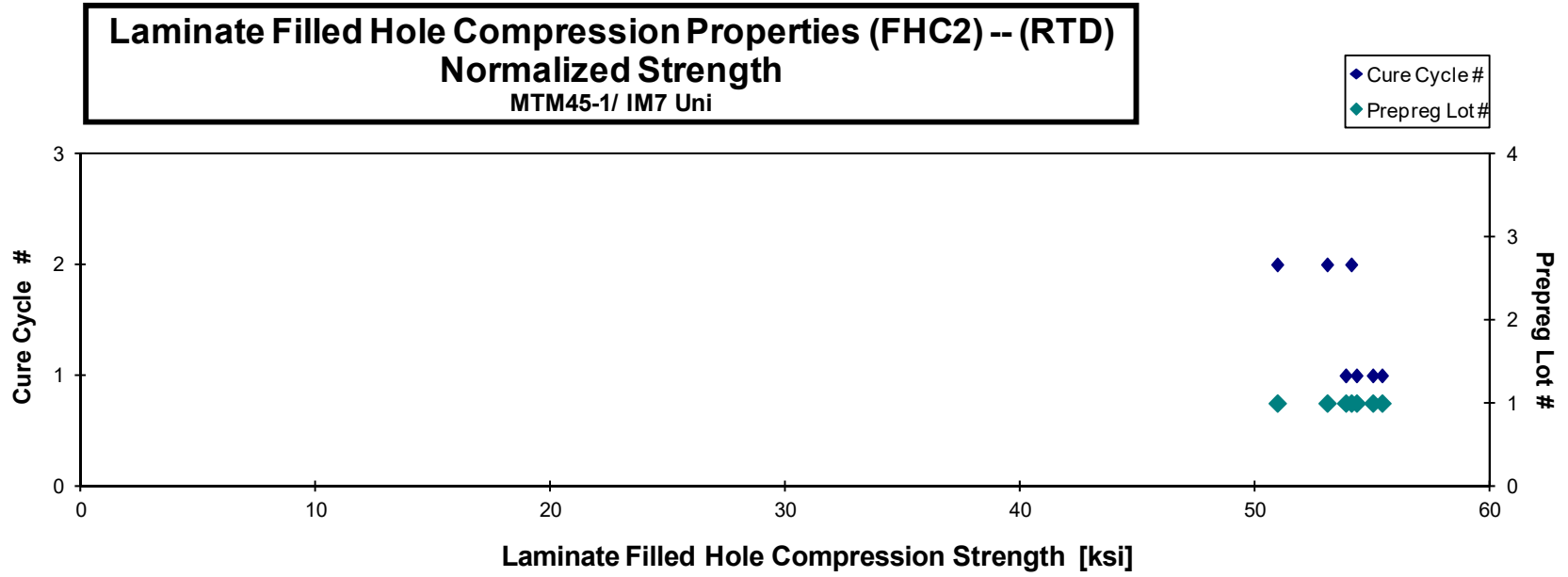
Laminate Filled Hole Compression Properties (FHC2) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-FHC2-A-MH1-RTD-1	AF8A111A	A	MH1	1	1	52.955	0.113	20	LGM	0.0056	54.303
IMU-FHC2-A-MH1-RTD-2	AF8A112A	A	MH1	1	1	52.092	0.114	20	LGM/LWB	0.0057	53.844
IMU-FHC2-A-MH1-RTD-3	AF8A113A	A	MH1	1	1	53.395	0.113	20	LGM	0.0057	54.997
IMU-FHC2-A-MH1-RTD-4	AF8A114A	A	MH1	1	1	53.446	0.114	20	LGM/LWT	0.0057	55.389
IMU-FHC2-A-MH2-RTD-1	AF8A211A	A	MH2	1	2	53.351	0.112	20	LGM	0.0056	54.079
IMU-FHC2-A-MH2-RTD-2	AF8A212A	A	MH2	1	2	52.528	0.111	20	LGM	0.0056	53.053
IMU-FHC2-A-MH2-RTD-3	AF8A213A	A	MH2	1	2	50.290	0.111	20	LGM	0.0056	50.930

Average 52.580
 Standard Dev. 1.128
 Coeff. of Var. [%] 2.145
 Min. 50.290
 Max. 53.446
 Number of Spec. 7

Average_{norm} 0.0056 53.799
 Standard Dev._{norm} 1.477
 Coeff. of Var. [%]_{norm} 2.745
 Min. 0.0056 50.930
 Max. 0.0057 55.389
 Number of Spec. 7



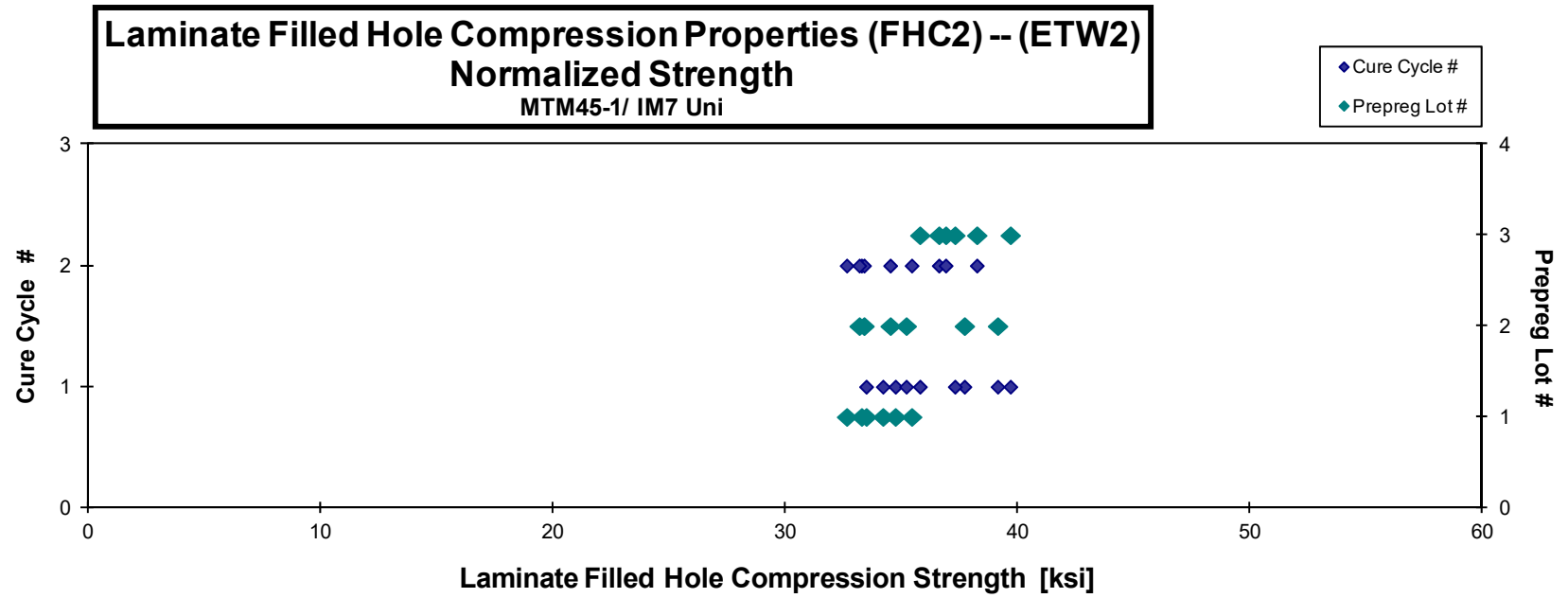
Laminate Filled Hole Compression Properties (FHC2) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength _{norm} [ksi]
IMU-FHC2-A-MH1-ETW2-1	AF8A111D	A	MH1	1	1	33.182	0.114	20	LGM	0.0057	34.238
IMU-FHC2-A-MH1-ETW2-2	AF8A112D	A	MH1	1	1	32.168	0.115	20	LGM	0.0057	33.519
IMU-FHC2-A-MH1-ETW2-3	AF8A113D	A	MH1	1	1	34.111	0.112	20	LGM	0.0056	34.773
IMU-FHC2-A-MH2-ETW2-1	AF8A211D	A	MH2	1	2	35.014	0.111	20	LGM	0.0056	35.476
IMU-FHC2-A-MH2-ETW2-2	AF8A212D	A	MH2	1	2	32.318	0.111	20	LGM	0.0056	32.680
IMU-FHC2-A-MH2-ETW2-3	AF8A213D	A	MH2	1	2	33.081	0.111	20	LGM	0.0055	33.316
IMU-FHC2-B-MH1-ETW2-1	AF8B111D	B	MH1	2	1	37.608	0.115	20	LGM	0.0057	39.175
IMU-FHC2-B-MH1-ETW2-2	AF8B112D	B	MH1	2	1	34.205	0.113	20	LGM	0.0057	35.241
IMU-FHC2-B-MH1-ETW2-3	AF8B113D	B	MH1	2	1	37.227	0.112	20	LGM	0.0056	37.746
IMU-FHC2-B-MH2-ETW2-1	AF8B211D	B	MH2	2	2	34.249	0.111	20	LGM	0.0055	34.555
IMU-FHC2-B-MH2-ETW2-2	AF8B212D	B	MH2	2	2	32.957	0.112	20	LGM	0.0056	33.426
IMU-FHC2-B-MH2-ETW2-3	AF8B213D	B	MH2	2	2	33.055	0.111	20	LGM	0.0055	33.220
IMU-FHC2-C-MH1-ETW2-1	AF8C111D	C	MH1	3	1	36.319	0.109	20	LGM	0.0054	35.829
IMU-FHC2-C-MH1-ETW2-2	AF8C112D	C	MH1	3	1	37.871	0.108	20	LGM/LGF	0.0054	37.337
IMU-FHC2-C-MH1-ETW2-3	AF8C113D	C	MH1	3	1	40.296	0.108	20	LGM/LGF	0.0054	39.722
IMU-FHC2-C-MH2-ETW2-1	AF8C211D	C	MH2	3	2	36.768	0.110	20	MGF	0.0055	36.645
IMU-FHC2-C-MH2-ETW2-2	AF8C212D	C	MH2	3	2	38.977	0.108	20	LGM/LGF	0.0054	38.280
IMU-FHC2-C-MH2-ETW2-3	AF8C213D	C	MH2	3	2	36.628	0.111	20	LGF	0.0055	36.939

Average 35.335
Standard Dev. 2.444
Coeff. of Var. [%] 6.915
Min. 32.168
Max. 40.296
Number of Spec. 18

Average_{norm} 0.0056 **35.673**
Standard Dev._{norm} **2.165**
Coeff. of Var. [%]_{norm} **6.068**
Min. 0.0054 **32.680**
Max. 0.0057 **39.722**
Number of Spec. 18



4.27 “50/40/10” Filled-Hole Compression 3 Properties (FHC3)

Laminate Filled Hole Compression Properties (FHC3) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

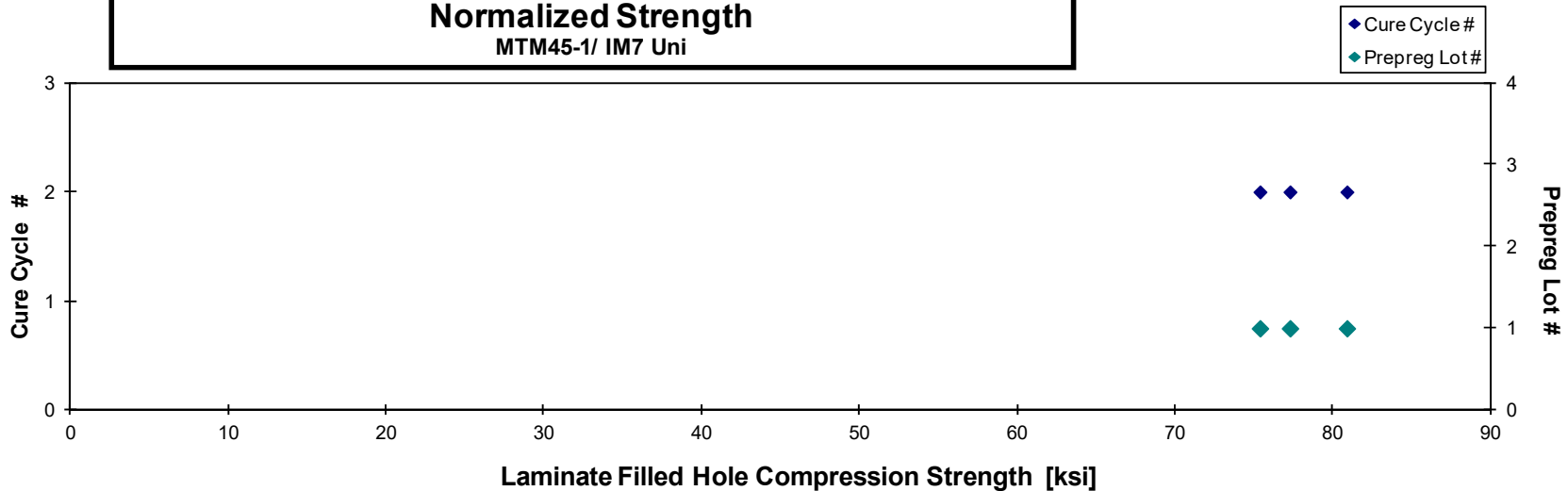
Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-FHC3-A-MH2-RTD-1	AF9A211A	A	MH2	1	2	76.585	0.111	20	LGM
IMU-FHC3-A-MH2-RTD-2	AF9A212A	A	MH2	1	2	80.524	0.111	20	LGM
IMU-FHC3-A-MH2-RTD-3	AF9A213A	A	MH2	1	2	74.499	0.111	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	77.281
0.0055	80.890
0.0056	75.379

*Data for IMU-FHC3-A-MH1 was not included, refer to Section 9.0 Deviations for further explanation.

Average	77.203	Average _{norm}	0.0055	77.850
Standard Dev.	3.060	Standard Dev. _{norm}		2.799
Coeff. of Var. [%]	3.963	Coeff. of Var. [%] _{norm}		3.596
Min.	74.499	Min.	0.0055	75.379
Max.	80.524	Max.	0.0056	80.890
Number of Spec.	3	Number of Spec.		3

Laminate Filled Hole Compression Properties (FHC3) -- (RTD)
Normalized Strength
 MTM45-1/ IM7 Uni



Laminate Filled Hole Compression Properties (FHC3) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

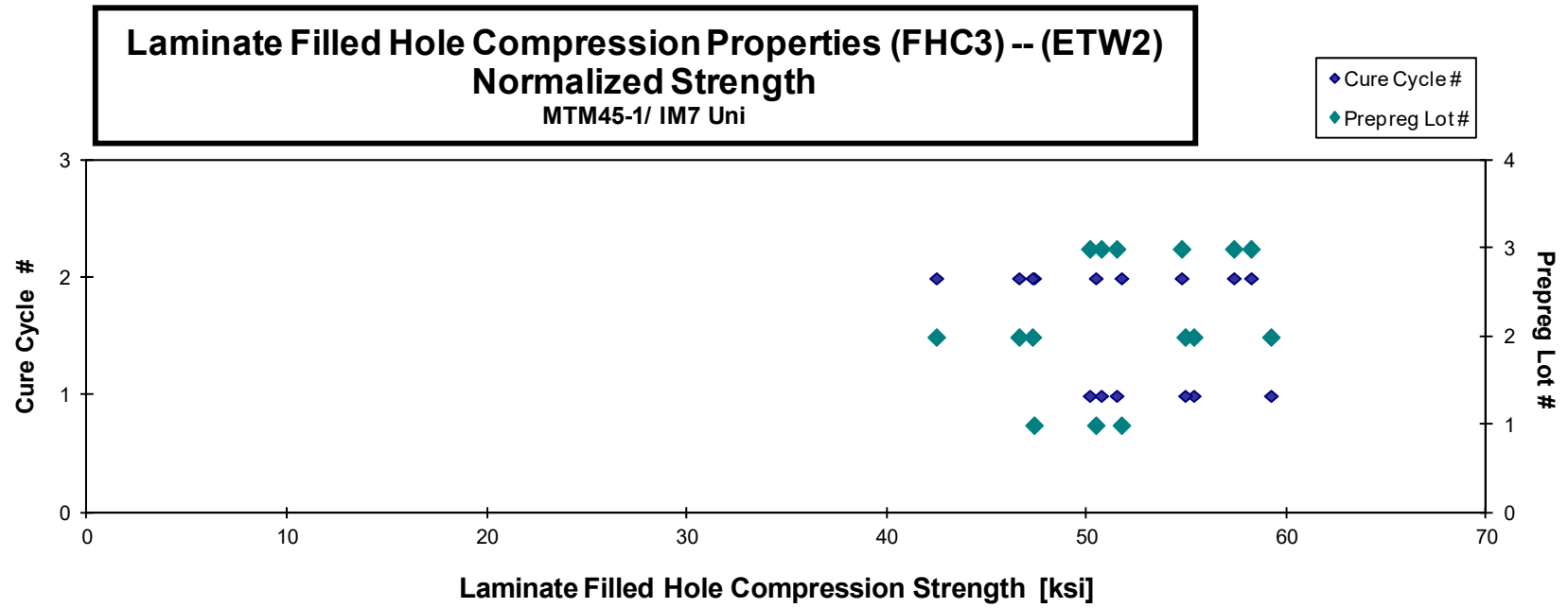
Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode
IMU-FHC3-A-MH2-ETW2-1	AF9A211D	A	MH2	1	2	46.717	0.112	20	LGM
IMU-FHC3-A-MH2-ETW2-2	AF9A212D	A	MH2	1	2	49.927	0.111	20	LGM
IMU-FHC3-A-MH2-ETW2-3	AF9A213D	A	MH2	1	2	50.905	0.112	20	LGM
IMU-FHC3-B-MH1-ETW2-1	AF9B111D	B	MH1	2	1	55.196	0.110	20	LGM
IMU-FHC3-B-MH1-ETW2-2	AF9B112D	B	MH1	2	1	54.285	0.111	20	LGM
IMU-FHC3-B-MH1-ETW2-3	AF9B113D	B	MH1	2	1	58.508	0.111	20	LGM
IMU-FHC3-B-MH2-ETW2-1	AF9B211D	B	MH2	2	2	47.078	0.110	20	LGM
IMU-FHC3-B-MH2-ETW2-2	AF9B212D	B	MH2	2	2	46.595	0.110	20	LGM
IMU-FHC3-B-MH2-ETW2-3	AF9B213D	B	MH2	2	2	42.725	0.109	20	LGM
IMU-FHC3-C-MH1-ETW2-1	AF9C111D	C	MH1	3	1	49.250	0.112	20	LGM
IMU-FHC3-C-MH1-ETW2-2	AF9C112D	C	MH1	3	1	51.028	0.111	20	LGM
IMU-FHC3-C-MH1-ETW2-3	AF9C113D	C	MH1	3	1	50.113	0.111	20	LGM
IMU-FHC3-C-MH2-ETW2-1	AF9C211D	C	MH2	3	2	57.890	0.111	20	LGM
IMU-FHC3-C-MH2-ETW2-2	AF9C212D	C	MH2	3	2	54.699	0.110	20	LGM / LGF
IMU-FHC3-C-MH2-ETW2-3	AF9C213D	C	MH2	3	2	56.699	0.111	20	LGM

Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	47.362
0.0056	50.449
0.0056	51.730
0.0055	55.346
0.0056	54.918
0.0056	59.208
0.0055	47.278
0.0055	46.609
0.0055	42.473
0.0056	50.145
0.0056	51.492
0.0056	50.721
0.0055	58.214
0.0055	54.740
0.0056	57.352

*Data for IMU-FHC3-A-MH1 was not included, refer to Section 9.0 Deviations for further explanation.

Average 51.441
Standard Dev. 4.645
Coeff. of Var. [%] 9.030
Min. 42.725
Max. 58.508
Number of Spec. 15

Average_{norm} 0.0055 **51.869**
Standard Dev._{norm} **4.763**
Coeff. of Var. [%]_{norm} **9.183**
Min. 0.0055 **42.473**
Max. 0.0056 **59.208**
Number of Spec. **15**



4.28 "25/50/25" Pin Bearing 1 Properties (PB1)

Laminate Pin Bearing Properties (PB1) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
[in]

0.0055

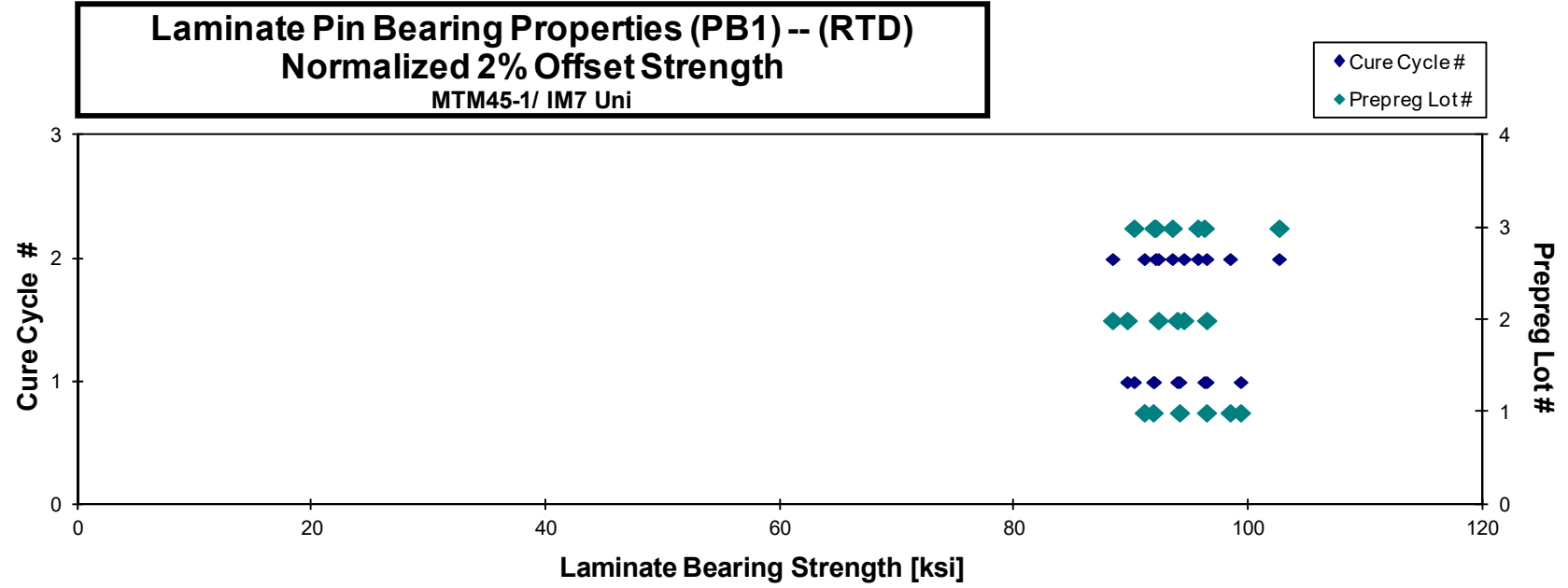
Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments
IMU-PB1-A-MH1-RTD-1	AF1A111A	A	MH1	1	1	89.980	0.135	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH1-RTD-2	AF1A112A	A	MH1	1	1	92.182	0.135	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH1-RTD-3	AF1A113A	A	MH1	1	1	98.603	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH2-RTD-1	AF1A211A	A	MH2	1	2	95.780	0.136	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH2-RTD-2	AF1A212A	A	MH2	1	2	95.076	0.134	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH2-RTD-3	AF1A213A	A	MH2	1	2	89.770	0.134	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH1-RTD-1	AF1B111A	B	MH1	2	1	88.999	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH1-RTD-2	AF1B112A	B	MH1	2	1	95.805	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH1-RTD-3	AF1B113A	B	MH1	2	1	93.242	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH2-RTD-1	AF1B211A	B	MH2	2	2	94.253	0.129	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH2-RTD-2	AF1B212A	B	MH2	2	2	98.295	0.127	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH2-RTD-3	AF1B213A	B	MH2	2	2	90.197	0.130	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH1-RTD-1	AF1C111A	C	MH1	3	1	90.665	0.132	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH1-RTD-2	AF1C112A	C	MH1	3	1	91.341	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH1-RTD-3	AF1C113A	C	MH1	3	1	96.329	0.132	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH2-RTD-1	AF1C211A	C	MH2	3	2	94.239	0.131	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH2-RTD-2	AF1C212A	C	MH2	3	2	102.327	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH2-RTD-3	AF1C213A	C	MH2	3	2	91.676	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH2-RTD-4	AF1C214A	C	MH2	3	2	95.631	0.132	24	2% Offset for UBS* / B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]
0.0056	91.957
0.0056	94.207
0.0055	99.424
0.0057	98.537
0.0056	96.516
0.0056	91.198
0.0055	89.741
0.0055	96.531
0.0055	94.019
0.0054	92.396
0.0053	94.572
0.0054	88.489
0.0055	90.322
0.0055	92.033
0.0055	96.329
0.0055	93.597
0.0055	102.714
0.0055	92.163
0.0055	95.775

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

Average 93.915
Standard Dev. 3.540
Coeff. of Var. [%] 3.770
Min. 88.999
Max. 102.327
Number of Spec. 19

Average_{norm} 0.0055
Standard Dev._{norm} 3.579
Coeff. of Var. [%]_{norm} 3.798
Min. 0.0053
Max. 102.714
Number of Spec. 19



Laminate Pin Bearing Properties (PB1) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

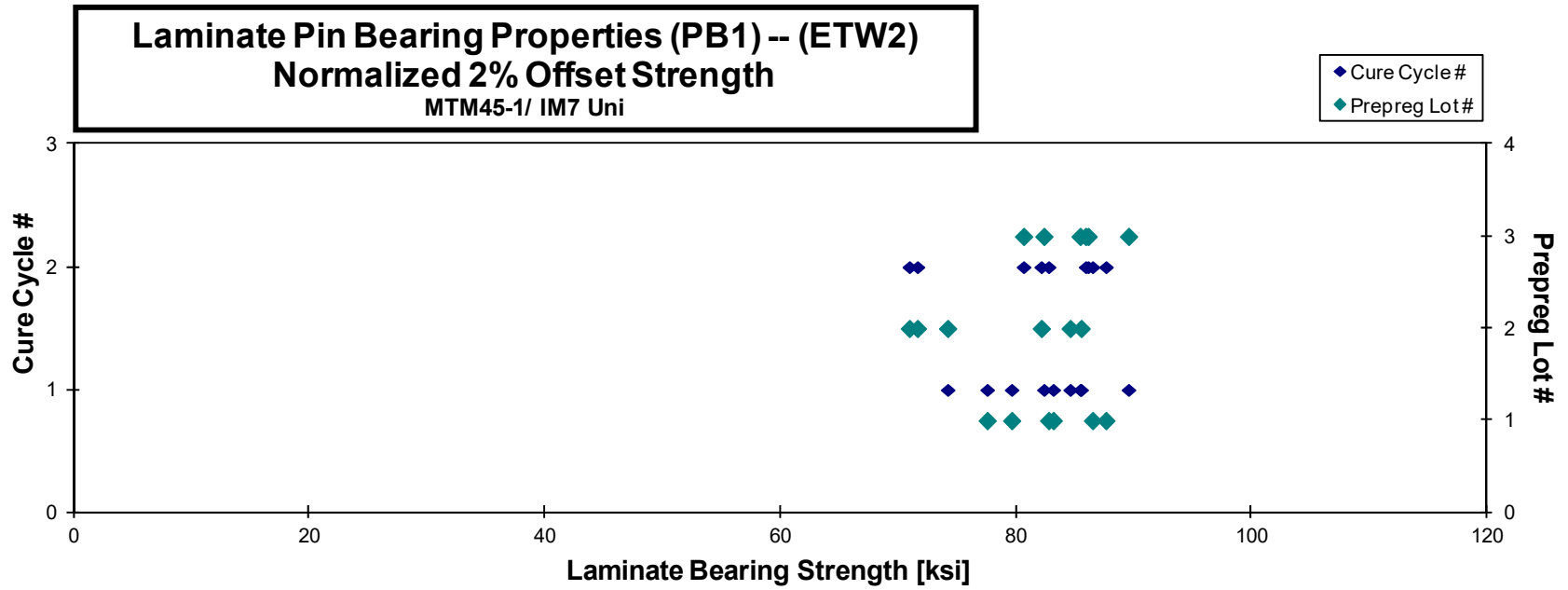
Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thicken. [in]	# Plies in Laminate	Comments
IMU-PB1-A-MH1-ETW2-1	AF1A111D	A	MH1	1	1	78.871	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH1-ETW2-2	AF1A112D	A	MH1	1	1	82.272	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH1-ETW2-3	AF1A113D	A	MH1	1	1	76.947	0.133	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH2-ETW2-1	AF1A211D	A	MH2	1	2	84.936	0.134	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH2-ETW2-2	AF1A212D	A	MH2	1	2	81.364	0.134	24	2% Offset for UBS* / B1I
IMU-PB1-A-MH2-ETW2-3	AF1A213D	A	MH2	1	2	86.125	0.134	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH1-ETW2-1	AF1B111D	B	MH1	2	1	72.860	0.134	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH1-ETW2-2	AF1B112D	B	MH1	2	1	84.926	0.132	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH1-ETW2-3	AF1B113D	B	MH1	2	1	85.588	0.132	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH2-ETW2-1	AF1B211D	B	MH2	2	2	73.114	0.128	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH2-ETW2-2	AF1B212D	B	MH2	2	2	74.396	0.127	24	2% Offset for UBS* / B1I
IMU-PB1-B-MH2-ETW2-3	AF1B213D	B	MH2	2	2	84.841	0.128	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH1-ETW2-1	AF1C111D	C	MH1	3	1	82.959	0.131	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH1-ETW2-2	AF1C112D	C	MH1	3	1	90.735	0.130	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH1-ETW2-3	AF1C113D	C	MH1	3	1	86.373	0.131	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH2-ETW2-1	AF1C211D	C	MH2	3	2	81.659	0.130	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH2-ETW2-2	AF1C212D	C	MH2	3	2	87.263	0.130	24	2% Offset for UBS* / B1I
IMU-PB1-C-MH2-ETW2-3	AF1C213D	C	MH2	3	2	86.761	0.131	24	2% Offset for UBS* / B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]
0.0056	79.657
0.0056	83.186
0.0055	77.578
0.0056	86.523
0.0056	82.792
0.0056	87.658
0.0056	74.221
0.0055	84.626
0.0055	85.555
0.0053	70.972
0.0053	71.653
0.0053	82.173
0.0055	82.393
0.0054	89.578
0.0054	85.467
0.0054	80.669
0.0054	86.150
0.0054	85.939

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

Average 82.333
Standard Dev. 5.180
Coeff. of Var. [%] 6.291
Min. 72.860
Max. 90.735
Number of Spec. 18

Average_{norm} 0.0055 **82.044**
Standard Dev._{norm} **5.382**
Coeff. of Var. [%]_{norm} **6.559**
Min. 0.0053 **70.972**
Max. 0.0056 **89.578**
Number of Spec. **18**



4.29 "10/80/10" Pin Bearing 2 Properties (PB2)

Laminate Pin Bearing Properties (PB2) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
[in]

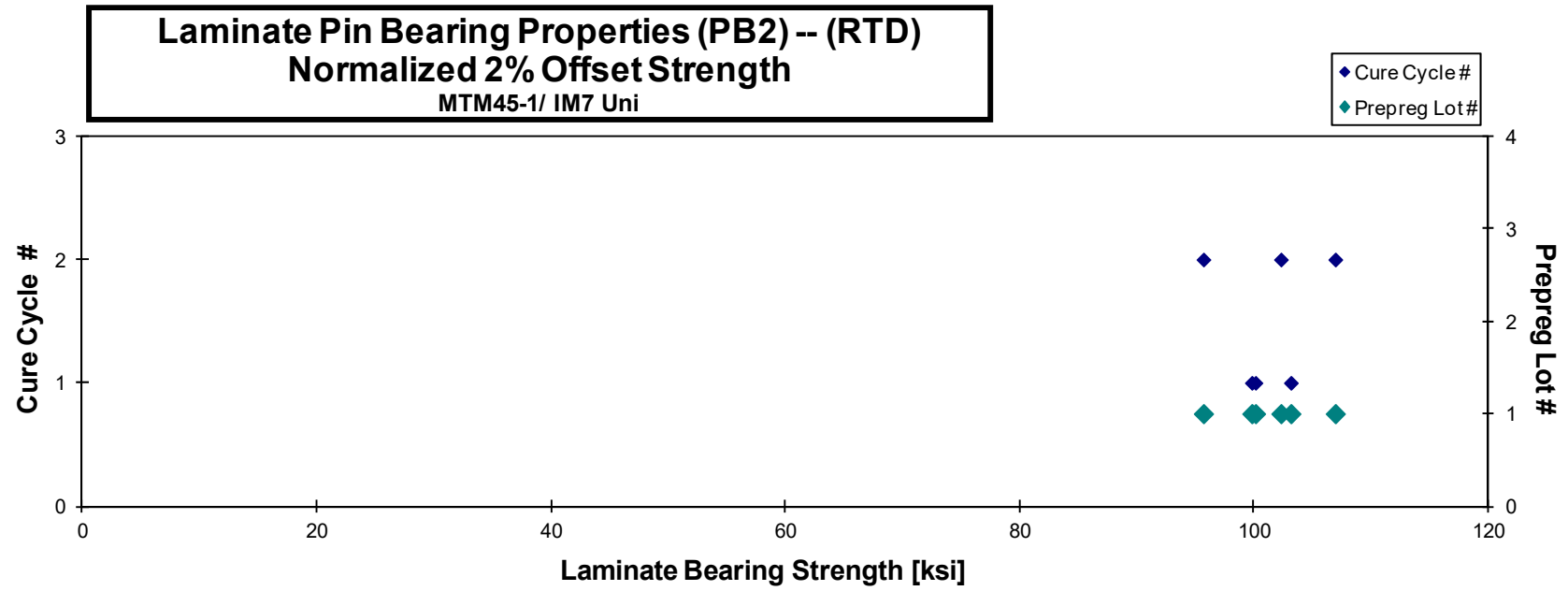
0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments
IMU-PB2-A-MH1-RTD-1	AF2A111A	A	MH1	1	1	96.866	0.113	20	2% Offset for UBS* / B1I
IMU-PB2-A-MH1-RTD-2	AF2A112A	A	MH1	1	1	101.263	0.112	20	2% Offset for UBS* / B1I
IMU-PB2-A-MH1-RTD-3	AF2A113A	A	MH1	1	1	97.948	0.113	20	2% Offset for UBS* / B1I
IMU-PB2-A-MH2-RTD-1	AF2A211A	A	MH2	1	2	106.408	0.111	20	2% Offset for UBS* / B1I
IMU-PB2-A-MH2-RTD-2	AF2A212A	A	MH2	1	2	94.190	0.112	20	2% Offset for UBS* / B1I
IMU-PB2-A-MH2-RTD-4	AF2A214A	A	MH2	1	2	100.791	0.112	20	2% Offset for UBS* / B1I
Ultimate Bearing Strength / B1I: B: Bearing, 1: first hole, I: inapplicable (not on bolt, nut or head side)									

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]
0.0057	99.860
0.0056	103.196
0.0056	100.174
0.0055	106.988
0.0056	95.732
0.0056	102.348

Average 99.578
Standard Dev. 4.243
Coeff. of Var. [%] 4.261
Min. 94.190
Max. 106.408
Number of Spec. 6

Average_{norm} 0.0056 **101.383**
Standard Dev._{norm} **3.778**
Coeff. of Var. [%]_{norm} **3.726**
Min. 0.0055 **95.732**
Max. 0.0057 **106.988**
Number of Spec. **6**



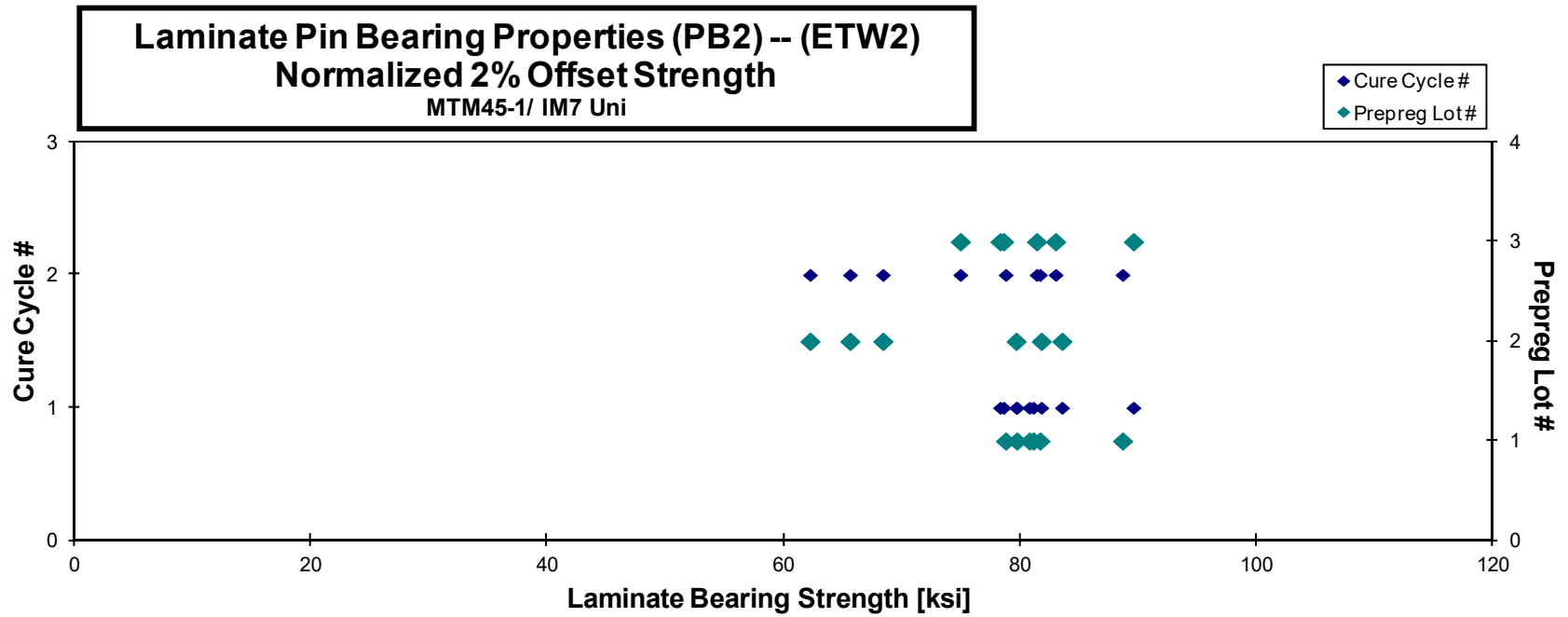
Laminate Pin Bearing Properties (PB2) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]
IMU-PB2-A-MH1-ETW2-1	AF2A111D	A	MH1	1	1	80.701	0.111	20	2% Offset for UBS* / B1l	0.0055	81.190
IMU-PB2-A-MH1-ETW2-2	AF2A112D	A	MH1	1	1	81.107	0.110	20	2% Offset for UBS* / B1l	0.0055	80.861
IMU-PB2-A-MH1-ETW2-3	AF2A113D	A	MH1	1	1	78.609	0.112	20	2% Offset for UBS* / B1l	0.0056	79.800
IMU-PB2-A-MH2-ETW2-1	AF2A211D	A	MH2	1	2	79.332	0.109	20	2% Offset for UBS* / B1l	0.0055	78.851
IMU-PB2-A-MH2-ETW2-2	AF2A212D	A	MH2	1	2	82.508	0.109	20	2% Offset for UBS* / B1l	0.0055	81.758
IMU-PB2-A-MH2-ETW2-3	AF2A213D	A	MH2	1	2	89.833	0.109	20	2% Offset for UBS* / B1l	0.0054	88.744
IMU-PB2-B-MH1-ETW2-1	AF2B111D	B	MH1	2	1	79.204	0.111	20	2% Offset for UBS* / B1l	0.0055	79.744
IMU-PB2-B-MH1-ETW2-2	AF2B112D	B	MH1	2	1	81.296	0.111	20	2% Offset for UBS* / B1l	0.0055	81.869
IMU-PB2-B-MH1-ETW2-3	AF2B113D	B	MH1	2	1	83.390	0.110	20	2% Offset for UBS* / B1l	0.0055	83.617
IMU-PB2-B-MH2-ETW2-1	AF2B211D	B	MH2	2	2	65.595	0.115	20	2% Offset for UBS* / B1l	0.0057	68.472
IMU-PB2-B-MH2-ETW2-2	AF2B212D	B	MH2	2	2	59.910	0.114	20	2% Offset for UBS* / B1l	0.0057	62.307
IMU-PB2-B-MH2-ETW2-3	AF2B213D	B	MH2	2	2	63.703	0.113	20	2% Offset for UBS* / B1l	0.0057	65.687
IMU-PB2-C-MH1-ETW2-1	AF2C111D	C	MH1	3	1	66.416	0.130	20	2% Offset for UBS* / B1l	0.0065	78.673
IMU-PB2-C-MH1-ETW2-2	AF2C112D	C	MH1	3	1	76.031	0.130	20	2% Offset for UBS* / B1l	0.0065	89.665
IMU-PB2-C-MH1-ETW2-3	AF2C113D	C	MH1	3	1	65.796	0.131	20	2% Offset for UBS* / B1l	0.0066	78.387
IMU-PB2-C-MH2-ETW2-1	AF2C211D	C	MH2	3	2	81.792	0.112	20	2% Offset for UBS* / B1l	0.0056	83.074
IMU-PB2-C-MH2-ETW2-2	AF2C212D	C	MH2	3	2	80.834	0.111	20	2% Offset for UBS* / B1l	0.0055	81.477
IMU-PB2-C-MH2-ETW2-3	AF2C213D	C	MH2	3	2	74.888	0.110	20	2% Offset for UBS* / B1l	0.0055	75.024
Ultimate Bearing Strength / B1l: B: Bearing, 1: first hole, l: Inapplicable (not on bolt, nut or head side)											

Average 76.164
Standard Dev. 8.277
Coeff. of Var. [%] 10.868
Min. 59.910
Max. 89.833
Number of Spec. 18

Average_{norm} 0.0057 **78.844**
Standard Dev._{norm} 7.115
Coeff. of Var. [%]_{norm} 9.024
Min. 0.0054 **62.307**
Max. 0.0066 **89.665**
Number of Spec. 18



4.30 “50/40/10” Pin Bearing 3 Properties (PB3)

Laminate Pin Bearing Properties (PB3) -- (RTD)
Strength
 MTM45-1/ IM7 Uni

normalizing t_{ply}
[in]

0.0055

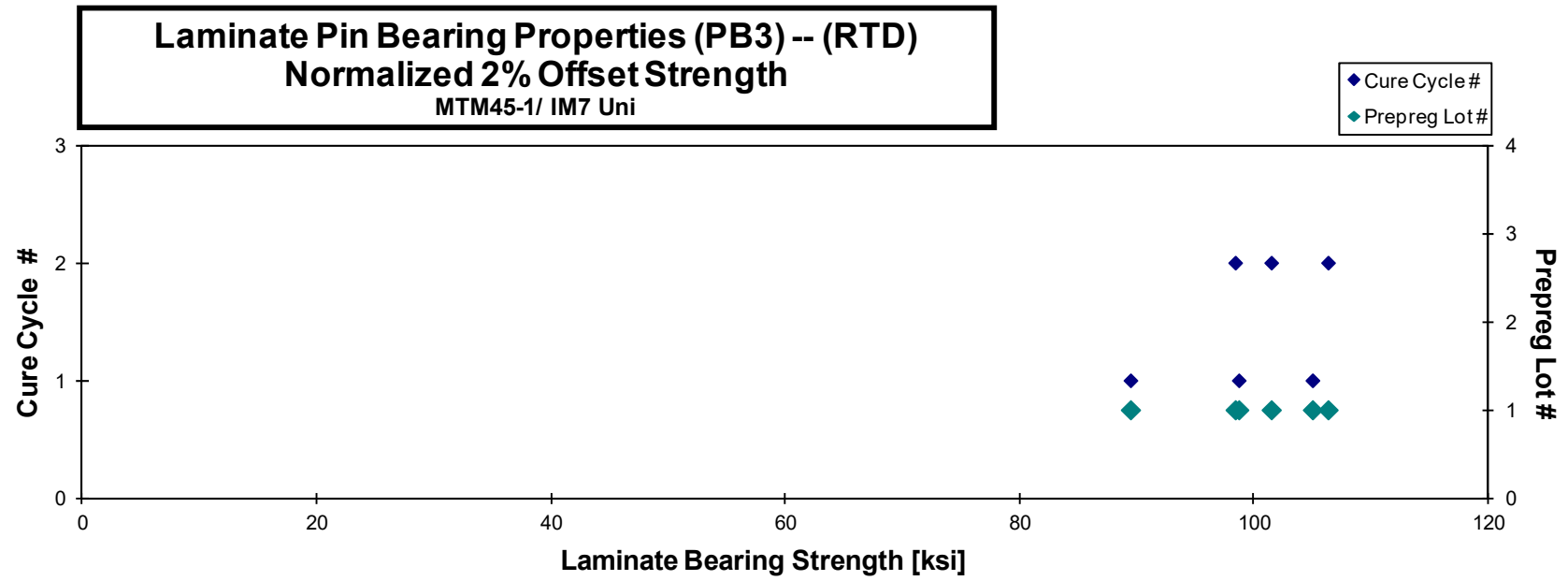
Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments
IMU-PB3-A-MH1-RTD-1	AF3A111A	A	MH1	1	1	97.856	0.111	20	2% Offset for UBS* / B1I
IMU-PB3-A-MH1-RTD-2	AF3A112A	A	MH1	1	1	87.903	0.112	20	2% Offset for UBS* / B1I
IMU-PB3-A-MH1-RTD-3	AF3A113A	A	MH1	1	1	103.435	0.112	20	2% Offset for UBS* / B1I
IMU-PB3-A-MH2-RTD-1	AF3A211A	A	MH2	1	2	97.554	0.111	20	2% Offset for UBS* / B1I
IMU-PB3-A-MH2-RTD-2	AF3A212A	A	MH2	1	2	103.818	0.113	20	2% Offset for UBS* / B1I
IMU-PB3-A-MH2-RTD-3	AF3A213A	A	MH2	1	2	101.334	0.110	20	2% Offset for UBS* / B1I

Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]
0.0056	98.746
0.0056	89.501
0.0056	105.034
0.0056	98.441
0.0056	106.366
0.0055	101.518

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

Average 98.650
Standard Dev. 5.902
Coeff. of Var. [%] 5.982
Min. 87.903
Max. 103.818
Number of Spec. 6

Average_{norm} 0.0056 **99.934**
Standard Dev._{norm} **6.040**
Coeff. of Var. [%]_{norm} **6.044**
Min. 0.0055 **89.501**
Max. 0.0056 **106.366**
Number of Spec. **6**



Laminate Pin Bearing Properties (PB3) -- (ETW2)
Strength
 MTM45-1/ IM7 Uni

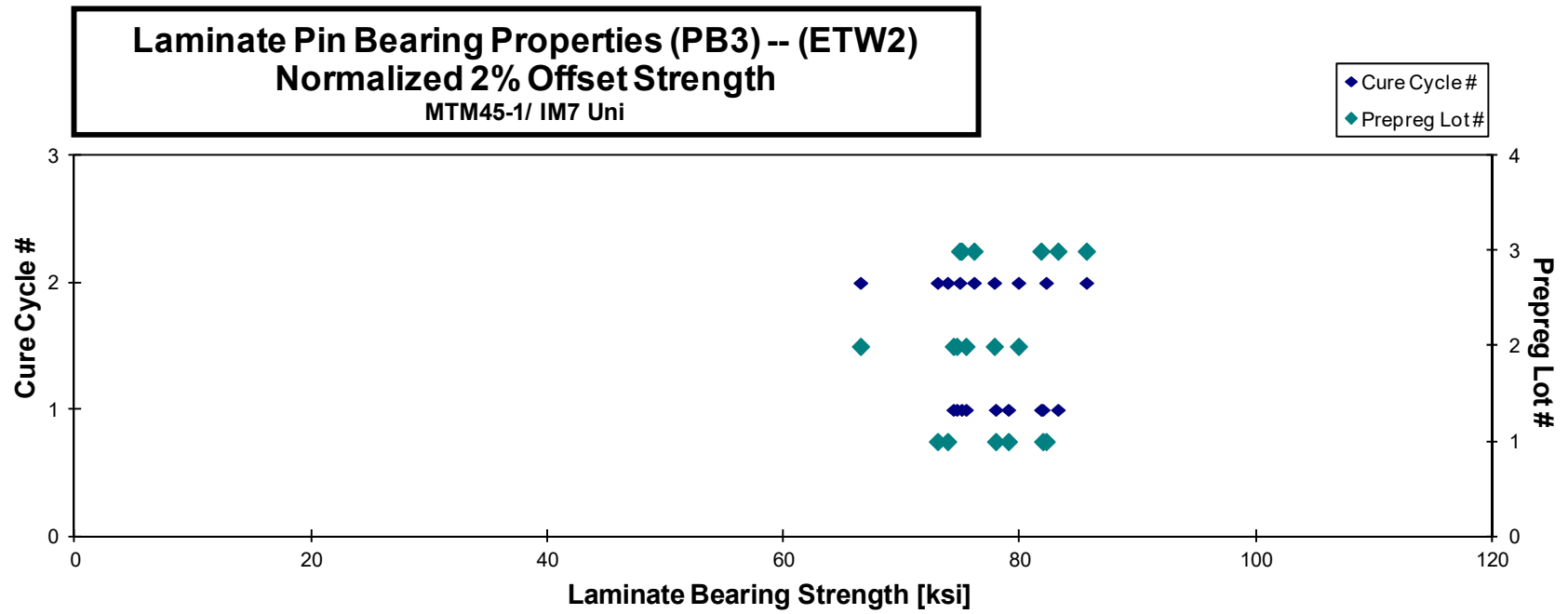
normalizing t_{ply}
 [in]
 0.0055

Specimen Number	NIAR Name	ACG Batch #	ACG Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% Offset Strength _{norm} [ksi]
IMU-PB3-A-MH1-ETW2-1	AF3A111D	A	MH1	1	1	78.166	0.110	20	2% Offset for UBS* / B1l	0.0055	77.953
IMU-PB3-A-MH1-ETW2-3	AF3A113D	A	MH1	1	1	82.399	0.109	20	2% Offset for UBS* / B1l	0.0055	81.937
IMU-PB3-A-MH1-ETW2-4	AF3A114D	A	MH1	1	1	79.057	0.110	20	2% Offset for UBS* / B1l	0.0055	79.021
IMU-PB3-A-MH2-ETW2-1	AF3A211D	A	MH2	1	2	74.386	0.109	20	2% Offset for UBS* / B1l	0.0055	73.879
IMU-PB3-A-MH2-ETW2-2	AF3A212D	A	MH2	1	2	72.700	0.111	20	2% Offset for UBS* / B1l	0.0055	73.030
IMU-PB3-A-MH2-ETW2-3	AF3A213D	A	MH2	1	2	81.531	0.111	20	2% Offset for UBS* / B1l	0.0055	82.223
IMU-PB3-B-MH1-ETW2-1	AF3B111D	B	MH1	2	1	75.008	0.111	20	2% Offset for UBS* / B1l	0.0055	75.434
IMU-PB3-B-MH1-ETW2-2	AF3B112D	B	MH1	2	1	74.371	0.110	20	2% Offset for UBS* / B1l	0.0055	74.371
IMU-PB3-B-MH1-ETW2-3	AF3B113D	B	MH1	2	1	74.657	0.110	20	2% Offset for UBS* / B1l	0.0055	74.657
IMU-PB3-B-MH2-ETW2-1	AF3B211D	B	MH2	2	2	79.591	0.110	20	2% Offset for UBS* / B1l	0.0055	79.881
IMU-PB3-B-MH2-ETW2-2	AF3B212D	B	MH2	2	2	66.275	0.110	20	2% Offset for UBS* / B1l	0.0055	66.501
IMU-PB3-B-MH2-ETW2-3	AF3B213D	B	MH2	2	2	76.603	0.112	20	2% Offset for UBS* / B1l	0.0056	77.839
IMU-PB3-C-MH1-ETW2-1	AF3C111D	C	MH1	3	1	82.747	0.109	20	2% Offset for UBS* / B1l	0.0054	81.788
IMU-PB3-C-MH1-ETW2-2	AF3C112D	C	MH1	3	1	83.508	0.110	20	2% Offset for UBS* / B1l	0.0055	83.223
IMU-PB3-C-MH1-ETW2-3	AF3C113D	C	MH1	3	1	75.542	0.109	20	2% Offset for UBS* / B1l	0.0055	75.062
IMU-PB3-C-MH2-ETW2-1	AF3C211D	C	MH2	3	2	86.836	0.108	20	2% Offset for UBS* / B1l	0.0054	85.632
IMU-PB3-C-MH2-ETW2-2	AF3C212D	C	MH2	3	2	75.555	0.109	20	2% Offset for UBS* / B1l	0.0055	74.902
IMU-PB3-C-MH2-ETW2-3	AF3C213D	C	MH2	3	2	76.027	0.110	20	2% Offset for UBS* / B1l	0.0055	76.114

Ultimate Bearing Strength / B1l:
 B: Bearing, 1: first hole, l: Inapplicable
 (not on bolt, nut or head side)

Average 77.498
Standard Dev. 4.800
Coeff. of Var. [%] 6.194
Min. 66.275
Max. 86.836
Number of Spec. 18

Average_{norm} 0.0055 77.414
Standard Dev._{norm} 4.591
Coeff. of Var. [%]_{norm} 5.930
Min. 0.0054 85.632
Max. 0.0056 85.632
Number of Spec. 18



4.31 “25/50/25” Compression After Impact 1 Properties (CAI1)

**Laminate Compression After Impact Properties (CAI1) -- (RTD)
Strength
MTM45-1/ IM7 Uni**

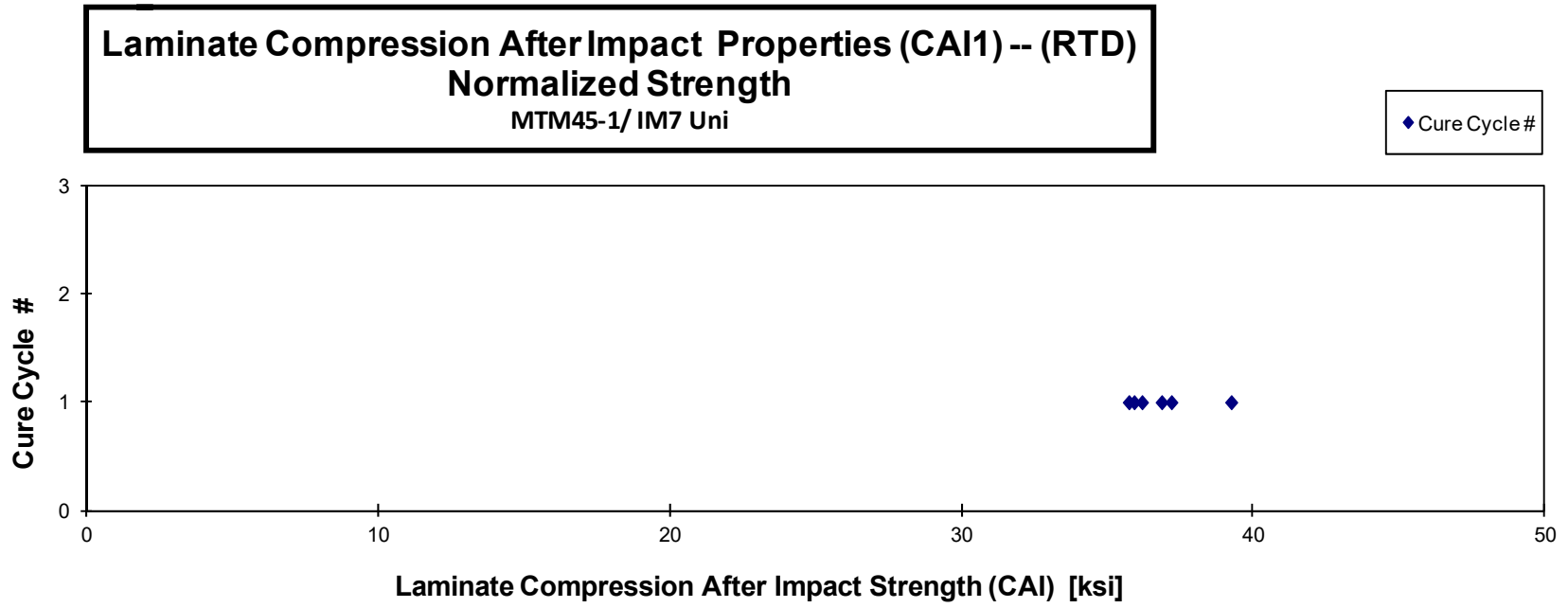
normalizing t_{ply}
[in]
0.0055

Specimen Number	NIAR Name	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
IMU-CAI1-A-MH1-RTD-1	AFKA111A	A	MH1	1	1	269.70	35.450	0.180	32	LDM
IMU-CAI1-A-MH1-RTD-2	AFKA112A	A	MH1	1	1	270.03	36.745	0.178	32	LDM
IMU-CAI1-A-MH1-RTD-3	AFKA113A	A	MH1	1	1	269.36	37.086	0.175	32	LDM
IMU-CAI1-A-MH1-RTD-4	AFKA114A	A	MH1	1	1	270.95	35.624	0.177	32	LDM
IMU-CAI1-A-MH1-RTD-5	AFKA115A	A	MH1	1	1	270.24	38.840	0.178	32	LDM
IMU-CAI1-A-MH1-RTD-6	AFKA116A	A	MH1	1	1	268.33	35.050	0.179	32	LDM

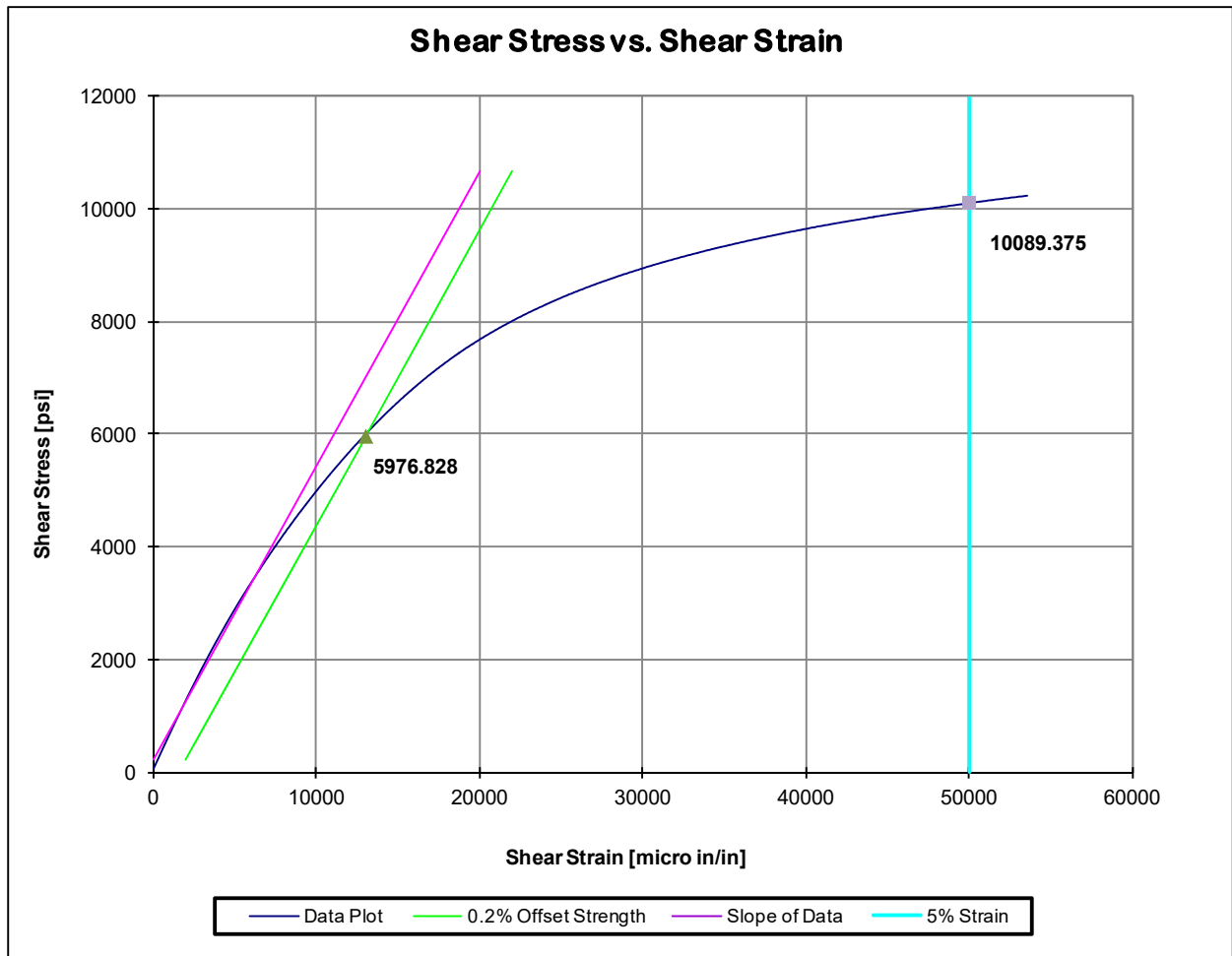
Avg. t_{ply} [in]	Strength _{norm} [ksi]
0.0056	36.155
0.0056	37.163
0.0055	36.833
0.0055	35.887
0.0056	39.215
0.0056	35.707

Average 36.466
Standard Dev. 1.403
Coeff. of Var. [%] 3.848
Min. 35.050
Max. 38.840
Number of Spec. 6

Average_{norm} 0.0056 **36.827**
Standard Dev._{norm} 1.297
Coeff. of Var. [%]_{norm} 3.521
Min. 0.0055 **35.707**
Max. 0.0056 **39.215**
Number of Spec. 6

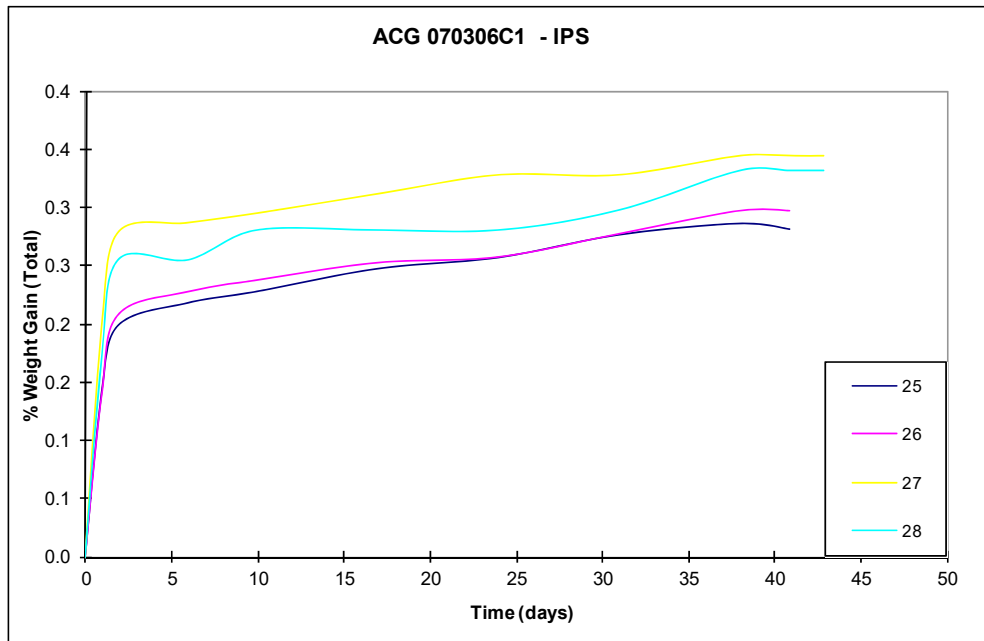


5. Shear Stress vs. Shear Strain, RTD

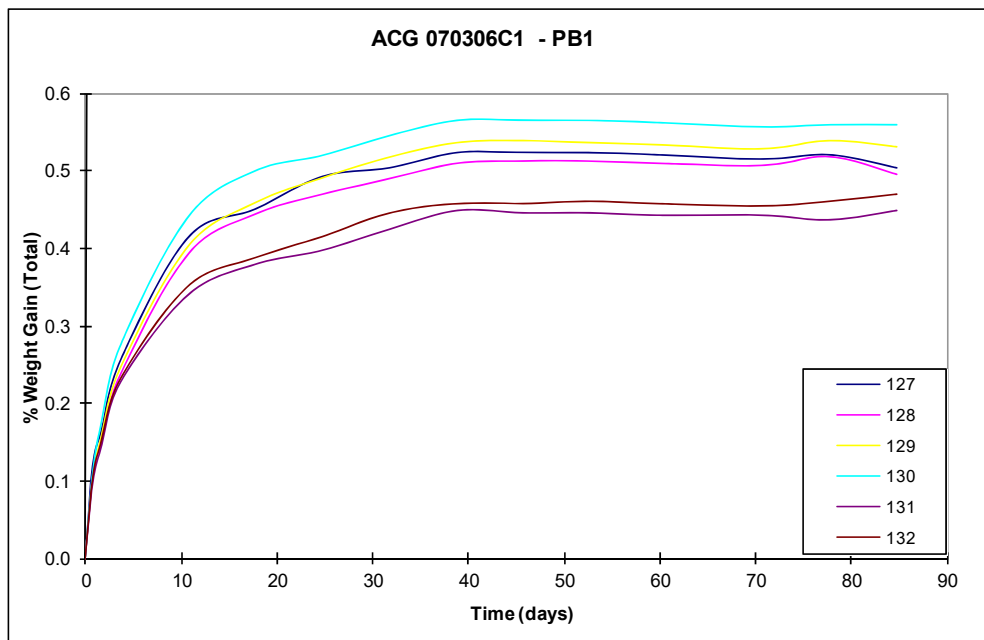


6. MOISTURE CONDITIONING CHARTS

6.1 In-Plane Shear Properties – Thinnest Panel



6.2 Pin Bearing 1 - Thickest Panel



7. DMA Results

The variability in the DMA data below is higher than expected; however, ACG and NCAMP have reviewed the cure cycle records, and could not find any assignable cause. NCAMP and ACG agreed to remove the data which resulted in Dry DMA values greater than Wet DMA values.

Test Panel Part Number					Representative DMA Sample #	MH Cure DMA Results - Onset Storage Modulus				MH Cure DMA Results - Peak Tangent Delta												
						AITR1392-IMU																
						DRY		85% RH WET		DRY		85% RH WET										
Test Plan-	Material-	Test-	Batch-	Cure	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]										
AITR1392-IMU	IMU	LT-	B-	MH1	MP1509A	182.09	359.77			209.04	408.27											
AITR1392-IMU	IMU	TT-	B-	MH1																		
AITR1392-IMU	IMU	LC-	B-	MH1																		
AITR1392-IMU	IMU	TC-	B-	MH1																		
AITR1392-IMU	IMU	UNT0-	B-	MH1																		
AITR1392-IMU	IMU	UNT1-	B-	MH1																		
AITR1392-IMU	IMU	UNC0-	B-	MH1																		
AITR1392-IMU	IMU	UNC1-	B-	MH1																		
AITR1392-IMU	IMU	OHT2-	B-	MH1																		
AITR1392-IMU	IMU	OHT3-	B-	MH1																		
AITR1392-IMU	IMU	OHC3-	B-	MH1																		
AITR1392-IMU	IMU	FHC2-	B-	MH1																		
AITR1392-IMU	IMU	FHC3-	B-	MH1																		
AITR1392-IMU	IMU	PB2-	B-	MH1																		
AITR1392-IMU	IMU	PB3-	B-	MH1																		
AITR1392-IMU	IMU	LT-	B-	MH2	MP1509B	178.16	352.89	175.99	348.78	209.90	409.82	209.01	408.22									
AITR1392-IMU	IMU	TT-	B-	MH2																		
AITR1392-IMU	IMU	LC-	B-	MH2																		
AITR1392-IMU	IMU	TC-	B-	MH2																		
AITR1392-IMU	IMU	IPS-	B-	MH1																		
AITR1392-IMU	IMU	UNT0-	B-	MH2																		
AITR1392-IMU	IMU	UNT1-	B-	MH2																		
AITR1392-IMU	IMU	UNC0-	B-	MH2																		
AITR1392-IMU	IMU	OHT1-	B-	MH1																		
AITR1392-IMU	IMU	FHT1-	B-	MH1																		
AITR1392-IMU	IMU	OHC1-	B-	MH1																		
AITR1392-IMU	IMU	OHC2-	B-	MH1																		
AITR1392-IMU	IMU	FHC1-	B-	MH1																		
AITR1392-IMU	IMU	PB1-	B-	MH1																		
AITR1392-IMU	IMU	FHT1-	A-	MH2	MP1509BB	178.49	353.28	157.62	315.71	204.53	400.16	187.11	368.80									
AITR1392-IMU	IMU	PB1-	C-	MH2																		
AITR1392-IMU	IMU	PB2-	C-	MH2																		
AITR1392-IMU	IMU	OHC3-	C-	MH1	MP1509BC	179.41	354.94	157.49	315.48	203.50	398.29	198.59	389.47									
AITR1392-IMU	IMU	PB2-	A-	MH2	MP1509BD	187.65	369.76	160.78	321.41	210.44	410.79	184.21	363.58									
AITR1392-IMU	IMU	PB3-	A-	MH2																		
AITR1392-IMU	IMU	IPS-	A-	MH3	MP1509BE	169.91	337.83	156.24	313.23	199.51	391.12	195.75	384.34									
AITR1392-IMU	IMU	UNT0-	A-	MH3																		
AITR1392-IMU	IMU	OHT1-	A-	MH3																		
AITR1392-IMU	IMU	OHT2-	A-	MH3																		
AITR1392-IMU	IMU	FHT1-	A-	MH3																		
AITR1392-IMU	IMU	FHC3-	A-	MH3																		
AITR1392-IMU	IMU	PB2-	A-	MH3																		
AITR1392-IMU	IMU	PB1-	A-	MH2	MP1509BK	173.95	345.10	155.32	311.57	201.08	393.94	189.64	373.35									
AITR1392-IMU	IMU	IPS-	A-	MH4																		
AITR1392-IMU	IMU	CAH1-	A-	MH1	MP1509BL	195.65	384.17			212.36	414.24											
AITR1392-IMU	IMU	IPS-	B-	MH2	MP1509C	186.77	368.19			211.74	413.13											
AITR1392-IMU	IMU	UNC1-	B-	MH2																		
AITR1392-IMU	IMU	OHT3-	B-	MH2																		
AITR1392-IMU	IMU	OHC2-	B-	MH2																		
AITR1392-IMU	IMU	OHC3-	B-	MH2																		
AITR1392-IMU	IMU	FHC1-	B-	MH2																		
AITR1392-IMU	IMU	FHC2-	B-	MH2																		
AITR1392-IMU	IMU	FHC3-	B-	MH2																		
AITR1392-IMU	IMU	PB1-	B-	MH2																		
AITR1392-IMU	IMU	PB2-	B-	MH2																		
AITR1392-IMU	IMU	PB3-	B-	MH2																		
AITR1392-IMU	IMU	OHT1-	B-	MH2										MP1509D	168.55	335.40	157.15	314.86	201.02	393.83	198.51	389.31
AITR1392-IMU	IMU	OHT2-	B-	MH2																		
AITR1392-IMU	IMU	FHT1-	B-	MH2																		
AITR1392-IMU	IMU	LT-	C-	MH2	MP1509E	---	---			---	---											
AITR1392-IMU	IMU	TT-	C-	MH2																		
AITR1392-IMU	IMU	LC-	C-	MH2																		
AITR1392-IMU	IMU	TC-	C-	MH2																		
AITR1392-IMU	IMU	UNT0-	C-	MH2																		
AITR1392-IMU	IMU	UNT1-	C-	MH2																		
AITR1392-IMU	IMU	LT-	C-	MH1	MP1509F	171.89	341.41	159.07	318.32	201.70	395.06	198.16	388.68									
AITR1392-IMU	IMU	TT-	C-	MH1																		
AITR1392-IMU	IMU	OHC1-	B-	MH2																		

AITR1392- IMU	UNC0-	C-	MH2	MP1509O	196.79	386.22			213.61	416.50			
AITR1392- IMU	UNC1-	C-	MH1										
AITR1392- IMU	OHT2-	C-	MH2										
AITR1392- IMU	OHT3-	C-	MH2										
AITR1392- IMU	OHC1-	C-	MH1										
AITR1392- IMU	OHC2-	C-	MH2										
AITR1392- IMU	OHT1-	C-	MH1	MP1509P	195.64	384.16			211.72	413.09			
AITR1392- IMU	OHT3-	A-	MH2										
AITR1392- IMU	OHC3-	C-	MH2										
AITR1392- IMU	FHC1-	C-	MH2										
AITR1392- IMU	FHC2-	C-	MH2										
AITR1392- IMU	FHC3-	C-	MH2										
AITR1392- IMU	PB3-	C-	MH2										
AITR1392- IMU	LT-	A-	MH1	MP1509Q	168.98	336.17	157.91	316.24	198.67	389.61	191.11	376.00	
AITR1392- IMU	TT-	A-	MH1										
AITR1392- IMU	LC-	A-	MH1										
AITR1392- IMU	LC-	C-	MH1										
AITR1392- IMU	TC-	A-	MH1										
AITR1392- IMU	TC-	C-	MH1										
AITR1392- IMU	IPS-	A-	MH1										
AITR1392- IMU	UNTO-	A-	MH1										
AITR1392- IMU	UNT1-	C-	MH1										
AITR1392- IMU	UNC0-	A-	MH1										
AITR1392- IMU	UNC0-	C-	MH1										
AITR1392- IMU	OHC2-	C-	MH1										
AITR1392- IMU	TC-	A-	MH2	MP1509R	167.09	332.76	156.20	313.17	197.88	388.18	189.42	372.95	
AITR1392- IMU	UNC1-	C-	MH2										
AITR1392- IMU	OHC1-	C-	MH2										
AITR1392- IMU	FHC1-	C-	MH1										
AITR1392- IMU	FHC2-	C-	MH1										
AITR1392- IMU	UNT1-	A-	MH1	MP1509S	169.35	336.82	158.33	316.99	199.19	390.55	191.37	376.47	
AITR1392- IMU	UNT2-	A-	MH1										
AITR1392- IMU	UNT3-	A-	MH1										
AITR1392- IMU	UNC1-	A-	MH1										
AITR1392- IMU	UNC3-	A-	MH1										
AITR1392- IMU	OHT1-	A-	MH1										
AITR1392- IMU	OHT2-	A-	MH1										
AITR1392- IMU	OHC1-	A-	MH2										
AITR1392- IMU	UNT1-	A-	MH2	MP1509T	169.59	337.26	156.91	314.43	198.60	389.49	196.41	385.54	
AITR1392- IMU	UNT2-	A-	MH2										
AITR1392- IMU	UNT3-	A-	MH2										
AITR1392- IMU	UNC1-	A-	MH2										
AITR1392- IMU	UNC3-	A-	MH2										
AITR1392- IMU	OHT3-	A-	MH1										
AITR1392- IMU	FHT1-	A-	MH1										
AITR1392- IMU	FHT2-	A-	MH1										
AITR1392- IMU	FHT3-	A-	MH1										
AITR1392- IMU	OHC1-	A-	MH1										
AITR1392- IMU	OHT1-	A-	MH2	MP1509U	168.35	335.03	156.17	313.10	198.25	388.84	196.86	386.35	
AITR1392- IMU	OHT2-	A-	MH2										
AITR1392- IMU	FHT2-	A-	MH2										
AITR1392- IMU	FHT3-	A-	MH2										
AITR1392- IMU	OHC2-	A-	MH1										
AITR1392- IMU	OHC3-	A-	MH1										
AITR1392- IMU	FHC1-	A-	MH1										
AITR1392- IMU	FHC2-	A-	MH1										
AITR1392- IMU	FHC3-	A-	MH1										
AITR1392- IMU	OHT3-	C-	MH1	MP1509V	169.22	336.60	159.91	319.84	199.57	391.22	193.55	380.40	
AITR1392- IMU	FHT1-	A-	MH4										
AITR1392- IMU	OHC2-	A-	MH2										
AITR1392- IMU	OHC3-	A-	MH2										
AITR1392- IMU	FHC1-	A-	MH2										
AITR1392- IMU	FHC2-	A-	MH2										
AITR1392- IMU	FHC3-	A-	MH2										
AITR1392- IMU	PB1-	A-	MH1										
AITR1392- IMU	PB1-	C-	MH1										
AITR1392- IMU	PB2-	A-	MH1										
AITR1392- IMU	PB3-	A-	MH1										
AITR1392- IMU	PB3-	C-	MH1										
AITR1392- IMU	LT-	A-	MH2	MP1509W	167.76	333.97	157.21	314.97	198.44	389.19	190.67	375.20	
AITR1392- IMU	TT-	A-	MH2										
AITR1392- IMU	LC-	A-	MH2										
AITR1392- IMU	IPS-	A-	MH2										
AITR1392- IMU	UNTO-	A-	MH2										
AITR1392- IMU	UNC0-	A-	MH2										
AITR1392- IMU	UNC2-	A-	MH1	MP1509X	168.98	336.16	157.73	315.91	200.12	392.21	186.04	366.88	
AITR1392- IMU	UNC2-	A-	MH2	MP1509Y	160.96	321.73	152.66	306.79	190.06	374.11	184.70	364.46	
Not 100 percent accurate since some specimens came from different batches					Average [°F]	349.06		317.11		398.93		379.41	
					Standard Deviation [°F]	18.80		8.80		11.28		11.42	
					Coefficient of Var. [%]	5.39		2.77		2.83		3.01	
					Batch Averages	A	342.55	A	314.95	A	392.94	A	374.97
Not 100 percent accurate since some specimens came from different batches					Batch Averages	B	354.01	B	331.82	B	406.26	398.77	
					Batch Averages	C	355.56	C	315.78	C	400.13	C	379.18

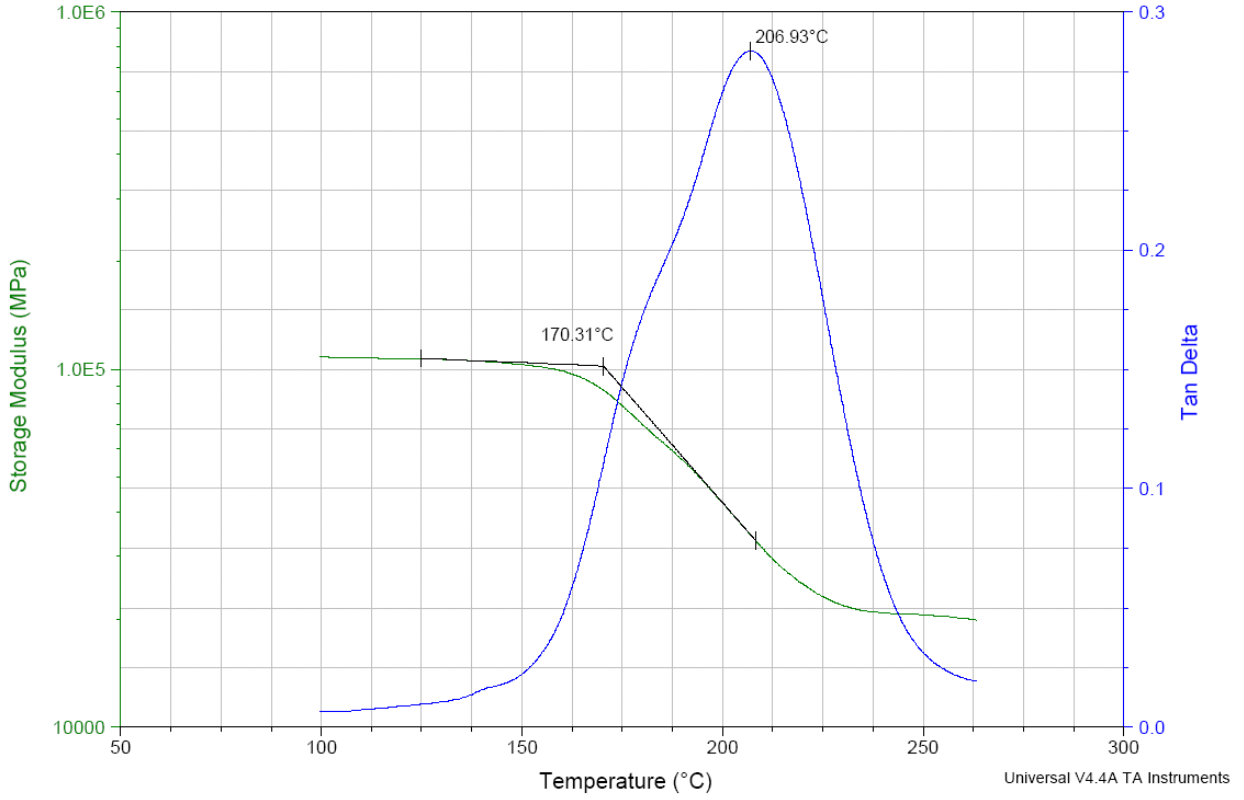
Table 3-1: DMA Results Summary

7.1 DMA Wet Batch B

Sample: MP1509 - MH Cure B - Wet - 3
Size: 20.0000 x 6.4100 x 1.0300 mm
Method: AGATE @5C/min without nitrogen
Comment: ACG MP1509 - MH Cure B HW (New DMA)

DMA

File: \\...MP1509 - MH Cure B - Wet - 3.001
Operator: Ping
Run Date: 28-Sep-2007 15:03
Instrument: DMA Q800 V7.5 Build 127

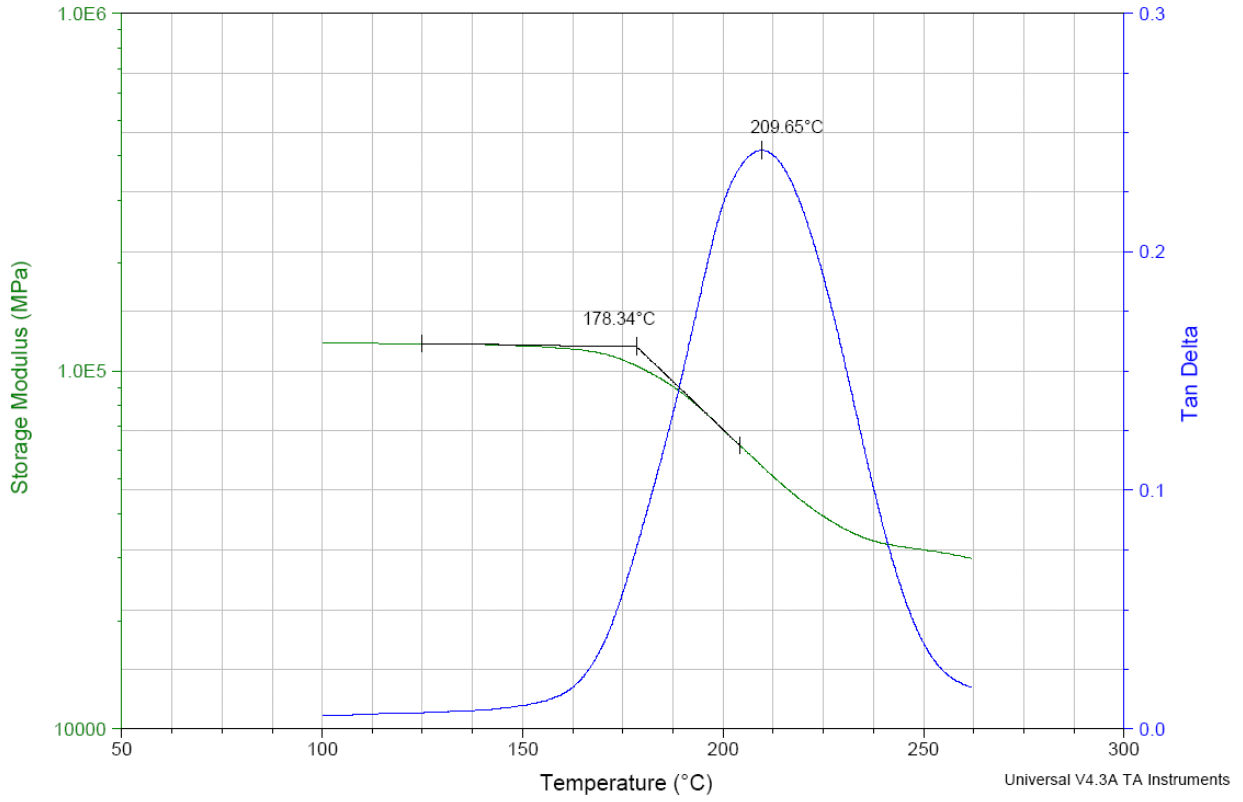


7.2 DMA Dry Batch B

Sample: MP1509 - MH Cure B - 1
Size: 20.0000 x 6.3100 x 1.0100 mm
Method: AGATE @5C/min without nitrogen
Comment: ACG MP1509 - MH Cure B RTD (New DMA)

DMA

File: \...MP1509 - MH Cure B - 1.001
Operator: Ping
Run Date: 08-Aug-2007 10:16
Instrument: DMA Q800 V7.4 Build 126



8. Prepreg Physical Test Results

The following prepreg 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:	
MTM45-1	IM7-GP	2781 UD3	1/16/2007	N/A	N/A	INDIVIDUAL:	INDIVIDUAL:	LTCP	
						29 35	136.3 153.7		MAT SPEC: ACGM1001/PCD-033
						AVERAGE:	AVERAGE:		SHIP DATE:
						30 34	137.75 152.25		INITIALS:
								S.O. #: 20719	



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
ROLL 1	M	2.1824	1.2689	218.24	2.7425	147.36	67.52199	32.47801	1.2744	FOIL WEIGHT
	C	2.1653	1.2634	216.53	2.7132	144.98	66.95608	33.04392	3.3757	SAMPLE & FOIL
	O	2.1499	1.2519	214.99	2.7181	146.62	68.19852	31.80148	3.3662	AFTER DEVOL.
AVERAGE				216.59		146.32	67.56	32.44	0.45	VOL (%)
ROLL 2	M	2.2153	1.2689	221.53	2.7508	148.19	66.89387	33.10613	1.2826	FOIL WEIGHT
	C	2.1907	1.2634	219.07	2.7148	145.14	66.2528	33.7472	3.3871	SAMPLE & FOIL
	O	2.1869	1.2519	218.69	2.7251	147.32	67.36476	32.63524	3.3766	AFTER DEVOL.
AVERAGE				219.76		146.88	66.84	33.16	0.50	VOL (%)
ROLL 3	M	2.2258	1.2507	222.58	2.7528	150.21	67.48585	32.51415	1.2859	FOIL WEIGHT
	C	2.2027	1.2621	220.27	2.7091	144.7	65.69211	34.30789	3.4157	SAMPLE & FOIL
	O	2.2386	1.28	223.86	2.7495	146.95	65.64371	34.35629	3.4065	AFTER DEVOL.
AVERAGE				222.24		147.29	66.27	33.73	0.43	VOL (%)
ROLL 4	M	2.1311	1.2507	213.11	2.7216	147.09	69.02069	30.97931	1.2786	FOIL WEIGHT
	C	2.1216	1.2621	212.16	2.6904	142.83	67.32183	32.67817	3.3691	SAMPLE & FOIL
	O	2.1503	1.2801	215.03	2.7598	147.97	68.81365	31.18635	3.3591	AFTER DEVOL.
AVERAGE				213.43		145.96	68.39	31.61	0.48	VOL (%)
ROLL 5	M	2.1233	1.2507	212.33	2.7214	147.07	69.26482	30.73518	1.2789	FOIL WEIGHT
	C	2.1132	1.2621	211.32	2.6891	142.7	67.52792	32.47208	3.3761	SAMPLE & FOIL
	O	2.1411	1.2801	214.11	2.7421	146.2	68.28266	31.71734	3.3666	AFTER DEVOL.
AVERAGE				212.59		145.32	68.36	31.64	0.45	VOL (%)
ROLL 6	M								1.2754	FOIL WEIGHT
	C								3.3464	SAMPLE & FOIL
	O								3.3382	AFTER DEVOL.
AVERAGE									0.40	VOL (%)
ROLL 7	M									FOIL WEIGHT
	C									SAMPLE & FOIL
	O									AFTER DEVOL.
AVERAGE										VOL (%)
ROLL 8	M									FOIL WEIGHT
	C									SAMPLE & FOIL
	O									AFTER DEVOL.
AVERAGE										VOL (%)

ACG431I/102196/ISSUE3

Table 8-1: Batch A Prepreg Physical Test Results

RESIN	FIBER	BATCH #	D.O.M.	J/G	PEAK TEMP	RC% RANGE	FAW RANGE	CUSTOMER:	PCD CUSTOMER
MTM45-1	IM7-GP	2699 UD3	9/25/2006	N/A	N/A	INDIVIDUAL:	INDIVIDUAL:	MAT SPEC:	PCD033
						29 35	137 153	SHIP DATE:	
						AVERAGE:	AVERAGE:	INITIALS:	
						30 34	137 153	S.O. #:	20719



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	2.113	1.2603	211.3	2.6854	142.51	67.44439	32.55561	1.2683	FOIL WEIGHT
	C	2.0771	1.2862	207.71	2.7044	141.82	68.27789	31.72211	3.3811	SAMPLE & FOIL
	O	2.0615	1.2685	206.15	2.6579	138.94	67.39753	32.60247	3.3739	AFTER DEVOL.
AVERAGE				208.39		141.09	67.71	32.29	0.34	VOL (%)
ROLL 2	M	2.1067	1.2736	210.67	2.6576	138.4	65.69516	34.30484	1.2688	FOIL WEIGHT
	C	2.1455	1.2733	214.55	2.7061	143.28	66.78164	33.21836	3.4443	SAMPLE & FOIL
	O	2.1597	1.2719	215.97	2.6881	141.62	65.57392	34.42608	3.4388	AFTER DEVOL.
AVERAGE				213.73		141.10	66.02	33.98	0.25	VOL (%)
ROLL 3	M	2.0774	1.2815	207.74	2.6696	138.81	66.8191	33.1809	1.2668	FOIL WEIGHT
	C	2.0883	1.2644	208.83	2.6852	142.08	68.0362	31.9638	3.3759	SAMPLE & FOIL
	O	2.1151	1.2686	211.51	2.6913	142.27	67.26396	32.73604	3.3712	AFTER DEVOL.
AVERAGE				209.36		141.05	67.37	32.63	0.22	VOL (%)
ROLL 4	M	2.1128	1.2732	211.28	2.69	141.68	67.05793	32.94207	1.2692	FOIL WEIGHT
	C	2.1004	1.2753	210.04	2.6948	141.95	67.58237	32.41763	3.3819	SAMPLE & FOIL
	O	2.1018	1.2746	210.18	2.678	140.34	66.77134	33.22866	3.3759	AFTER DEVOL.
AVERAGE				210.50		141.32	67.14	32.86	0.28	VOL (%)
ROLL 5	M								1.2645	FOIL WEIGHT
	C								3.3724	SAMPLE & FOIL
	O								3.3654	AFTER DEVOL.
AVERAGE									0.33	VOL (%)
ROLL 6	M								1.2663	FOIL WEIGHT
	C								3.3991	SAMPLE & FOIL
	O								3.3925	AFTER DEVOL.
AVERAGE									0.31	VOL (%)
ROLL 7	M									FOIL WEIGHT
	C									SAMPLE & FOIL
	O									AFTER DEVOL.
AVERAGE										VOL (%)
ROLL 8	M									FOIL WEIGHT
	C									SAMPLE & FOIL
	O									AFTER DEVOL.
AVERAGE										VOL (%)

ACG431I/102196/ISSUE3

Table 8-2: Batch B Prepreg Physical Test Results

RESIN	FIBER	BATCH #	D.O.M.	J/G	PEAK TEMP	RC% RANGE	FAW RANGE	CUSTOMER: LTCP	
MTM45-1	IM7-GP	2751 UD3	12/6/2006	374.13	231.48	INDIVIDUAL:	INDIVIDUAL:	MAT SPEC:	pcd33
						28 36	136.3 153.7	SHIP DATE:	
						AVERAGE:	AVERAGE:	INITIALS:	
						29 35	137.75 152.25	S.O. #:	20719



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	2.0258	1.2264	202.58	2.6475	142.11	70.15006	29.84994	1.2664	FOIL WEIGHT
	C	2.032	1.2325	203.2	2.6705	143.8	70.76772	29.23228	3.2946	SAMPLE & FOIL
	O	2.0705	1.2297	207.05	2.6489	141.92	68.54383	31.45617	3.2796	AFTER DEVOL.
AVERAGE				204.28		142.61	69.82	30.18	0.74	VOL (%)
ROLL 2	M	2.0899	1.2633	208.99	2.6996	143.63	68.72578	31.27422	1.2614	FOIL WEIGHT
	C	2.0891	1.2306	208.91	2.6792	144.86	69.34086	30.65914	3.4552	SAMPLE & FOIL
	O	2.11	1.2504	211	2.6752	142.48	67.52607	32.47393	3.4408	AFTER DEVOL.
AVERAGE				209.63		143.66	68.53	31.47	0.66	VOL (%)
ROLL 3	M	2.1132	1.2745	211.32	2.7139	143.94	68.11471	31.88529	1.2573	FOIL WEIGHT
	C	2.1273	1.2791	212.73	2.7408	146.17	68.71151	31.28849	3.3275	SAMPLE & FOIL
	O	2.1314	1.2715	213.14	2.704	143.25	67.20935	32.79065	3.3154	AFTER DEVOL.
AVERAGE				212.40		144.45	68.01	31.99	0.58	VOL (%)
ROLL 4	M	2.0958	1.2918	209.58	2.7187	142.69	68.08379	31.91621	1.2806	FOIL WEIGHT
	C	2.1346	1.284	213.46	2.7406	145.66	68.23761	31.76239	3.3153	SAMPLE & FOIL
	O	2.1483	1.2457	214.83	2.7113	146.56	68.22138	31.77862	3.3047	AFTER DEVOL.
AVERAGE				212.62		144.97	68.18	31.82	0.52	VOL (%)
ROLL 5	M	2.1321	1.2918	213.21	2.7415	144.97	67.994	32.006	1.2791	FOIL WEIGHT
	C	2.1181	1.284	211.81	2.7227	143.87	67.92408	32.07592	3.4386	SAMPLE & FOIL
	O	2.1457	1.2457	214.57	2.6975	145.18	67.6609	32.3391	3.4299	AFTER DEVOL.
AVERAGE				213.20		144.67	67.86	32.14	0.40	VOL (%)
ROLL 6	M								1.2829	FOIL WEIGHT
	C								3.2726	SAMPLE & FOIL
	O								3.2579	AFTER DEVOL.
AVERAGE									0.74	VOL (%)
ROLL 7	M									FOIL WEIGHT
	C									SAMPLE & FOIL
	O									AFTER DEVOL.
AVERAGE										VOL (%)
ROLL 8	M									FOIL WEIGHT
	C									SAMPLE & FOIL
	O									AFTER DEVOL.
AVERAGE										VOL (%)

ACG431I/102196/ISSUE3

Table 8-3: Batch C Prepreg Physical Test Results

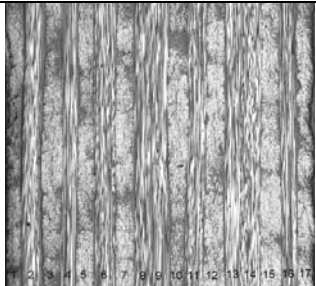


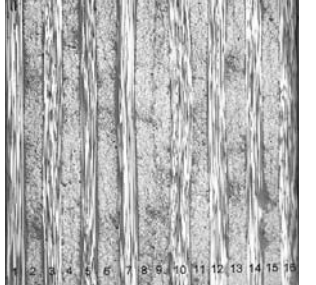
9. Deviations

Some of the data from specific panels and cures has been removed from this report and statistical calculations because there were problems during the panel fabrication process. As seen in the section 4 in this report for the following test types and test conditions:

1. LT [RTD, CTD, ETW, ETW2]
 - a. IMU-LT-A-MH2
2. UNC0 [RTD, CTD, ETD, ETW, ETW2]
 - a. IMU-UNC0-B-MH2
 - b. IMU-UNC0-C-MH1
 - c. IMU-UNC0-C-MH2
3. UNC1 [RTD, ETW, ETW2]
 - a. IMU-UNC1-A-MH2
 - b. IMU-UNC1-B-MH2
4. SBS1 [RTD, ETW and ETW2]
 - a. IMU-SBS1-A-MH2
 - b. IMU-SBS1-B-MH2

After reviewing batch plots, photomicrographs, DMA data, and cure cycle charts there is enough substantial evidence to discard the data from the statistical calculations. During a panel inspection process it was shown that the panels with data thrown out contained no visible glass strings or remnant of such embedded in the surface of the panels on or near the corners, thus evidence that these were not used during the panel fabrication as recommended per ACG Process Specification ACGP 1001-02 Revision E Test Panel Fabrication Specification. Incorrect panel processing led to missing glass breather strings and the scatter across multiple data points and cure cycles allow us to contribute the problem the panel processing instead of a material or testing flaw.

Material property data from panels with the incorrect layup was removed from both the qualification material property data report and the statistical analysis. The incorrect layups were found after testing of some of the unnotched compression specimens yielded unacceptable failure modes. The differences in the panel symmetry and ply count seen in the unnotched compression specimens were not significant enough in all cases to cause inconsistent results. The following images were taken to verify the incorrect panel fabrication.

Panel ID	Photomicrograph of Panel Received	Per Test Plan		Panel Received		Comment
		Correct Layup	No. of Plies	Incorrect Layup	No. of Plies	
UNC0-B-MH2-ETW		[90/0]4S	16	[90/0/90/0/90/0/90/0/0/90/0/90/0/0/90/0/90]	17	The panel has 17 plies instead of 16 plies.
UNC0-C-MH1-ETW		[90/0]4S	16	[0/90]4S	16	The 0° plies are swapped with 90° plies
UNC0-C-MH2-ETW		[90/0]4S	16	[0/90]4S	16	The 0° plies are swapped with 90° plies
UNC0-C-MH2-ETW2		[90/0]4S	16	[0/90]4S	16	The 0° plies are swapped with 90° plies

From the beginning a series of specimens were never tested nor included in the panel shipments to NIAR for testing. The specimens removed from the test matrix from the very beginning are the following:

- FHT3-A-MH2-RTD
- FHT3-A-MH2-CTD
- FHC3-A-MH1-ETW2
- FHC3-A-MH1-RTD
- ILT-A-MH1-ETW2
- ILT-A-MH2-ET2
- ILT-A-MH1-RTD
- ILT-A-MH2-RTD

March 28, 2018

CAM-RP-2008-007 Rev B

From the material shortage noticed in the beginning, additional panels were later fabricated using two alternate cure cycles Cure 3 and Cure 4 were added.

- IPS-A-MH3
- IPS-A-MH4
- FHT1-A-MH3
- FHT1-A-MH4

350ohm strain gauges were used instead of 120ohm.

No Fluid Sensitivity Short-Beam Strength testing was conducted for this series of testing.