Newport Adhesives and Composites NCT4708 MR60H 300gsm 38% RC Unidirectional Qualification Material Property Data Report

NCAMP Project: NPN030901

NCAMP Test Report Number: CAM-RP-2010-041 A

August 19, 2011

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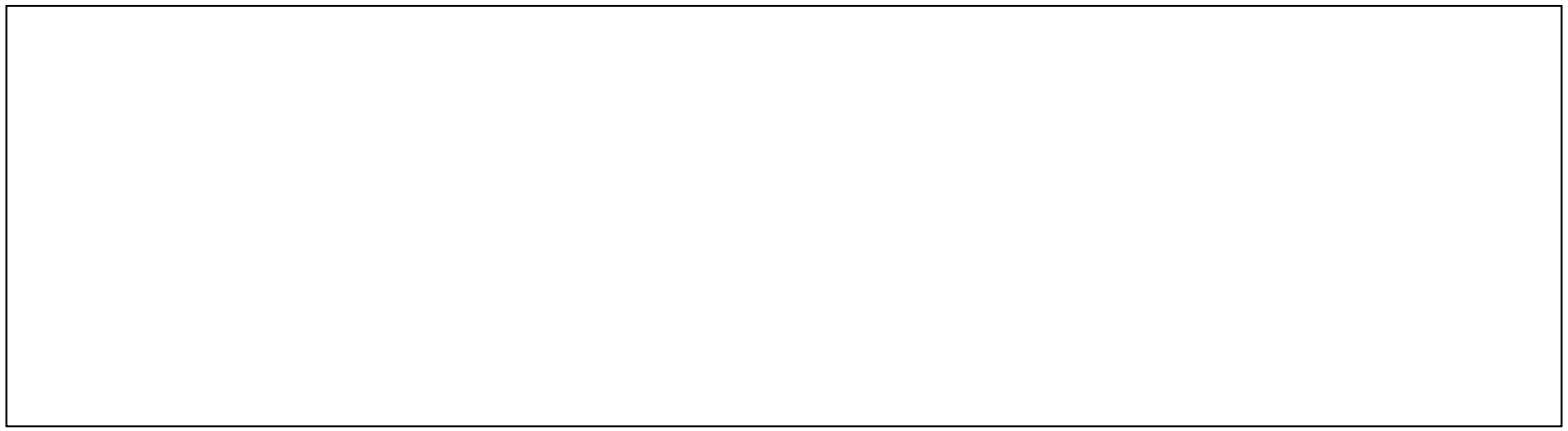
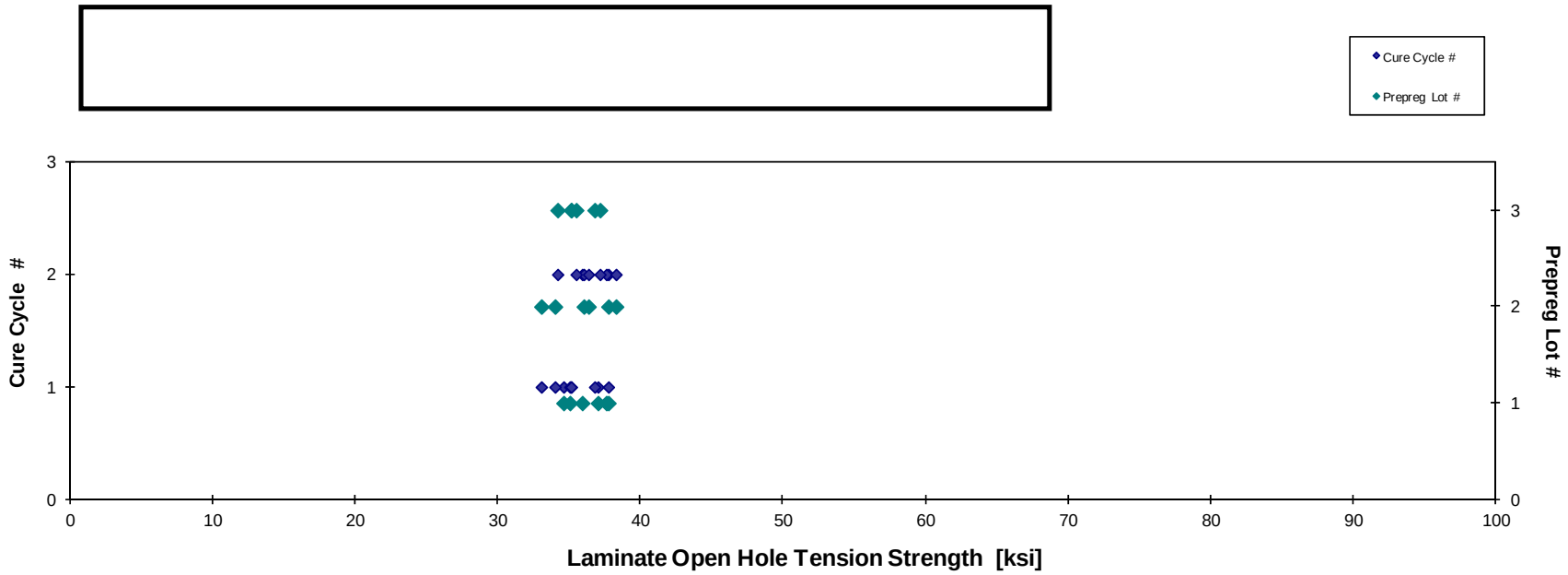


normalizing t_{ply} [in]
0.01260

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WFEA118F	A	C1	1	1	33.486	0.143	11	0.0130	AGM / DGM	0.0130	34.613
WFEA119F	A	C1	1	1	33.990	0.143	11	0.0130	AGM / DGM	0.0130	35.057
WFEA11AF	A	C1	1	1	36.277	0.141	11	0.0129	AGM / DGM	0.0129	37.028
WFEA218F	A	C2	1	2	36.442	0.144	11	0.0131	AGM / DGM	0.0131	37.757
WFEA219F	A	C2	1	2	34.927	0.143	11	0.0130	AGM / DGM	0.0130	35.923
WFEA21AF	A	C2	1	2	36.657	0.142	11	0.0129	AGM / DGM	0.0129	37.609
WFEB118F	B	C1	2	1	33.361	0.137	11	0.0125	AGM / DGM	0.0125	33.056
WFEB119F	B	C1	2	1	34.198	0.138	11	0.0125	AGM / DGM	0.0125	34.013
WFEB11AF	B	C1	2	1	37.685	0.139	11	0.0126	AGM / DGM	0.0126	37.758
WFEB218F	B	C2	2	2	35.929	0.139	11	0.0126	AGM / DGM	0.0126	36.037
WFEB219F	B	C2	2	2	38.549	0.138	11	0.0125	AGM / DGM	0.0125	38.294
WFEB21AF	B	C2	2	2	36.698	0.137	11	0.0125	AGM / DGM	0.0125	36.367
WFEC118F	C	C1	3	1	37.427	0.136	11	0.0124	AGM / DGM	0.0124	36.792
WFEC119F	C	C1	3	1	35.518	0.137	11	0.0125	AGM / DGM	0.0125	35.143
WFEC11AF	C	C1	3	1	35.912	0.136	11	0.0123	AGM / DGM	0.0123	35.148
WFEC218F	C	C2	3	2	35.688	0.138	11	0.0125	AGM / DGM	0.0125	35.495
WFEC219F	C	C2	3	2	34.873	0.136	11	0.0124	AGM / DGM	0.0124	34.197
WFEC21AF	C	C2	3	2	37.945	0.136	11	0.0123	AGM / DGM	0.0123	37.170

Average	**35.865**	**Average**	**0.0126**	**$Average_{norm}$**	**0.01264**	**35.970**
Standard Dev.	**1.522**			**$Standard\ Dev._{norm}$**		**1.487**
Coeff. of Var. [%]	**4.242**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**4.135**
Min.	**33.361**	**Min.**	**0.0123**	**Min.**	**0.0123**	**33.056**
Max.	**38.549**	**Max.**	**0.0131**	**Max.**	**0.0131**	**38.294**
Number of Spec.	**18**			**Number of Spec.**		**18y**


Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
0
10
20
30
40
50
60
70
80
90
100
Laminate Open Hole Tension Strength [ksi]

4.18 Open Hole Tension 3 Properties

Laminate Open Hole Tension Properties (OHT3) -- (CTD) Strength
Newport NCT4708 MR60H 300gsm 38% RC Unitape

normalizing t_{ply} [in]
0.01260

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WFFA111B	A	C1	1	1	126.423	0.139	11	0.0126	AGM / DGM	0.0126	126.332
WFFA112B	A	C1	1	1	137.128	0.141	11	0.0128	AGM / DGM	0.0128	139.750
WFFA113B	A	C1	1	1	124.495	0.141	11	0.0128	AGM / DGM	0.0128	126.457
WFFA211B	A	C2	1	2	130.754	0.138	11	0.0125	AGM / DGM	0.0125	129.874
WFFA212B	A	C2	1	2	128.099	0.140	11	0.0127	AGM / DGM	0.0127	128.977
WFFA213B	A	C2	1	2	129.387	0.139	11	0.0126	AGM / DGM	0.0126	129.698
WFFB111B	B	C1	2	1	135.051	0.137	11	0.0124	AGM / DGM	0.0124	133.411
WFFB112B	B	C1	2	1	134.116	0.140	11	0.0127	AGM / DGM	0.0127	135.261
WFFB113B	B	C1	2	1	121.876	0.139	11	0.0127	AGM / DGM	0.0127	122.389
WFFB211B	B	C2	2	2	141.058	0.134	11	0.0122	AGM / DGM	0.0122	136.783
WFFB212B	B	C2	2	2	117.101	0.136	11	0.0124	AGM / DGM	0.0124	115.243
WFFB213B[1]	B	C2	2	2		0.138	11	0.0125	DGM	0.0125	
WFFC111B	C	C1	3	1	125.241	0.135	11	0.0123	AGM / DGM	0.0123	122.394
WFFC112B	C	C1	3	1	129.718	0.136	11	0.0123	AGM / DGM	0.0123	126.957
WFFC113B	C	C1	3	1	133.345	0.136	11	0.0124	AGM / DGM	0.0124	131.261
WFFC211B	C	C2	3	2	122.696	0.135	11	0.0122	AGM / DGM	0.0122	119.126
WFFC212B	C	C2	3	2	120.882	0.135	11	0.0123	AGM / DGM	0.0123	118.091
WFFC213B	C	C2	3	2	122.823	0.135	11	0.0123	AGM / DGM	0.0123	119.514

[1] Strength data points removed due to bad failure

Average	**128.247**	**Average**	**0.0125**	**$Average_{norm}$**	**0.0125**	**127.148**
Standard Dev.	**6.448**			**$Standard\ Dev._{norm}$**		**6.999**
Coeff. of Var. [%]	**5.028**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**5.504**
Min.	**117.101**	**Min.**	**0.0122**	**Min.**	**0.0122**	**115.243**
Max.	**141.058**	**Max.**	**0.0128**	**Max.**	**0.0128**	**139.750**
Number of Spec.	**17**			**Number of Spec.**		**17**

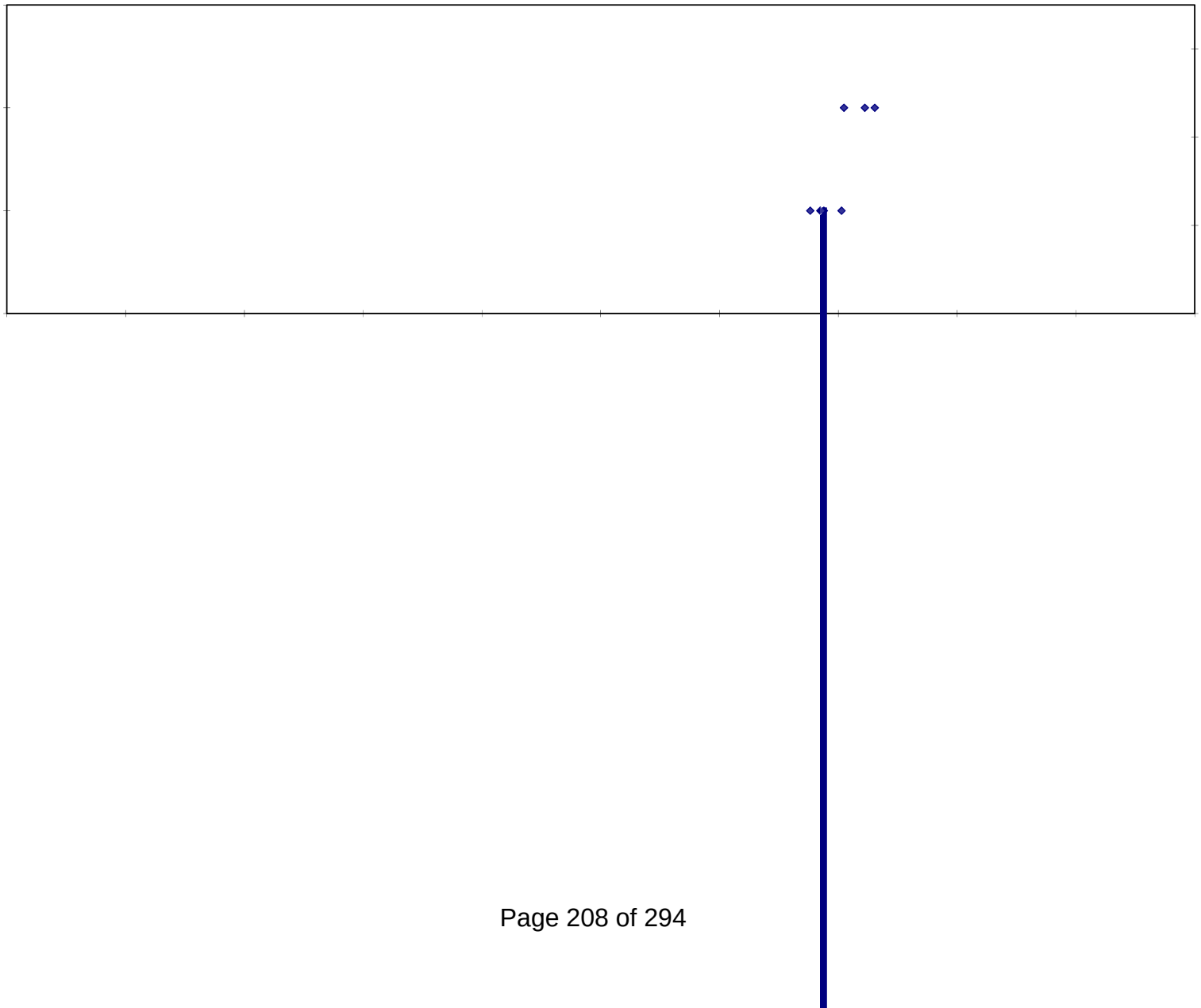
Laminate Open Hole Tension Properties (OHT3) -- (RTD) Strength

Newport NCT4708 MR60H 300gsm 38% RC Unitape

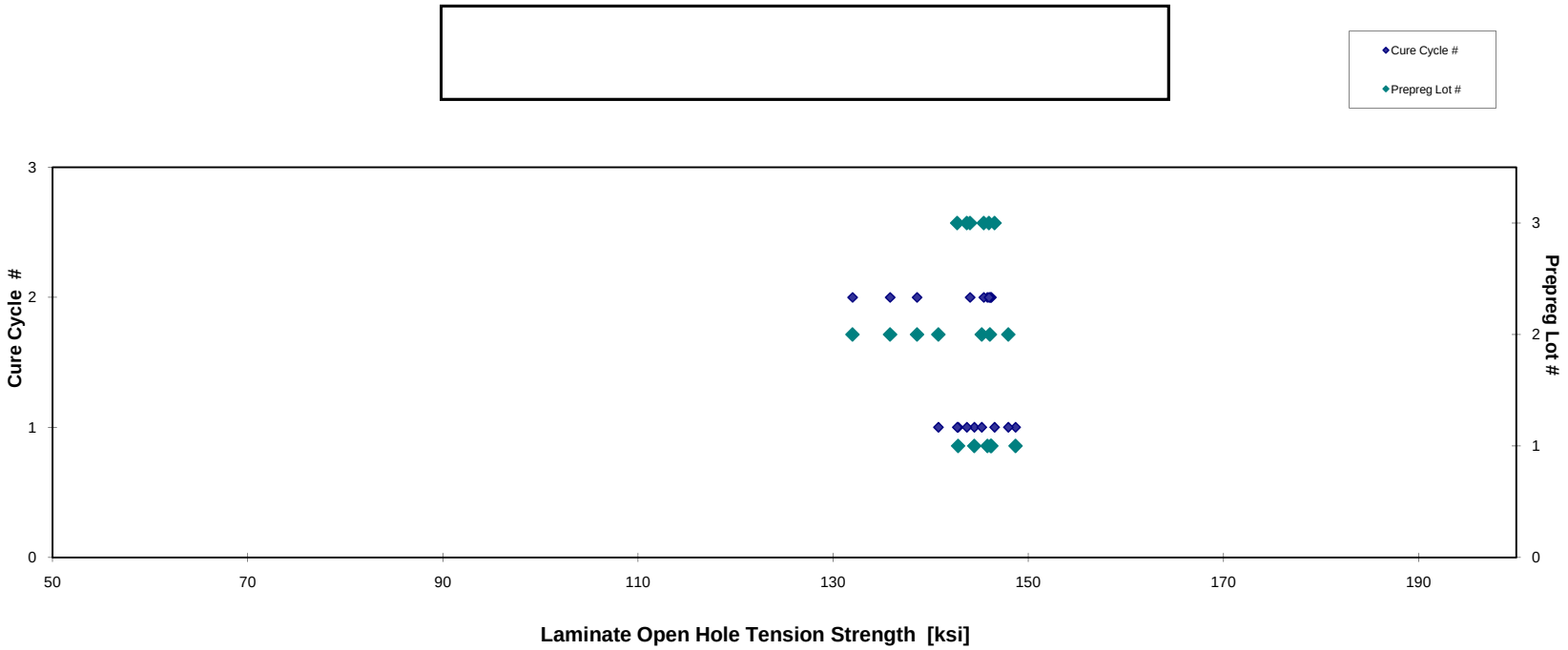
normalizing t_{ply} [in]: 0.01260

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. t_{ply} [in]	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WFFA115A	A	C1	1	1	135.718	0.144	11	0.0130	MGM	0.0130	140.532
WFFA116A	A	C1	1	1	129.791	0.144	11	0.0131	MGM	0.0131	135.269
WFFA117A	A	C1	1	1	132.105	0.144	11	0.0131	MGM	0.0131	137.554
WFFA215A	A	C2	1	2	138.331	0.141	11	0.0128	MGM	0.0128	140.942
WFFA216A	A	C2	1	2	142.564	0.142	11	0.0129	MGM	0.0129	146.129
WFFA217A	A	C2	1	2	140.290	0.143	11	0.0130	MGM	0.0130	144.457
WFFB115A	B	C1	2	1	135.759	0.140	11	0.0127	MGM	0.0127	136.951
WFFB116A	B	C1	2	1	141.122	0.139	11	0.0127	MGM	0.0127	141.902
WFFB117A	B	C1	2	1	140.340	0.139	11	0.0126	MGM	0.0126	140.796
WFFB215A	B	C2	2	2	160.080	0.135	11	0.0123	MGM	0.0123	156.114
WFFB216A	B	C2	2	2	161.346	0.135	11	0.0123	MGM	0.0123	157.174
WFFB217A	B	C2	2	2	137.462	0.137	11	0.0124	MGM	0.0124	135.578
WFFC115A	C	C1	3	1	136.344	0.136	11	0.0124	MGM	0.0124	133.869
WFFC116A	C	C1	3	1	135.642	0.136	11	0.0124	MGM	0.0124	133.211
WFFC117A	C	C1	3	1	132.344	0.136	11	0.0124	MGM	0.0124	130.020
WFFC215A	C	C2	3	2	129.553	0.134	11	0.0122	MGM	0.0122	125.160
WFFC216A	C	C2	3	2	154.390	0.136	11	0.0123	MGM	0.0123	150.937
WFFC217A	C	C2	3	2	138.289	0.135	11	0.0123	MGM	0.0123	134.713

Average	**140.082**	**Average**	**0.0126**	**$Average_{norm}$**	**0.01261**	**140.073**
Standard Dev.	**9.359**			**$Standard\ Dev._{norm}$**		**8.491**
Coeff. of Var. [%]	**6.681**			**$Coeff.\ of\ Var.\ [\%]_{norm}$**		**6.062**
Min.	**129.553**	**Min.**	**0.0122**	**Min.**	**0.0122**	**125.160**
Max.	**161.346**	**Max.**	**0.0131**	**Max.**	**0.0131**	**157.174**
Number of Spec.	**18**			**Number of Spec.**		**18**

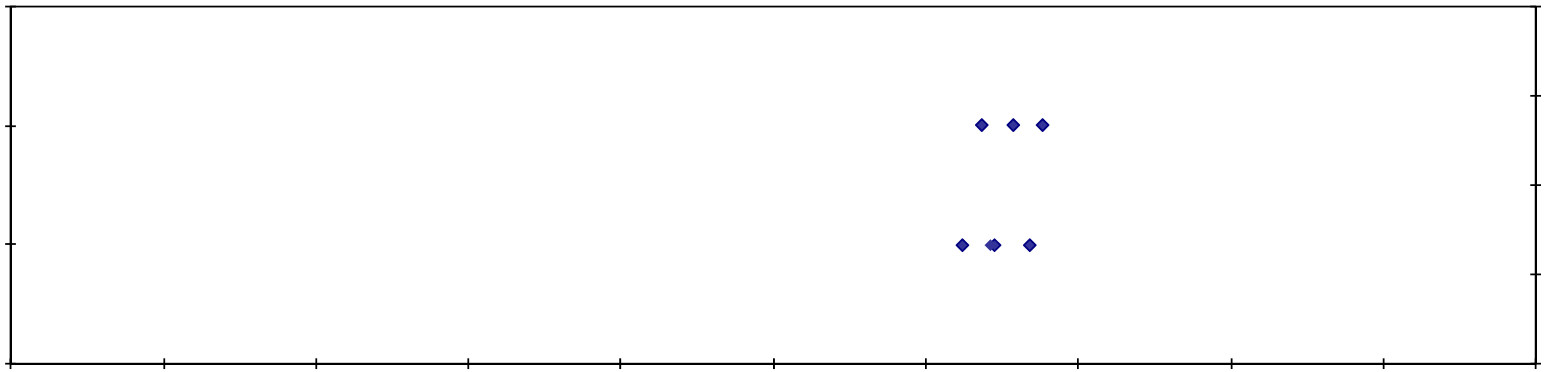


normalizing t_{ply} [in]


Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
50
70
90
110
130
150
170
190
Laminate Open Hole Tension Strength [ksi]

4.19 Filled-Hole Tension 1 Properties

										normalizing t_{ply} [in]
										0.0126
Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF4A111B	A	C1	1	1	65.289	0.103	8	AGM / DGM	0.0129	66.801
WF4A112B	A	C1	1	1	60.708	0.104	8	AGM / DGM	0.0129	62.364
WF4A113B	A	C1	1	1	63.285	0.103	8	AGM / DGM	0.0128	64.477
WF4A211B	A	C2	1	2	61.930	0.104	8	AGM / DGM	0.0129	63.641
WF4A212B	A	C2	1	2	63.762	0.104	8	AGM / DGM	0.0130	65.712
WF4A213B	A	C2	1	2	65.663	0.104	8	AGM / DGM	0.0130	67.639
WF4B111B	B	C1	2	1	64.903	0.100	8	AGM / DGM	0.0125	64.205
WF4B112B	B	C1	2	1	66.883	0.100	8	AGM / DGM	0.0126	66.640
WF4B113B	B	C1	2	1	66.512	0.100	8	AGM / DGM	0.0125	66.193
WF4B211B	B	C2	2	2	68.162	0.099	8	AGM / DGM	0.0124	67.159
WF4B212B	B	C2	2	2	62.585	0.100	8	AGM / DGM	0.0125	62.316
WF4B213B	B	C2	2	2	61.436	0.100	8	AGM / DGM	0.0125	61.060
WF4C111B	C	C1	3	1	66.399	0.098	8	AGM / DGM	0.0123	64.785
WF4C112B	C	C1	3	1	68.478	0.099	8	AGM / DGM	0.0123	67.097
WF4C113B	C	C1	3	1	64.494	0.098	8	AGM / DGM	0.0123	62.841
WF4C211B	C	C2	3	2	62.889	0.098	8	AGM / DGM	0.0123	61.433
WF4C212B	C	C2	3	2	69.197	0.099	8	AGM / DGM	0.0124	67.927
WF4C213B	C	C2	3	2	64.194	0.099	8	AGM / DGM	0.0124	63.111
				Average	**64.820**			**$Average_{norm}$**	**0.0126**	**64.744**
				Standard Dev.	**2.470**			**$Standard\ Dev._{norm}$**		**2.232**
				Coeff. of Var. [%]	**3.810**			**Coeff. of Var. $[\%]_{norm}$**		**3.448**
				Min.	**60.708**			**Min.**	**0.0123**	**61.060**



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

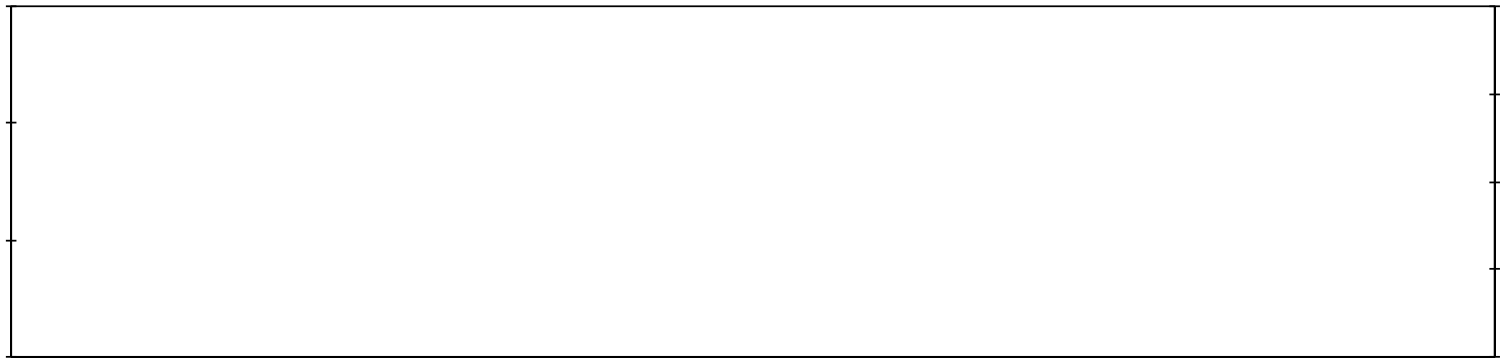
Newport NCT4708 MR60H 300gsm 38% RC Unitape

normalizing t_{ply} [in]
0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF4A115A	A	C1	1	1	74.419	0.103	8	LGM / DGM	0.0128	75.810
WF4A116A	A	C1	1	1	70.030	0.103	8	LGM / DGM	0.0129	71.419
WF4A117A	A	C1	1	1	74.583	0.103	8	LGM / DGM	0.0128	76.014
WF4A215A	A	C2	1	2	63.224	0.105	8	LGM / DGM	0.0132	66.036
WF4A216A	A	C2	1	2	61.885	0.106	8	LGM / DGM	0.0133	65.241
WF4A217A	A	C2	1	2	69.140	0.105	8	LGM / DGM	0.0132	72.261
WF4B115A	B	C1	2	1	62.153	0.100	8	LGM / DGM	0.0125	61.732
WF4B116A	B	C1	2	1	62.409	0.100	8	LGM / DGM	0.0125	61.914
WF4B117A	B	C1	2	1	67.953	0.099	8	LGM / DGM	0.0124	66.762
WF4B215A	B	C2	2	2	71.878	0.100	8	LGM / DGM	0.0125	71.047
WF4B216A	B	C2	2	2	65.570	0.100	8	LGM / DGM	0.0125	64.866
WF4B217A	B	C2	2	2	68.767	0.099	8	LGM / DGM	0.0124	67.744
WF4C115A	C	C1	3	1	70.623	0.098	8	LGM / DGM	0.0122	68.381
WF4C116A	C	C1	3	1	66.609	0.098	8	LGM / DGM	0.0122	64.527
WF4C117A	C	C1	3	1	72.652	0.098	8	LGM / DGM	0.0123	70.742
WF4C215A	C	C2	3	2	73.991	0.099	8	LGM / DGM	0.0124	72.682
WF4C216A	C	C2	3	2	70.242	0.099	8	LGM / DGM	0.0124	68.941
WF4C217A	C	C2	3	2	68.568	0.099	8	LGM / DGM	0.0124	67.219

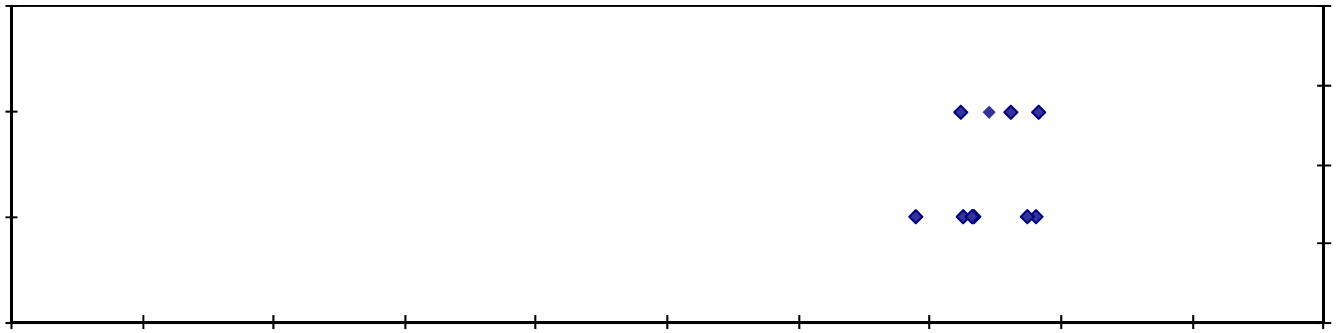
	Strength [ksi]
Average	68.594
Standard Dev.	4.218
Coeff. of Var. [%]	6.150
Min.	61.885
Max.	74.583
Number of Spec.	18

	t_{ply} [in]	$Strength_{norm}$ [ksi]
$Average_{norm}$	0.0126	68.519
$Standard\ Dev._{norm}$		4.214
$Coeff.\ of\ Var.\ [\%]_{norm}$		6.150
Min.	0.0122	61.732
Max.	0.0133	76.014
Number of Spec.		18



normalizing t_{ply} [in]
0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	Strength $_{norm}$ [ksi]
WF4A118F	A	C1	1	1	76.761	0.103	8	AGM/DGM	0.0128	78.131
WF4A119F	A	C1	1	1	67.841	0.102	8	AGM/DGM	0.0128	68.851
WF4A11AF	A	C1	1	1	76.898	0.102	8	AGM/DGM	0.0127	77.458
WF4A218F	A	C2	1	2	75.058	0.105	8	AGM/DGM	0.0132	78.334
WF4A219F	A	C2	1	2	69.103	0.106	8	AGM/DGM	0.0132	72.325
WF4A21AF	A	C2	1	2	73.143	0.105	8	AGM/DGM	0.0131	76.191
WF4B118F	B	C1	2	1	74.160	0.099	8	AGM/DGM	0.0123	72.504
WF4B119F	B	C1	2	1	74.611	0.099	8	AGM/DGM	0.0124	73.328
WF4B11AF	B	C1	2	1	74.666	0.099	8	AGM/DGM	0.0124	73.197
WF4B218F	B	C2	2	2	75.572	0.099	8	AGM/DGM	0.0124	74.510
WF4B219F	B	C2	2	2	69.389	0.100	8	AGM/DGM	0.0125	68.885
WF4B21AF	B	C2	2	2	74.397	0.100	8	AGM/DGM	0.0125	73.868
WF4C118F	C	C1	3	1	77.817	0.099	8	AGM/DGM	0.0123	76.131
WF4C119F	C	C1	3	1	73.008	0.099	8	AGM/DGM	0.0124	71.861
WF4C11AF	C	C1	3	1	73.163	0.099	8	AGM/DGM	0.0123	71.542
WF4C218F	C	C2	3	2	76.943	0.099	8	AGM/DGM	0.0124	75.620
WF4C219F	C	C2	3	2	78.507	0.099	8	AGM/DGM	0.0124	77.144
WF4C21AF	C	C2	3	2	75.354	0.098	8	AGM/DGM	0.0123	73.498
				Average	74.244			Average $_{norm}$		



4.20 Filled-Hole Tension 2 Properties

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

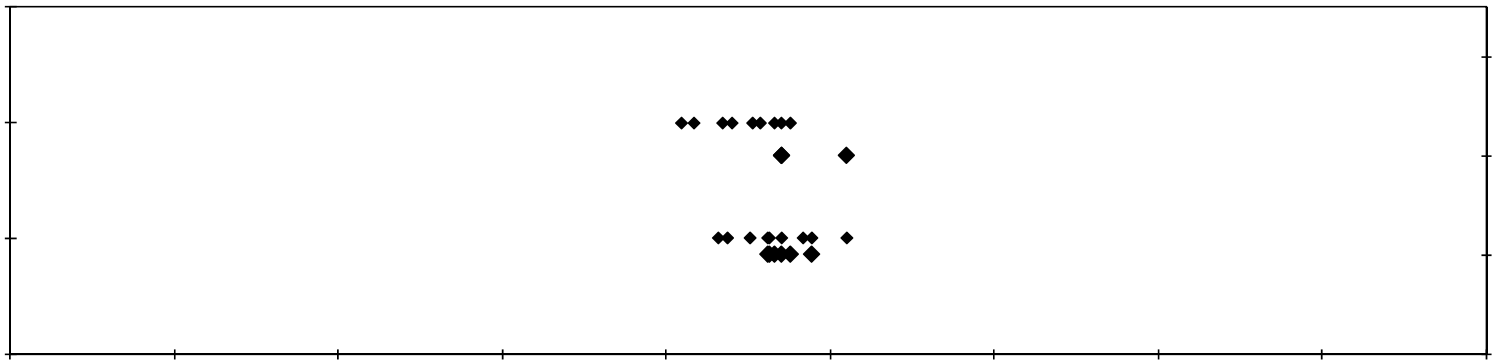
Newc 0 9TD)

normalizing t_{ply} [in]: 0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF5A115A	A	C1	1	1	38.196	0.143	11	AGM/DGM	0.0130	39.427
WF5A116A	A	C1	1	1	36.856	0.143	11	AGM/DGM	0.0130	38.084
WF5A117A	A	C1	1	1	36.836	0.143	11	AGM/DGM	0.0130	38.134
WF5A215A	A	C2	1	2	37.320	0.142	11	AGM/DGM	0.0129	38.289
WF5A216A	A	C2	1	2	37.517	0.142	11	AGM/DGM	0.0129	38.500
WF5A217A	A	C2	1	2	37.625	0.143	11	AGM/DGM	0.0130	38.774
WF5B115A	B	C1	2	1	40.107	0.140	11	AGM/DGM	0.0127	40.493
WF5B116A	B	C1	2	1	38.527	0.139	11	AGM/DGM	0.0126	38.508
WF5B117A	B	C1	2	1	39.044	0.139	11	AGM/DGM	0.0126	39.162
WF5B215A	B	C2	2	2	37.806	0.138	11	AGM/DGM	0.0125	37.624
WF5B216A	B	C2	2	2	35.755	0.137	11	AGM/DGM	0.0125	35.458
WF5B217A	B	C2	2	2	36.100	0.138	11	AGM/DGM	0.0125	35.840
WF5C115A	C	C1	3	1	37.376	0.136	11	AGM/DGM	0.0123	36.581
WF5C116A	C	C1	3	1	37.702	0.136	11	AGM/DGM	0.0123	36.859
WF5C117A	C	C1	3	1	38.495	0.135	11	AGM/DGM	0.0123	37.546
WF5C215A	C	C2	3	2	37.619	0.136	11	AGM/DGM	0.0124	36.999
WF5C216A	C	C2	3	2	38.773	0.135	11	AGM/DGM	0.0123	37.859
WF5C217A	C	C2	3	2	37.756	0.135	11	AGM/DGM	0.0123	36.712

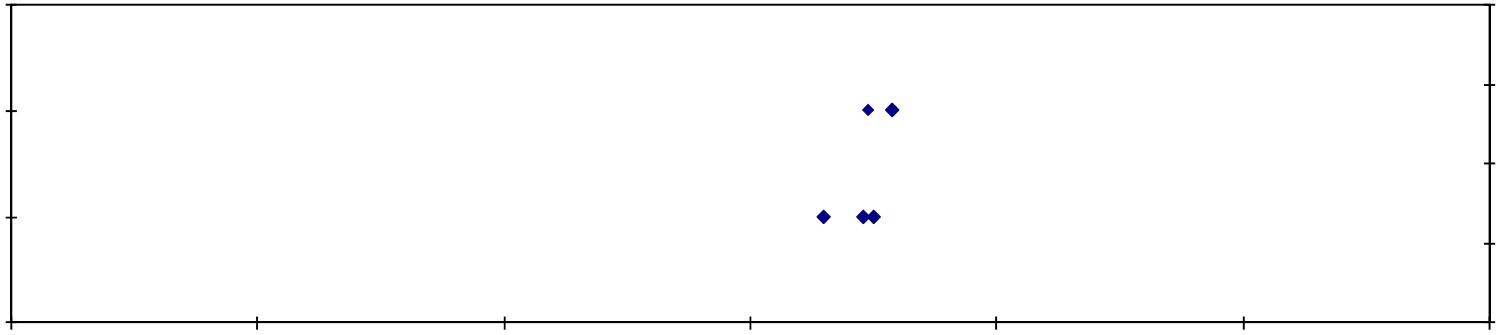
Average	37.745	
Standard Dev.	1.040	
Coeff. of Var. [%]	2.755	
Min.	35.755	
Max.	40.107	
Number of Spec.	18	

$Average_{norm}$	0.0126	37.825
$Standard\ Dev._{norm}$		1.277
$Coeff.\ of\ Var.\ [\%]_{norm}$		3.377
Min.	0.0123	35.458
Max.	0.0130	40.493
Number of Spec.		18



	normalizing t_{ply} [in]
	0.0126

Specimen	Newport	WSU Cure	Prepreg	Cure Cycle	Strength	Avg. Specimen	# Plies in	Failure	Avg. t



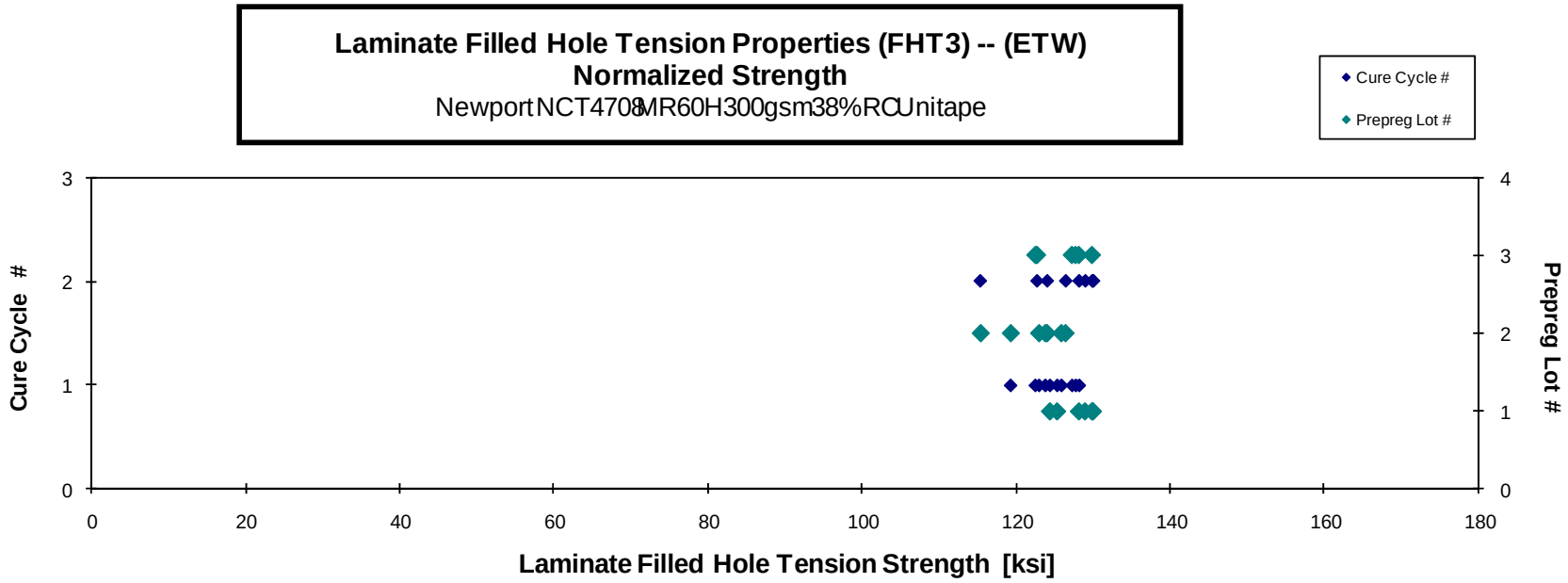
4.21 Filled-Hole Tension 3 Properties

normalizing t_{ply} [in]
0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]

normalizing t_{ply} [in]
0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF6A118F	A	C1	1	1	120.984	0.144	11	MGM	0.0131	125.378
WF6A119F	A	C1	1	1	124.034	0.143	11	MGM	0.0130	128.210
WF6A11AF	A	C1	1	1	121.154	0.142	11	MGM	0.0129	124.446
WF6A218F	A	C2	1	2	125.437	0.144	11	MGM	0.0130	129.902
WF6A219F	A	C2	1	2	124.602	0.143	11	MGM	0.0130	128.992


Laminate Filled Hole Tension Properties (FHT3) -- (ETW)
Normalized Strength
NewportNCT4708MR60H300gsm38%RCUnitape
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
0
1
2
3
4
0
20
40
60
80
100
120
140
160
180
Laminate Filled Hole Tension Strength [ksi]

Laminate Open Hole Compression Properties (OHC1) -- (ETW)
Strength

Newport NCT4708 MR60H 300gsm 38% RC Unitape

normalizing t_{ply} [in]: 0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WFGA116F	A	C1	1	1	33.506	0.208	16	LGM	0.0130	34.650
WFGA117F	A	C1	1	1	30.642	0.206	16	LGM	0.0129	31.296
WFGA118F	A	C1	1	1	29.946	0.205	16	LGM	0.0128	30.424
WFGA119F	A	C1	1	1	31.497	0.204	16	LGM	0.0128	31.882
WFGA216F	A	C2	1	2	28.137	0.205	16	LGM	0.0128	28.655
WFGA217F	A	C2	1	2	26.685	0.206	16	LGM	0.0129	27.254
WFGA218F	A	C2	1	2	27.599	0.206	16	LGM	0.0129	28.213
WFGB116F	B	C1	2	1	29.830	0.202	16	LGM	0.0126	29.844
WFGB117F	B	C1	2	1	27.881	0.202	16	LGM	0.0126	27.934
WFGB118F	B	C1	2	1	29.789	0.201	16	LGM	0.0126	29.703
WFGB119F	B	C1	2	1	29.192	0.202	16	LGM	0.0126	29.202
WFGB216F	B	C2	2	2	29.812	0.201	16	LGM	0.0126	29.777
WFGB217F	B	C2	2	2	28.734	0.200	16	LGM	0.0125	28.573
WFGB218F	B	C2	2	2	29.416	0.201	16	LGM	0.0126	29.387
WFGC114F	C	C1	3	1	28.129	0.199	16	LGM	0.0124	27.787
WFGC115F	C	C1	3	1	28.434	0.199	16	LGM	0.0124	28.035
WFGC116F	C	C1	3	1	27.634	0.199	16	LGM	0.0125	27.307
WFGC216F	C	C2	3	2	30.091	0.198	16	LGM	0.0124	29.551
WFGC217F	C	C2	3	2	28.380	0.198	16	LGM	0.0124	27.829
WFGC218F	C	C2	3	2	31.782	0.198	16	LGM	0.0124	31.267
WFGC219F	C	C2	3	2	30.750	0.199	16	LGM	0.0125	30.392

Average	**29.422**	
Standard Dev.	**1.632**	
Coeff. of Var. [%]	**5.547**	
Min.	**26.685**	
Max.	**33.506**	
Number of Spec.	**21**	

$Average_{norm}$	**0.0126**	**29.474**
$Standard\ Dev._{norm}$		**1.788**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**6.066**
Min.	**0.0124**	**27.254**
Max.	**0.0130**	**34.650**
Number of Spec.		**21**

4.23 Open Hole Compression 2 Properties

Laminate Open Hole Compression Properties (OHC2) -- (RTD) Strength

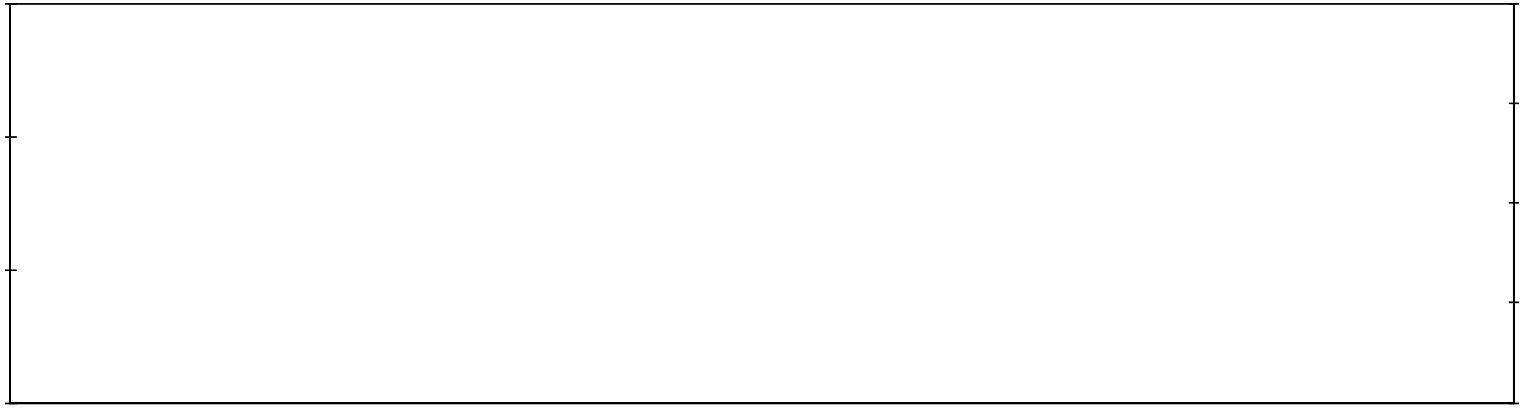
Newport NCT470 8HR 60H 300gsm 38% RC Unitape

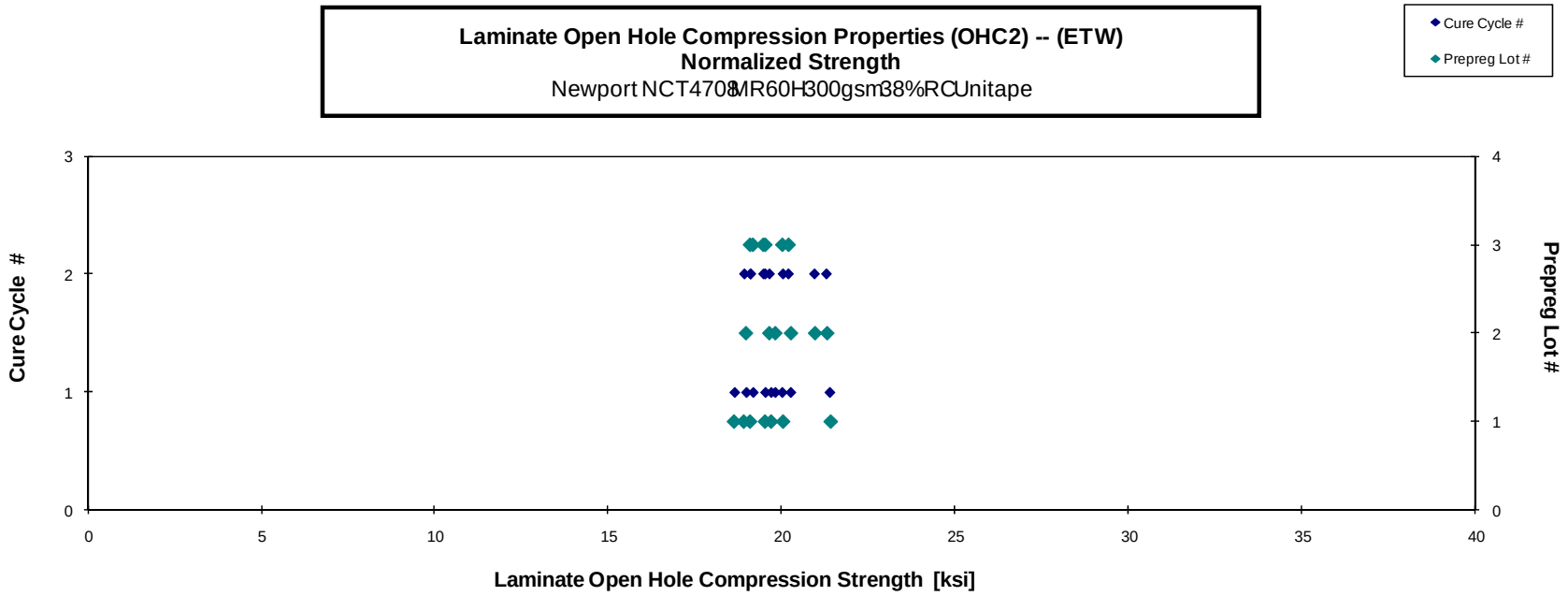
normalizing t_{ply} [in]
0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WFHA111A	A	C1	1	1	27.192	0.137	11	MGM	0.0125	26.931
WFHA112A	A	C1	1	1	30.599	0.140	11	MGM	0.0128	31.000
WFHA113A	A	C1	1	1	27.924	0.140	11	MGM	0.0128	28.290
WFHA212A	A	C2	1	2	29.636	0.139	11	MGM	0.0127	29.814
WFHA214A	A	C2	1	2	29.121	0.141	11	MGM	0.0128	29.531
WFHA216A	A	C2	1	2	29.012	0.139	11	MGM	0.0127	29.145
WFHB111A	B	C1	2	1	28.015	0.139	11	MGM	0.0127	28.167
WFHB112A	B	C1	2	1	28.970	0.138	11	MGM	0.0126	28.876
WFHB113A	B	C1	2	1	29.854	0.138	11	MGM	0.0126	29.811
WFHB211A	B	C2	2	2	28.366	0.138	11	MGM	0.0125	28.250
WFHB212A	B	C2	2	2	28.151	0.138	11	MGM	0.0126	28.060
WFHB213A	B	C2	2	2	28.407	0.138	11	MGM	0.0126	28.318
WFHC111A	C	C1	3	1	31.978	0.136	11	MGM	0.0123	31.270
WFHC112A	C	C1	3	1	28.902	0.136	11	MGM	0.0123	28.291
WFHC113A	C	C1	3	1	29.296	0.137	11	MGM	0.0124	28.855
WFHC114A	C	C1	3	1	30.266	0.136	11	MGM	0.0123	29.647
WFHC211A	C	C2	3	2	30.402	0.134	11	MGM	0.0122	29.437
WFHC212A	C	C2	3	2	28.983	0.135	11	MGM	0.0122	28.160
WFHC213A	C	C2	3	2	29.097	0.135	11	MGM	0.0122	28.274
WFHC214A	C	C2	3	2	30.593	0.135	11	MGM	0.0123	29.783

Average	**29.238**	
Standard Dev.	**1.136**	
Coeff. of Var. [%]	**3.885**	
Min.	**27.192**	
Max.	**31.978**	
Number of Spec.	**20**	

$Average_{norm}$	**0.0125**	**28.995**
Standard $Dev._{norm}$		**1.055**
Coeff. of Var. $[\%]_{norm}$		**3.640**
Min.	**0.0122**	**26.931**
Max.	**0.0128**	**31.270**
Number of Spec.		**20**




Laminate Open Hole Compression Properties (OHC2) -- (ETW)
Normalized Strength
Newport NCT4708/MR60H/300gsm/38%RC/Unitape
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
1
2
3
4
0
5
10
15
20
25
30
35
40

4.24 Open Hole Compression 3 Properties

Laminate Open Hole Compression Properties (OHC3) -- (RTD) Strength

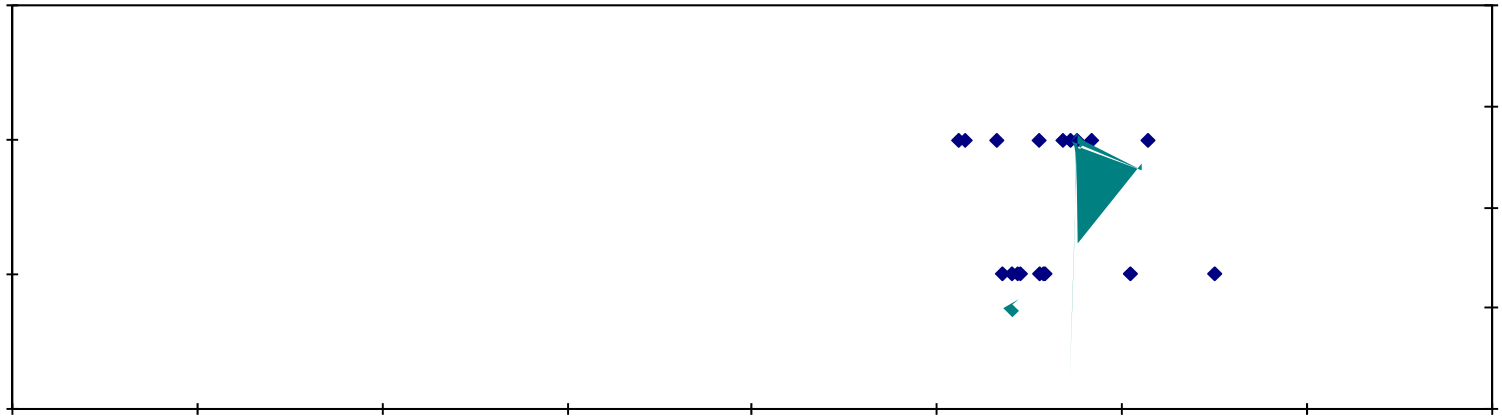
Newport NCT470 8HR 60H 300gsm 38%RC Unitape

normalizing t_{ply} [in]
0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WFIA111A	A	C1	1	1	54.127	0.138	11	LGM	0.0126	54.081
WFIA112A	A	C1	1	1	59.934	0.140	11	LGM	0.0127	60.453
WFIA113A	A	C1	1	1	54.851	0.140	11	LGM	0.0128	55.570
WFIA211A	A	C2	1	2	57.301	0.138	11	LGM	0.0126	57.233
WFIA212A	A	C2	1	2	52.888	0.140	11	LGM	0.0127	53.263
WFIA213A	A	C2	1	2	57.441	0.141	11	LGM	0.0128	58.367
WFIB111A	B	C1	2	1	52.930	0.140	11	LGM	0.0128	53.567
WFIB112A	B	C1	2	1	54.943	0.141	11	LGM	0.0128	55.855
WFIB113A	B	C1	2	1	63.425	0.142	11	LGM	0.0129	64.989
WFIB211A	B	C2	2	2	50.871	0.140	11	LGM	0.0127	51.213
WFIB212A	B	C2	2	2	55.566	0.142	11	LGM	0.0129	56.823
WFIB213A	B	C2	2	2	50.696	0.141	11	LGM	0.0128	51.562
WFIC111A	C	C1	3	1	55.850	0.135	11	LGM	0.0123	54.534
WFIC112A	C	C1	3	1	56.482	0.137	11	LGM	0.0124	55.776
WFIC113A	C	C1	3	1	55.183	0.137	11	LGM	0.0124	54.387
WFIC211A	C	C2	3	2	63.531	0.134	11	LGM	0.0122	61.399
WFIC212A	C	C2	3	2	58.674	0.136	11	LGM	0.0124	57.581
WFIC213A	C	C2	3	2	56.304	0.137	11	LGM	0.0124	55.539

Average	**56.167**	
Standard Dev.	**3.585**	
Coeff. of Var. [%]	**6.382**	
Min.	**50.696**	
Max.	**63.531**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0126**	**56.233**
$Standard\ Dev._{norm}$		**3.464**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**6.161**
Min.	**0.0122**	**51.213**
Max.	**0.0129**	**64.989**
Number of Spec.		**18**



Laminate Open Hole Compression Properties (OHC3) -- (ETW) Strength

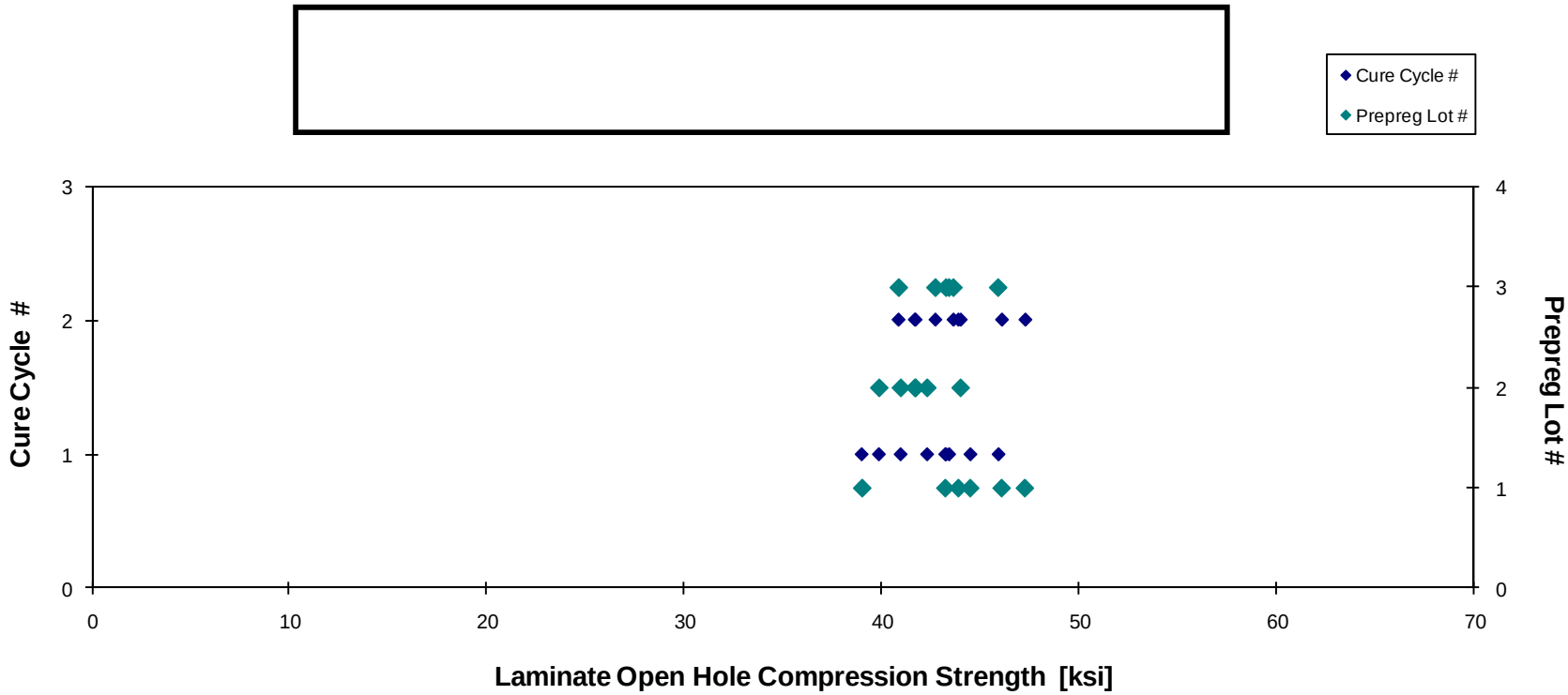
Newport NCT470 8HMR60H300gsm38%RC Unitape

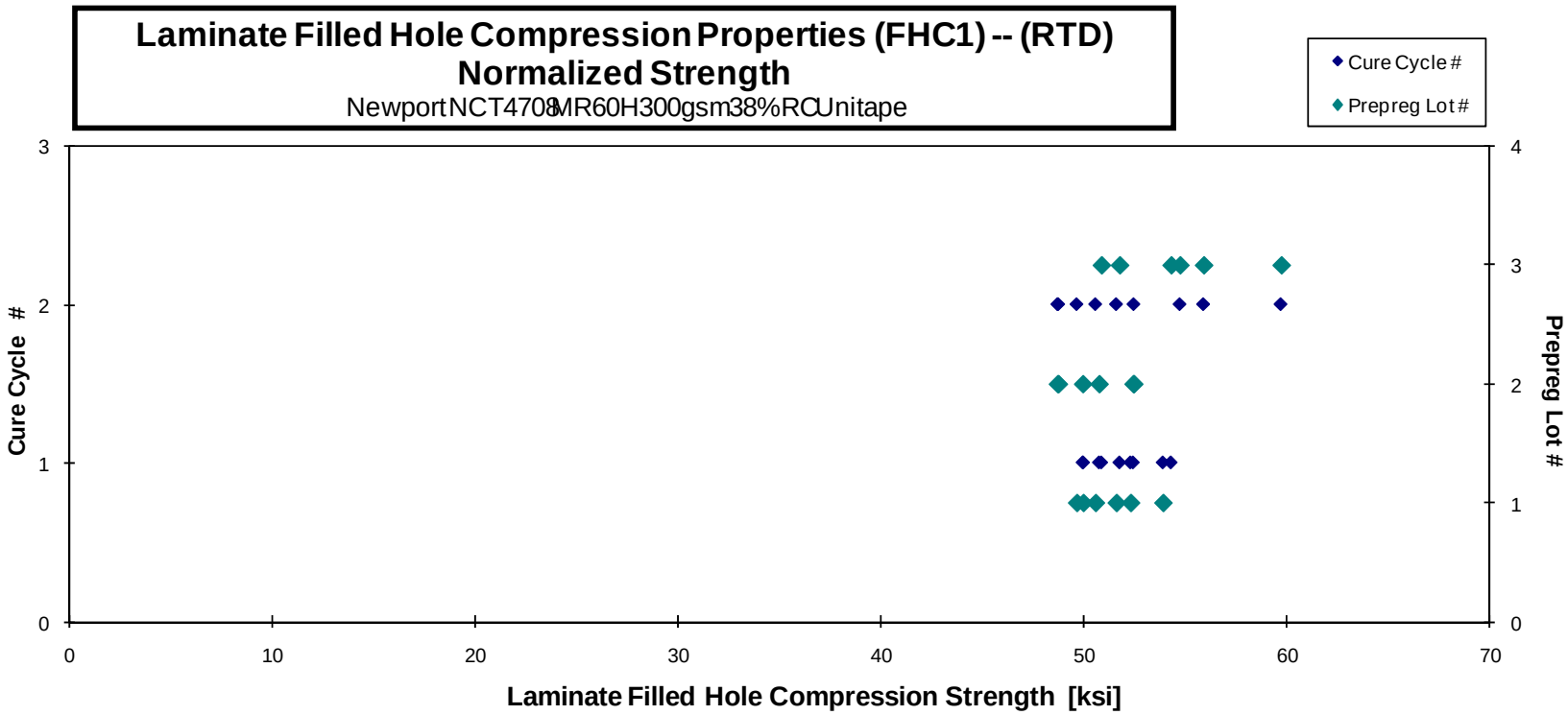
normalizing t_{ply} [in]: 0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Modes	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WFIA116F	A	C1	1	1	43.869	0.141	11	LGM	0.0128	44.544
WFIA117F	A	C1	1	1	42.625	0.141	11	LGM	0.0128	43.271
WFIA118F	A	C1	1	1	38.407	0.141	11	LGM	0.0128	39.026
WFIA216F	A	C2	1	2	45.276	0.141	11	LGM	0.0128	46.148
WFIA217F	A	C2	1	2	42.846	0.142	11	LGM	0.0129	43.938
WFIA218F	A	C2	1	2	46.217	0.142	11	LGM	0.0129	47.334
WFIB116F	B	C1	2	1	40.337	0.141	11	LGM	0.0128	41.001
WFIB117F	B	C1	2	1	39.196	0.141	11	LGM	0.0128	39.899
WFIB118F	B	C1	2	1	41.593	0.141	11	LGM	0.0128	42.348
WFIB216F	B	C2	2	2	41.912	0.138	11	LGM	0.0126	41.760
WFIB217F	B	C2	2	2	41.734	0.139	11	LGM	0.0126	41.723
WFIB218F	B	C2	2	2	44.092	0.138	11	LGM	0.0126	44.055
WFIC116F	C	C1	3	1	43.654	0.138	11	LGM	0.0125	43.465
WFIC117F	C	C1	3	1	46.513	0.137	11	LGM	0.0125	45.970
WFIC118F	C	C1	3	1	43.950	0.137	11	LGM	0.0124	43.310
WFIC216F	C	C2	3	2	41.775	0.136	11	LGM	0.0123	40.896
WFIC217F	C	C2	3	2	43.575	0.136	11	LGM	0.0124	42.768
WFIC218F	C	C2	3	2	44.288	0.137	11	LGM	0.0124	43.686

Average	**42.881**	
Standard Dev.	**2.196**	
Coeff. of Var. [%]	**5.121**	
Min.	**38.407**	
Max.	**46.513**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0127**	**43.063**
$Standard\ Dev._{norm}$		**2.171**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.042**
Min.	**0.0123**	**39.026**
Max.	**0.0129**	**47.334**
Number of Spec.		**18**


Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Open Hole Compression Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60
70


Laminate Filled Hole Compression Properties (FHC1) -- (RTD)
Normalized Strength
Newport NCT470 8HMR60H300gsm38%RC Unitape
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Compression Strength [ksi]
0
10
20
30
40
50
60
70
0
1
2
3
4

Laminate Filled Hole Compression Properties (FHC1) -- (ETW) Strength

Newport NCT470 8HR60H300gsm38%RC Unitape

normalizing t_{ply} [in]: 0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF7A116F	A	C1	1	1	36.464	0.204	16	MGF	0.013	36.931
WF7A117F	A	C1	1	1	34.883	0.204	16	MGF	0.013	35.235
WF7A118F	A	C1	1	1	35.443	0.203	16	MGF	0.013	35.646
WF7A216F	A	C2	1	2	36.118	0.207	16	MGF	0.013	37.103
WF7A217F	A	C2	1	2	35.620	0.206	16	MGF	0.013	36.477
WF7A218F	A	C2	1	2	39.786	0.206	16	MGF	0.013	40.599
WF7B116F	B	C1	2	1	37.935	0.202	16	MGF	0.013	37.938
WF7B117F	B	C1	2	1	36.526	0.200	16	MGF	0.012	36.233
WF7B118F	B	C1	2	1	37.293	0.200	16	MGF	0.013	37.052
WF7B216F	B	C2	2	2	34.305	0.203	16	LGM	0.013	34.470
WF7B217F	B	C2	2	2	32.239	0.205	16	LGM	0.013	32.716
WF7B218F	B	C2	2	2	36.088	0.204	16	LGM	0.013	36.485
WF7B219F	B	C2	2	2	38.654	0.205	16	LGM	0.013	39.255
WF7B21AF	B	C2	2	2	37.257	0.203	16	LGM	0.013	37.602
WF7C116F	C	C1	3	1	38.088	0.199	16	LGM	0.012	37.622
WF7C117F	C	C1	3	1	36.961	0.199	16	LGM	0.012	36.438
WF7C118F	C	C1	3	1	38.308	0.199	16	LGM	0.012	37.779
WF7C216F	C	C2	3	2	44.732	0.197	16	LGF	0.012	43.704
WF7C217F	C	C2	3	2	39.327	0.198	16	LGF	0.012	38.602
WF7C218F	C	C2	3	2	43.260	0.198	16	LGM	0.012	42.534

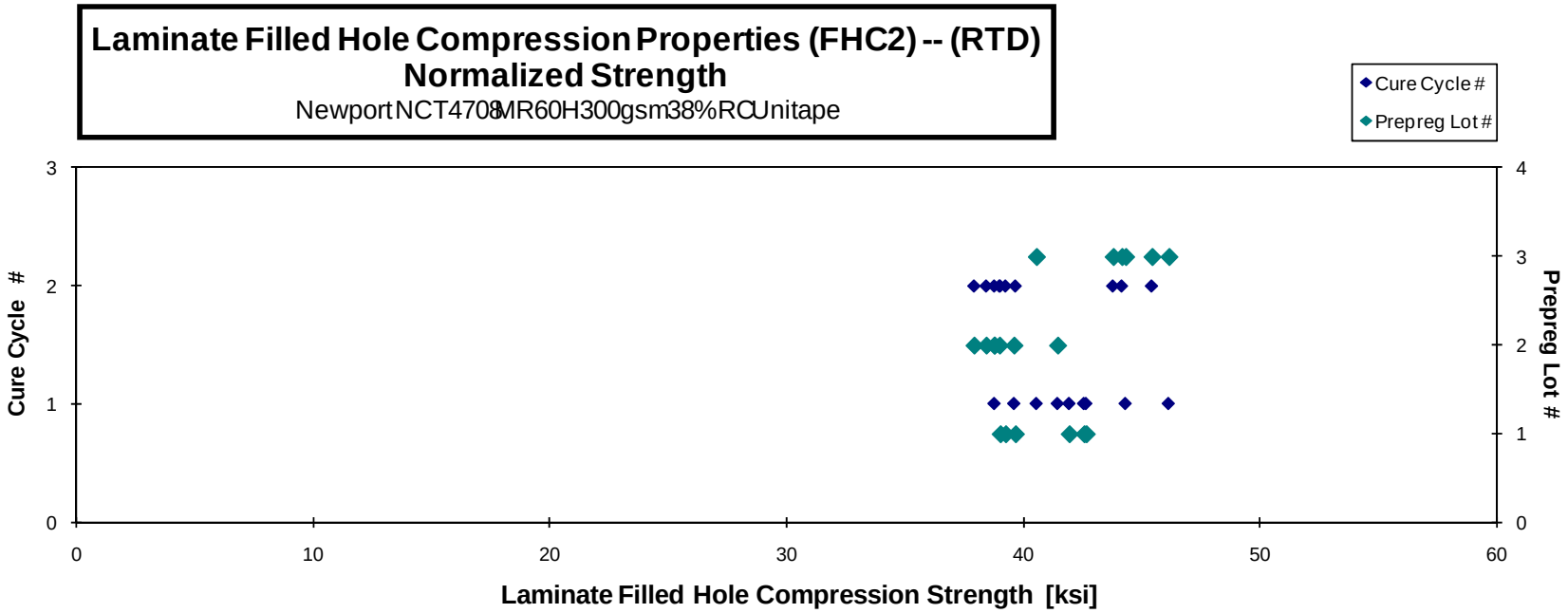
Average	**37.464**	
Standard Dev.	**2.859**	
Coeff. of Var. [%]	**7.633**	
Min.	**32.239**	
Max.	**44.732**	
Number of Spec.	**20**	

$Average_{norm}$	**0.0126**	**37.521**
Standard $Dev._{norm}$		**2.556**
Coeff. of Var. $[\%]_{norm}$		**6.813**
Min.	**0.0123**	**32.716**
Max.	**0.0129**	**43.704**
Number of Spec.		**20**

4.26 Filled-Hole Compression 2 Properties

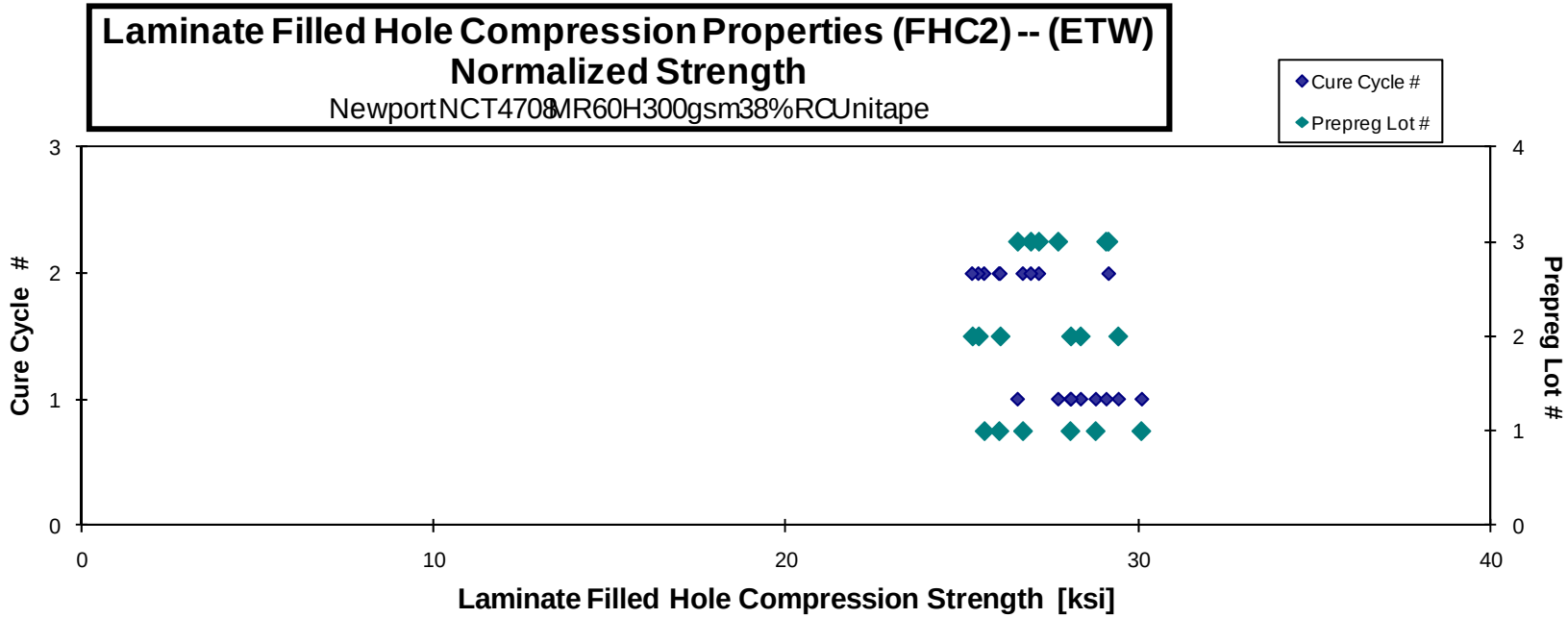
normalizing t_{ply} [in]
0.0126

Specimen Newport


Laminate Filled Hole Compression Properties (FHC2) -- (RTD)
Normalized Strength
Newport NCT470 8HR 60H 300gsm 38%RC Unitape
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Compression Strength [ksi]
0
10
20
30
40
50
60
0
1
2
3
4

normalizing t_{ply} [in]
0.0126

Specimen Number	Cytec Batch #	Cytec Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF8A116F	A	C1	1	1	29.197	0.143	11	LGM	0.0130	30.103
WF8A117F	A	C1	1	1	27.248	0.143	11	LGM	0.0130	28.077
WF8A119F	A	C1	1	1	28.167	0.142	11	LGM	0.0129	28.797
WF8A216F	A	C2	1	2	25.268	0.141	11	AGM	0.0128	25.623
WF8A217F	A	C2	1	2	25.658	0.141	11	AGM	0.0128	26.047
WF8A218F	A	C2	1	2	26.331	0.141	11	AGM	0.0128	26.723
WF8B116F	B	C1	2	1	28.862	0.136	11	MGM	0.0124	28.372
WF8B117F	B	C1	2	1	28.615	0.136	11	AGM/LGM	0.0124	28.095
WF8B118F	B	C1	2	1	29.978	0.136	11	AGM/LGM	0.0124	29.443


Laminate Filled Hole Compression Properties (FHC2) -- (ETW)
Normalized Strength
Newport NCT470 8HR 60H 300gsm 38%RC Unitape
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Compression Strength [ksi]
0
10
20
30
40
0
1
2
3
4

4.27 Filled-Hole Compression 3 Properties

Laminate Filled Hole Compression Properties (FHC3) -- (RTD)
Strength

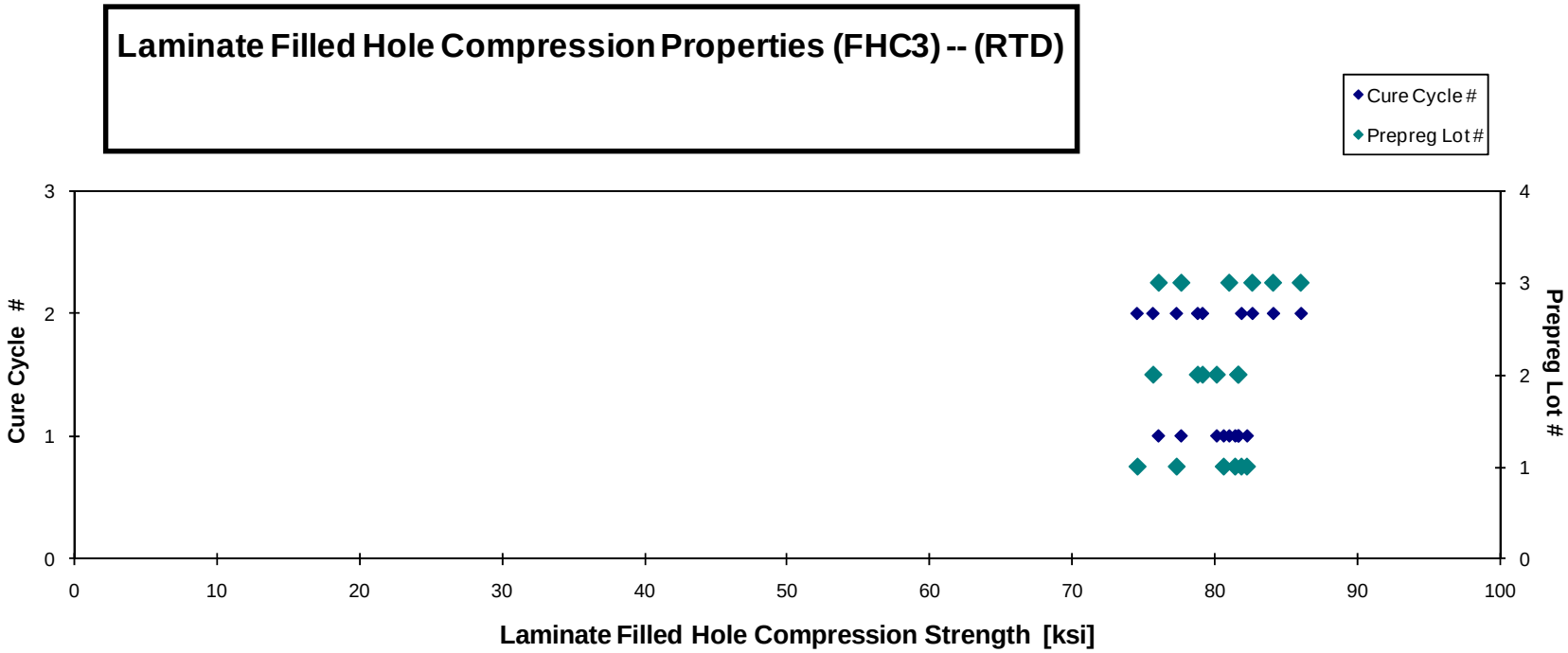
Newport

normalizing t_{ply} [in]
0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF9A111A	A	C1	1	1	82.442	0.138	11	LGF	0.0126	82.254
WF9A112A	A	C1	1	1	79.853	0.140	11	LGF	0.0127	80.621
WF9A113A	A	C1	1	1	80.295	0.141	11	LGF	0.0128	81.424
WF9A211A	A	C2	1	2	81.767	0.139	11	LGF	0.0126	81.865
WF9A212A	A	C2	1	2	75.944	0.141	11	LGF	0.0128	77.313
WF9A213A	A	C2	1	2	72.946	0.142	11	LGM	0.0129	74.560
WF9B111A	B	C1	2	1	82.205	0.138	11	MGM	0.0125	81.662
WF9B112A	B	C1	2	1	81.589	0.139	11	LGF	0.0126	81.628
WF9B113A	B	C1	2	1	80.471	0.138	11	LGM / LGF	0.0125	80.132
WF9B211A	B	C2	2	2	80.698	0.136	11	LGF	0.0124	79.136
WF9B212A	B	C2	2	2	79.891	0.137	11	LGF	0.0124	78.796
WF9B213A	B	C2	2	2	77.275	0.136	11	LGF	0.0123	75.668
WF9C111A	C	C1	3	1	78.991	0.133	11	LGF	0.0121	76.055
WF9C112A	C	C1	3	1	79.145	0.136	11	LGF	0.0124	77.641
WF9C113A	C	C1	3	1	82.850	0.136	11	LGF	0.0123	81.007
WF9C212A	C	C2	3	2	85.593	0.136	11	LGF	0.0124	84.090
WF9C213A	C	C2	3	2	84.143	0.136	11	LGF	0.0124	82.625
WF9C214A	C	C2	3	2	87.618	0.136	11	LGF	0.0124	86.027

Average	**80.762**	
Standard Dev.	**3.403**	
Coeff. of Var. [%]	**4.213**	
Min.	**72.946**	
Max.	**87.618**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0125**	**80.139**
Standard $Dev._{norm}$		**3.028**
Coeff. of Var. $[\%]_{norm}$		**3.779**
Min.	**0.0121**	**74.560**
Max.	**0.0129**	**86.027**
Number of Spec.		**18**


Laminate Filled Hole Compression Properties (FHC3) -- (RTD)
Cure Cycle #
Prepreg Lot #
Cure Cycle #
Prepreg Lot #
Laminate Filled Hole Compression Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100

normalizing t_{ply} [in]
0.0126

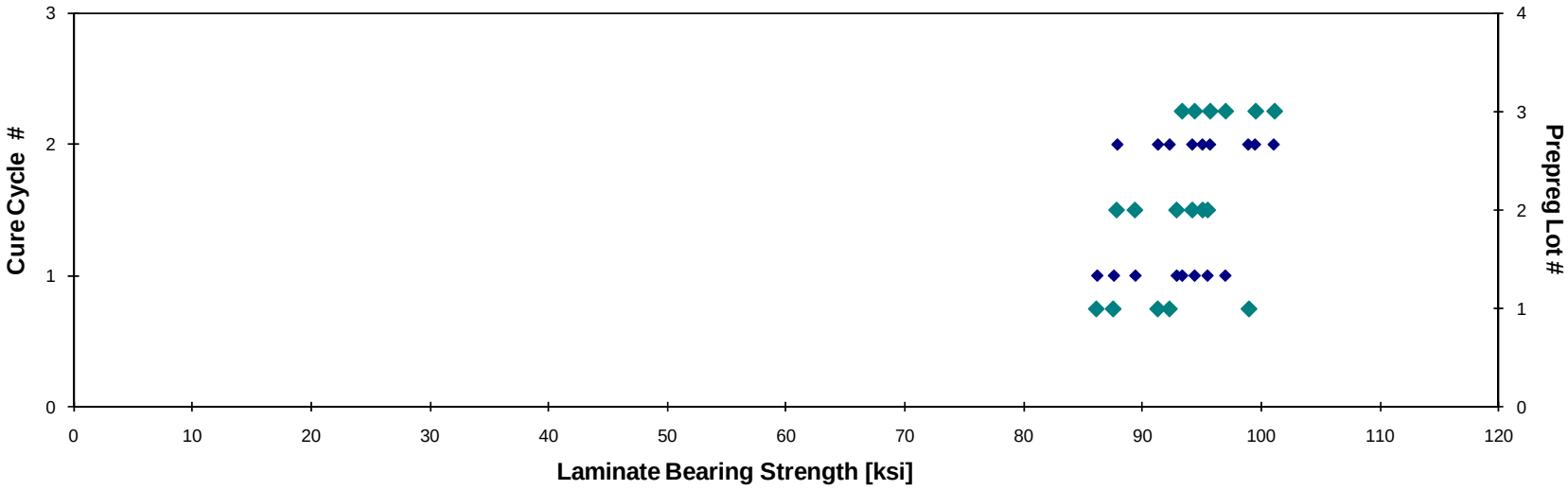
Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Failure Mode	Avg. t_{ply} [in]	$Strength_{norm}$ [ksi]
WF9A116F	A	C1	1	1	57.979	0.141	11	MGF	0.013	58.941
WF9A117F	A	C1	1	1	54.897	0.141	11	MGF	0.013	56.020
WF9A118F	A	C1	1	1	59.551	0.141	11	MGF	0.013	60.654
WF9A216F	A	C2	1	2	57.288	0.142	11	MGF	0.013	58.507
WF9A217F	A	C2	1	2	53.710	0.141	11	MGF	0.013	54.672
WF9A218F	A	C2	1	2	56.079	0.141	11	MGF	0.013	57.057
WF9B116F	B	C1	2	1	60.193	0.139	11	MGF	0.013	60.149
WF9B117F	B	C1	2	1	54.638	0.138	11	MGF	0.013	54.427
WF9B118F	B	C1	2	1	52.645	0.138	11	MGF	0.013	52.259
WF9B216F	B	C2	2	2	54.959	0.138	11	LGF	0.013	54.563
WF9B217F	B	C2	2	2	52.083	0.137	11	MGF	0.012	51.588
WF9B218F	B	C2	2	2	56.171	0.137	11	LGF	0.012	55.550
WF9C116F	C	C1	3	1	53.397	0.136	11	LGF	0.012	52.421
WF9C117F	C	C1	3	1	54.559	0.136	11	LGF	0.012	53.510
WF9C11AF	C	C1	3	1	50.533	0.135	11	LGF	0.012	49.305
WF9C216F	C	C2	3	2	58.956	0.136	11	LGF	0.012	57.708
WF9C217F	C	C2	3	2	57.520	0.135	11	LGF	0.012	56.068
WF9C218F	C	C2	3	2	57.300	0.136	11	LGF	0.012	56.122

Average	**55.692**	
Standard Dev.	**2.674**	
Coeff. of Var. [%]	**4.802**	
Min.	**50.533**	
Max.	**60.193**	
Number of Spec.	**18**	

$Average_{norm}$	**0.0126**	**55.529**
$Standard\ Dev._{norm}$		**3.045**
$Coeff.\ of\ Var.\ [\%]_{norm}$		**5.484**
Min.	**0.0123**	**49.305**
Max.	**0.0129**	**60.654**
Number of Spec.		**18**

4.28 Single Shear Bearing 1 Properties

normalizing t_{ply} [in]
0.0126


Cure Cycle #
Prepreg Lot #
Laminate Bearing Strength [ksi]
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
100
110
120

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

NewportNCT470&MR60H300gsm38%RCUnitape

normalizing t_{ply} [in]: 0.0126

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% Offset $Strength_{norm}$ [ksi]	Ultimate $Strength_{norm}$ [ksi]
WFSA116F	A	C1	1	1	59.635	81.052	0.100	8	B1[1] / D1[2]	0.0125	58.985	80.168
WFSA117F	A	C1	1	1	71.393	88.768	0.101	8	B1[1] / D1[2]	0.0126	71.535	88.944
WFSA118F	A	C1	1	1	73.473	86.482	0.100	8	B1[1] / D1[2]	0.0125	73.085	86.025
WFSA216F	A	C2	1	2	63.895	81.798	0.101	8	B1[1] / D1[2]	0.0127	64.297	82.312
WFSA217F	A	C2	1	2	65.059	81.501	0.102	8	B1[1] / D1[2]	0.0127	65.607	82.188
WFSA218F	A	C2	1	2	69.766	83.475	0.101	8	B1[1] / D1[2]	0.0126	69.651	83.337
WFSB116F	B	C1	2	1	69.001	84.026	0.098	8	B1[1] / D1[2]	0.0123	67.255	81.900
WFSB117F	B	C1	2	1	69.087	79.990	0.100	8	B1[1] / D1[2]	0.0125	68.288	79.064
WFSB118F	B	C1	2	1	70.416	84.249	0.099	8	B1[1] / D1[2]	0.0124	69.252	82.856
WFSB216F	B	C2	2	2	69.418	83.610	0.098	8	B1[1] / D1[2]	0.0122	67.352	81.122
WFSB217F	B	C2	2	2	65.224	84.176	0.101	8	B1[1] / D1[2]	0.0126	65.224	84.176
WFSB218F	B	C2	2	2	68.191	84.028	0.101	8	B1[1] / D1[2]	0.0126	67.999	83.792
WFSC117F	C	C1	3	1	68.248	86.714	0.100	8	B1[1] / D1[2]	0.0124	67.379	85.610
WFSC118F	C	C1	3	1	77.086	88.011	0.099	8	B1[1] / D1[2]	0.0124	75.710	86.440
WFSC119F	C	C1	3	1	79.059	85.621	0.099	8	B1[1] / D1[2]	0.0124	77.686	84.135
WFSC216F	C	C2	3	2	69.511	85.569	0.097	8	B1[1] / D1[2]	0.0121	66.787	82.216
WFSC217F	C	C2	3	2	74.681	88.442	0.098	8	B1[1] / D1[2]	0.0122	72.273	85.591
WFSC218F	C	C2	3	2	77.618	89.373	0.097	8	B1[1] / D1[2]	0.0121	74.602	85.900

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

[1]: Primary Failure

[2]: Secondary Failure

Average	**70.042**	**84.827**	
Standard Dev.	**5.012**	**2.767**	
Coeff. of Var. [%]	**7.156**	**3.261**	
Min.	**59.635**	**79.990**	
Max.	**79.059**	**89.373**	
Number of Spec.	**18**	**18**	

$Average_{norm}$	**0.0124**	**69.054**	**83.654**
$Standard\ Dev._{norm}$		**4.532**	**2.473**
Coeff. of Var. [%]$_{norm}$		**6.562**	**2.956**
Min.	**0.0121**	**58.985**	**79.064**
Max.	**0.0127**	**77.686**	**88.944**
Number of Spec.		**18**	**18**

4.29 Single Shear Bearing 2 Properties

												normalizing t_{ply} [in]		
												0.0126		
Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate		Comments		Avg. t_{ply} [in]	2% Offset $Strength_{norm}$ [ksi]	Ultimate $Strength_{norm}$ [ksi]
WF2A111A	A	C1	1	1	83.811	105.229	0.144	11		B1I		0.0131	87.036	109.279
WF2A112A	A	C1	1	1	91.218	113.681	0.143	11		B1I		0.0130	94.070	117.235
WF2A113A	A	C1	1	1	90.752	114.440	0.145	11		B1I		0.0132	94.790	119.532
WF2A211A	A	C2	1	2	101.976	119.108	0.139	11		B1I		0.0126	102.209	119.380
WF2A212A	A	C2	1	2	96.547	113.093	0.140	11		B1I		0.0127	97.383	114.072
WF2A213A	A	C2	1	2	107.246	121.530	0.139	11		B1I		0.0126	107.453	121.764
WF2B111A	B	C1	2	1	105.992	120.580	0.138	11		B1I		0.0125	105.367	119.870
WF2B112A	B	C1	2	1	94.398	114.168	0.138	11		B1I		0.0125	93.989	113.674
WF2B113A	B	C1	2	1	95.200	112.353	0.138	11		B1I		0.0126	95.028	112.150
WF2B211A	B	C2	2	2	100.816	116.942	0.137	11		B1I		0.0124	99.507	115.423
WF2B212A	B	C2	2	2	97.884	118.933	0.138	11		B1I		0.0125	97.107	117.989
WF2B213A	B	C2	2	2	98.509	118.914	0.137	11		B1I		0.0124	97.123	117.241
WF2C111A	C	C1	3	1	111.137	121.325	0.135	11		B1I		0.0123	108.157	118.072
WF2C112A	C	C1	3	1	107.608	123.392	0.136	11		B1I		0.0124	105.719	121.225
WF2C113A	C	C1	3	1	104.718	122.091	0.136	11		B1I		0.0124	102.779	119.830
WF2C211A	C	C2	3	2	103.066	117.840	0.135	11		B1I		0.0123	100.513	114.921
WF2C212A	C	C2	3	2	101.327	123.805	0.137	11		B1I		0.0125	100.230	122.465
WF2C213A	C	C2	3	2	107.493	119.783	0.136	11		B1I		0.0123	105.089	117.104
									Ultimate1in		Co76 4.2(#97966.4(o76 4.T0313 Tc[(BT9 0 320.64 449.94 Tm-.0147 Tc.0194 Tw[0 250.2 480.96 Tp8(l)30.9(t)-7.6(i)19.1(m)88.5(a)0			

4.30 Single Shear Bearing 3 Properties

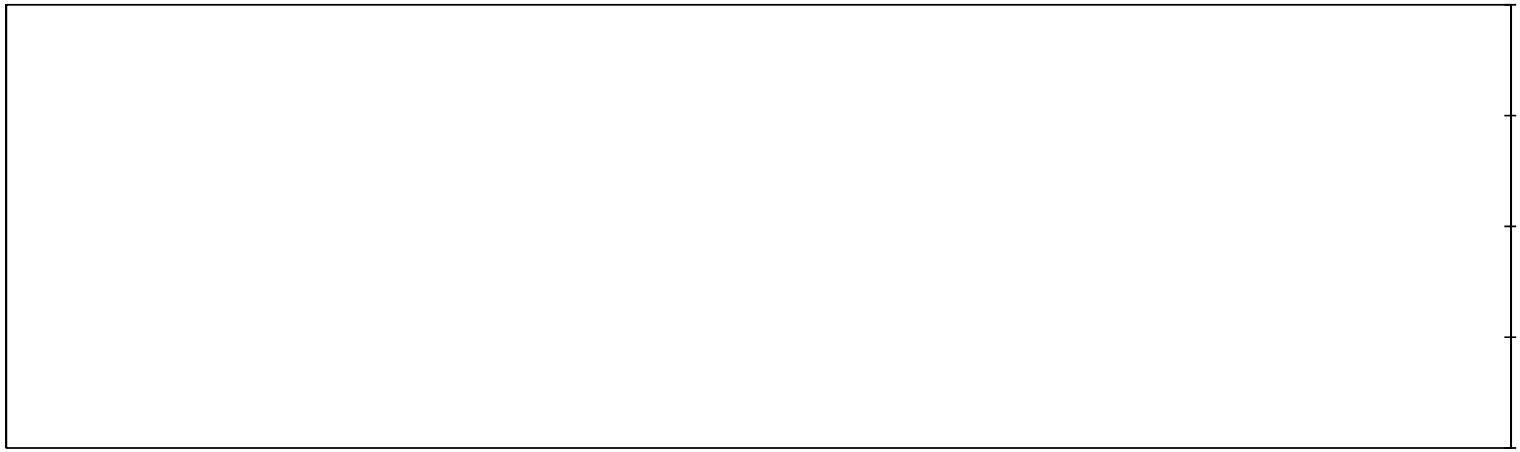
Laminate Single Shear Bearing Properties (SSB3) -- (RTD) Strength

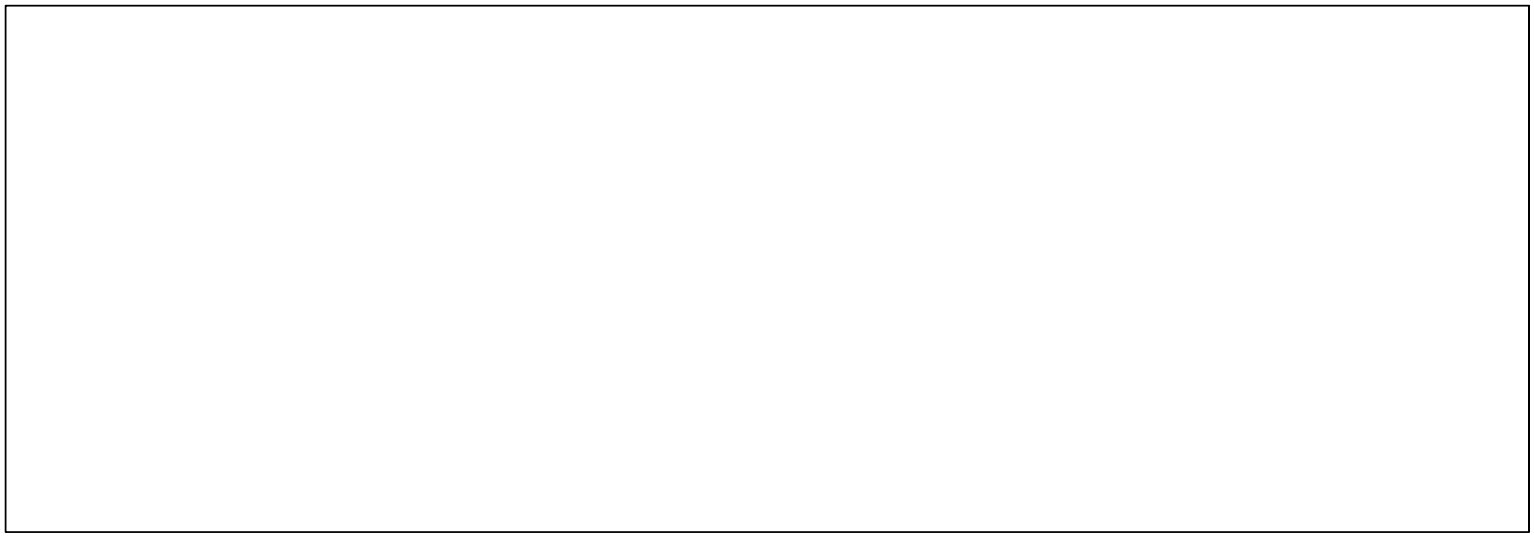
Newport NCT470 8HR 60H 300gsm 38%RC Unitape

normalizing t_{ply} [in]: 0.0126

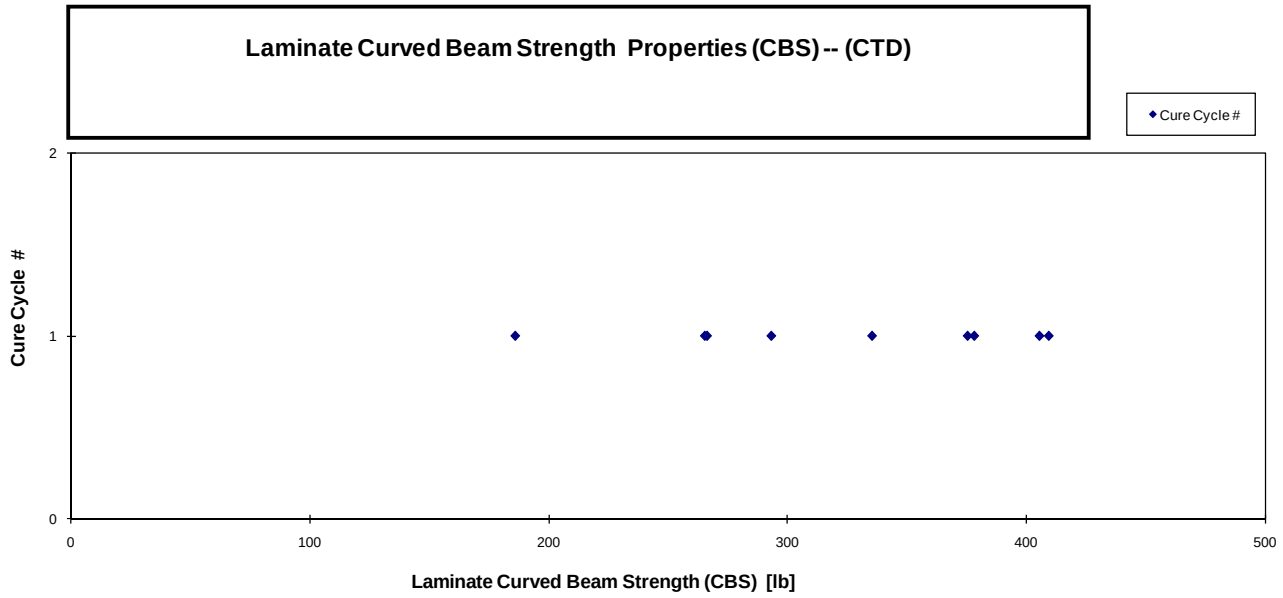
Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	2% Offset Strength [ksi]	Ultimate Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Comments	Avg. t_{ply} [in]	2% Offset Strength$_{norm}$ [ksi]	Ultimate Strength$_{norm}$ [ksi]
WF3A111A	A	C1	1	1	89.475	115.735	0.140	11	B1I	0.0127	90.100	116.542
WF3A112A	A	C1	1	1	89.913	110.844	0.141	11	B1I	0.0128	91.600	112.923
WF3A115A	A	C1	1	1	81.164	109.309	0.140	11	B1I	0.0127	81.789	110.151
WF3A211A	A	C2	1	2	87.783	112.076	0.138	11	B1I	0.0126	87.487	111.699
WF3A212A	A	C2	1	2	95.799	118.978	0.138	11	B1I	0.0126	95.684	118.835
WF3A213A	A	C2	1	2	98.390	120.730	0.139	11	B1I	0.0126	98.473	120.831
WF3B111A	B	C1	2	1	99.381	116.891	0.135	11	B1I	0.0123	96.692	113.729
WF3B112A	B	C1	2	1	102.456	111.456	0.135	11	B1I	0.0123	99.979	108.762
WF3B113A	B	C1	2	1	103.532	115.530	0.135	11	B1I	0.0123	101.079	112.793
WF3B211A	B	C2	2	2	95.546	115.568	0.136	11	B1I	0.0124	93.696	113.330
WF3B212A	B	C2	2	2	96.265	118.500	0.138	11	B1I	0.0125	95.802	117.930
WF3B213A	B	C2	2	2	91.787	115.901	0.138	11	B1I	0.0125	91.059	114.981
WF3C111A	C	C1	3	1	89.859	117.011	0.134	11	B1I	0.0122	86.822	113.057
WF3C112A	C	C1	3	1	97.625	118.203	0.136	11	B1I	0.0124	95.981	116.213
WF3C113A	C	C1	3	1	102.082	122.027	0.138	11	B1I	0.0125	101.320	121.117
WF3C211A	C	C2	3	2	99.564	123.516	0.133	11	B1I	0.0121	95.518	118.495
WF3C212A	C	C2	3	2	100.683	121.313	0.135	11	B1I	0.0122	97.705	117.724
WF3C213A	C	C2	3	2	100.086	121.539	0.135	11	B1I	0.0122	97.125	117.944
									Ultimate Bearing Strength / B1I: B:Bearing, 1:first hole, I: Inapplicable (not on bolt, nut or head side)			

Average	**95.633**	**116.951**	**Average$_{norm}$**	**0.0124**	**94.328**	**115.392**
Standard Dev.	**6.074**	**4.112**	**Standard Dev.$_{norm}$**		**5.277**	**3.555**
Coeff. of Var. [%]	**6.351**	**3.516**	**Coeff. of Var. [%]$_{norm}$**		**5.594**	**3.080**
Min.	**81.164**	**109.309**	**Min.**	**0.0121**	**81.789**	**108.762**
Max.	**103.532**	**123.516**	**Max.**	**0.0128**	**101.320**	**121.117**
Number of Spec.	**18**	**18**	**Number of Spec.**		**18**	**18**





4.32 Interlaminar Tension Properties

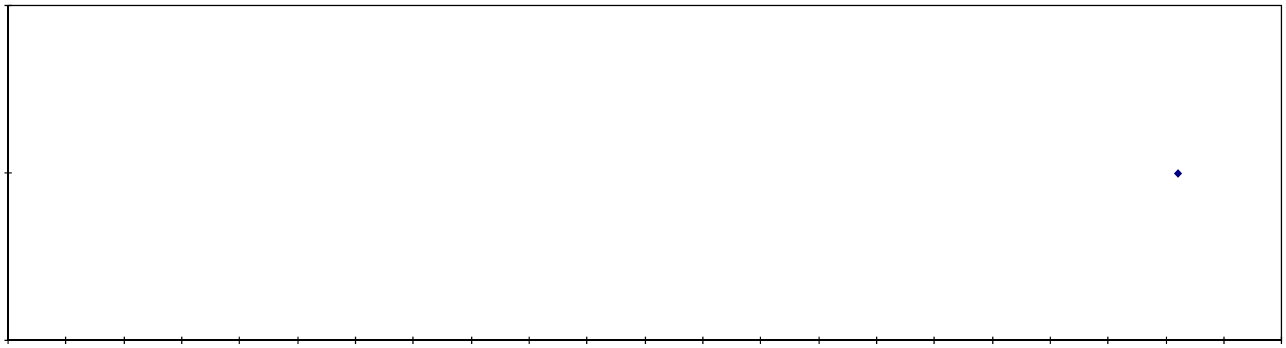

Laminate Curved Beam Strength Properties (CBS) -- (CTD)
Cure Cycle #
Cure Cycle #
2
1
0
0
100
200
300
400
500
Laminate Curved Beam Strength (CBS) [lb]

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
WFMC119A	C	C1	3	1	237.080	5.769	0.187	15
WFMC11AA	C	C1	3	1	185.664	4.490	0.188	15
WFMC11BA	C	C1	3	1	216.792	5.211	0.188	15
WFMC11CA	C	C1	3	1	206.859	4.990	0.188	15
WFMC11DA	C	C1	3	1	196.737	4.744	0.188	15
WFMC11EA	C	C1	3	1	196.212	4.701	0.189	15
WFMC11FA	C	C1	3	1	241.548	5.877	0.187	15

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

Average	**211.556**	**5.112**
Standard Dev.	**21.315**	**0.538**
Coeff. of Var. [%]	**10.075**	**10.517**
Min.	**185.664**	**4.490**
Max.	**241.548**	**5.877**
Number of Spec.	**7**	**7**

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Cure Cycle #	Curved Beam Strength [lb]	Interlaminar Tension Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate
WFMC11HF	C	C1	3	1	202.159	4.842	0.189	15
WFMC11IF	C	C1	3	1	158.975	3.856	0.187	15
WFMC11JF	C	C1	3	1	147.187	3.603	0.186	15
WFMC11KF	C	C1	3	1	152.311	3.782	0.184	15
WFMC11LF	C	C1	3	1	170.839	4.225	0.184	15
WFMC11MF	C	C1	3	1	192.587	4.670	0.187	15
WFMC11NF	C	C1	3	1	205.383	4.958	0.188	15
WFMC11OF	C	C1	3	1	198.812	4.840	0.187	15
WFMC11JFC	C1	3	1	152.33	0			



5. Shear Stress vs. Shear Strain, RTD

Figure 5-1 illustrates a shear stress vs shear strain curve that was obtained from a biaxial strain gage. ASTM D3518 In-plane Shear test method was used to obtain this data.

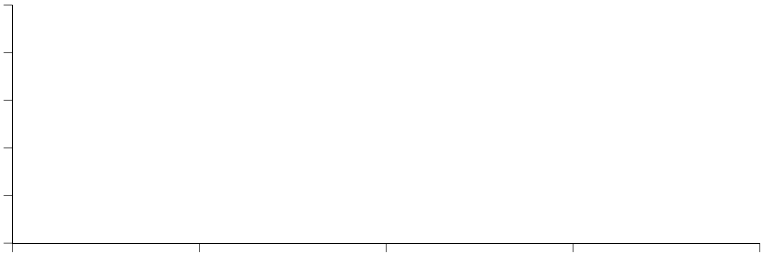


Figure 5-1: Shear Stress vs Shear Strain Curve for RTD

6. FLUID SENSITIVITY COMPARISON

1		2.715
2		4.108
3		5.139
4		4.098
5		0.930
6		2.877
7		3.867
8		1.277
9		6.941
10		0.064
11		0.073
12		-1.538
13		7.161
14		0.000
15		13.169

	Extended Contact
1	100 Low Lead Aviation Fuel (ASTM D910)
2	SAE AMS 2629 Jet Reference Fluid
3	MIL-PRF-5606 Hydraulic Oil
4	MIL-PRF-83282 Hydraulic Oil
5	MIL-PRF-7808 Engine Oil
6	MIL-PRF-23699, Class STD Engine Oil
7	Sea Water (ASTM D1141 or equiv.)
8	Skydrol LD-4 (SAE AS1241, Type IV, Class 1)
9	50% Water with 50% Skydrol LD-4 (SAE AS1241, Type IV, Class 1)
	Short Duration Contact
10	MEK washing fluid. ASTM D740
11	Polypropylene Glycol Deicer (Type I) Mil-A-824 3

Table 6-1: Fluid Sensitivity Results Comparison for RT

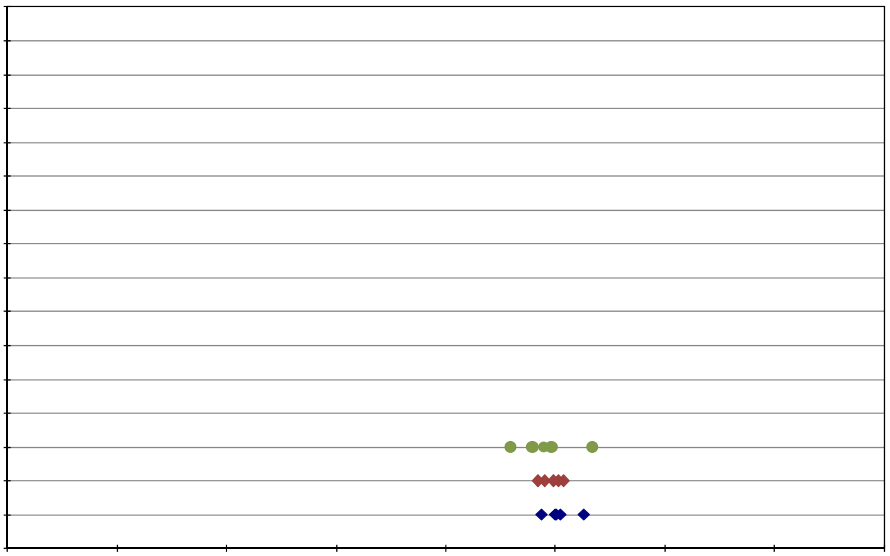


Figure 6-2: Plot of Fluid Sensitivity Results for RT

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Fluid	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode	Average Strength [ksi]
WFQC21G4	C	C2	3	1	10.002	0.265	21	0.0126	Interlaminar Shear	
WFQC21H4	C	C2	3	1	10.099	0.259	21	0.0124	Interlaminar Shear	
WFQC21I4	C	C2	3	1	10.524	0.248	21	0.0118	Interlaminar Shear	10.080
WFQC21J4	C	C2	3	1	9.754	0.258	21	0.0123	Interlaminar Shear	
WFQC21K5	C	C2	3	1	10.022	0.267	21	0.0127	Interlaminar Shear	
WFQC21Q6	C	C2	3	2	10.153	0.266	21	0.0127	Interlaminar Shear	
WFQC21R6	C	C2	3	2	10.061	0.245	21	0.0116	Interlaminar Shear	
WFQC21S6	C	C2	3	2	9.811	0.247	21	0.0118	Interlaminar Shear	9.936
WFQC21T6	C	C2	3	2	9.688	0.267	21	0.0127	Interlaminar Shear	
WFQC21U6	C	C2	3	2	9.969	0.261	21	0.0124	Interlaminar Shear	
WFQC21128	C	C2	3	3	10.679	0.259	21	0.0123	Interlaminar Shear	
WFQC21138	C	C2	3	3	9.183	0.267	21	0.0127	Interlaminar Shear	
WFQC21148	C	C2	3	3	9.924	0.258	21	0.0123	Interlaminar Shear	9.830
WFQC21158	C	C2	3	3	9.577	0.258	21	0.0123	Interlaminar Shear	
WFQC21168	C	C2	3	3	9.784	0.254	21	0.0121	Interlaminar Shear	
WFQC211DC	C	C2	3	4	10.367	0.261	21	0.0124	Interlaminar Shear	
WFQC211EC	C	C2	3	4	9.389	0.266	21	0.0126	Interlaminar Shear	
WFQC211FC	C	C2	3	4	10.555	0.245	21	0.0117	Interlaminar Shear	9.937
WFQC211GC	C	C2	3	4	9.641	0.261	21	0.0124	Interlaminar Shear	
WFQC211HC	C	C2	3	4	9.734	0.252	21	0.0120	Interlaminar Shear	
WFQC211OH	C	C2	3	5	10.467	0.262	21	0.0125	Interlaminar Shear	
WFQC211PH	C	C2	3	5	9.859	0.265	21	0.0126	Interlaminar Shear	
WFQC211QH	C	C2	3	5	10.036	0.237	21	0.0113	Interlaminar Shear	10.266
WFQC211RH	C	C2	3	5	10.627	0.259	21	0.0123	Interlaminar Shear	
WFQC211SH	C	C2	3	5	10.338	0.253	21	0.0120	Interlaminar Shear	
WFQC211ZJ	C	C2	3	6	9.503	0.264	21	0.0126	Interlaminar Shear	
WFQC2121J	C	C2	3	6	10.894	0.259	21	0.0123	Interlaminar Shear	

Table 6-2: Fluid Sensitivity Test Summary for RT

Fluid	Average Interlaminar Shear Strength With Fluid (ksi)	Same Environment Interlaminar Shear Strength Without Fluid (ksi) (ETD)	tWsic3(Ca-9J9(()19 -1.3O4eu-55.3()54.3)
1			2.762
2			1.132
3			1.858
4			1.627
5			5.127
6			3.984
7			8.345
8			2.255
9			11.356
10			0.203
11			-0.669
12			2.380
13			11.984
14			0.000
15			25.214

	Extended Contact
1	100 Low Lead Aviation Fuel (ASTM D910)
2	SAE AMS 2629 Jet Reference Fluid
3	MIL-PRF-5606 Hydraulic Oil
4	MIL-PRF-83282 Hydraulic Oil
5	MIL-PRF-7808 Engine Oil
6	MIL-PRF-23699, Class STD Engine Oil
7	Sea Water (ASTM D1141 or equiv.)
8	Skydrol LD-4 (SAE AS1241, Type IV, Class 1)
9	50% Water with 50% Skydrol LD-4 (SAE AS1241, Type IV, Class 1)
	Short Duration Contact
10	MEK washing fluid. ASTM D740
11	Polypropylene Glycol Deicer (Type I) Mil-A-824 3
12	Isopropyl Alcohol Deicing Agent (TT-I-735)
	Control Tests
13	Distilled Water
14	Dry
15	85% Relative Humidity

Table 6-3: Fluid Sensitivity Results Comparison for ET

Figure 6-2: Plot of Fluid Sensitivity Results for ET

Specimen Number	Newport Batch #	WSU Cure Cycle	Prepreg Lot #	Fluid	Strength [ksi]	Avg. Specimen Thickn. [in]	# Plies in Laminate	Avg. tply [in]	Failure Mode	Average Strength [ksi]
WFQC21L5	C	C2	3	1	8.162	0.259	21	0.0123	Interlaminar Shear	
WFQC21M5	C	C2	3	1	8.408	0.263	21	0.0125	Interlaminar Shear	
WFQC21N5	C	C2	3	1	8.383	0.263	21	0.0125	Interlaminar Shear	8.246
WFQC21O5	C	C2	3	1	8.205	0.258	21	0.0123	Interlaminar Shear	
WFQC21P5	C	C2	3	1	8.075	0.261	21	0.0124	Interlaminar Shear	
WFQC21V7	C	C2	3	2	8.364	0.236	21	0.0112	Interlaminar Shear	
WFQC21W7	C	C2	3	2	8.355	0.263	21	0.0125	Interlaminar Shear	
WFQC21X7	C	C2	3	2	8.405	0.262	21	0.0125	Interlaminar Shear	8.385
WFQC21Y7	C	C2	3	2	8.393	0.264	21	0.0126	Interlaminar Shear	
WFQC21117	C	C2	3	2	8.406	0.258	21	0.0123	Interlaminar Shear	
WFQC21179	C	C2	3	3	8.253	0.263	21	0.0125	Interlaminar Shear	
WFQC21189	C	C2	3	3	8.651	0.247	21	0.0118	Interlaminar Shear	
WFQC21199	C	C2	3	3	8.083	0.264	21	0.0126	Interlaminar Shear	8.323
WFQC211B9	C	C2	3	3	8.383	0.253	21	0.0120	Interlaminar Shear	
WFQC211C9	C	C2	3	3	8.244	0.263	21	0.0125	Interlaminar Shear	
WFQC211ID	C	C2	3	4	8.292	0.262	21	0.0125	Interlaminar Shear	
WFQC211JD	C	C2	3	4	8.294	0.259	21	0.0123	Interlaminar Shear	
WFQC211KD	C	C2	3	4	8.362	0.261	21	0.0125	Interlaminar Shear	8.343
WFQC211LD	C	C2	3	4	8.353	0.258	21	0.0123	Interlaminar Shear	
WFQC211MD	C	C2	3	4	8.412	0.264	21	0.0126	Interlaminar Shear	
WFQC211TI	C	C2	3	5	7.976	0.258	21	0.0123	Interlaminar Shear	
WFQC211UI	C	C2	3	5	7.969	0.259	21	0.0123	Interlaminar Shear	
WFQC211WI	C	C2	3	5	7.961	0.257	21	0.0122	Interlaminar Shear	8.046
WFQC211XI	C	C2	3	5	8.150	0.262	21	0.0125	Interlaminar Shear	
WFQC211YI	C	C2	3	5	8.172	0.244	21	0.0116	Interlaminar Shear	
WFQC2125K	C	C2	3	6	8.064	0.262	21	0.0125	Interlaminar Shear	
WFQC2126K	C	C2	3	6	8.044	0.236	21	0.0112	Interlaminar Shear	
WFQC2127K	C	C2	3	6	7.913	0.257	21	0.0123	Interlaminar Shear	8.143
WFQC2128K	C	C2	3	6	8.227	0.245	21	0.0116	Interlaminar Shear	
WFQC2129K	C	C2	3	6	8.465	0.246	21	0.0117	Interlaminar Shear	
WFQC212GM	C	C2	3	7	7.716	0.260	21	0.0124	Interlaminar Shear	
WFQC212IM	C	C2	3	7	7.860	0.263	21	0.0125	Interlaminar Shear	
WFQC212JM	C	C2	3	7	7.829	0.259	21	0.0123	Interlaminar Shear	7.773
WFQC212KM	C	C2	3	7	7.816	0.263	21	0.0125	Interlaminar Shear	
WFQC212LM	C	C2	3	7	7.644	0.258	21	0.0123	Interlaminar Shear	
WFQC212RO	C	C2	3	8	7.990	0.258	21	0.0123	Interlaminar Shear	
WFQC212SO	C	C2	3	8	8.249	0.259	21	0.0123	Interlaminar Shear	

Table 6-4: Fluid Sensitivity Test Summary for ET

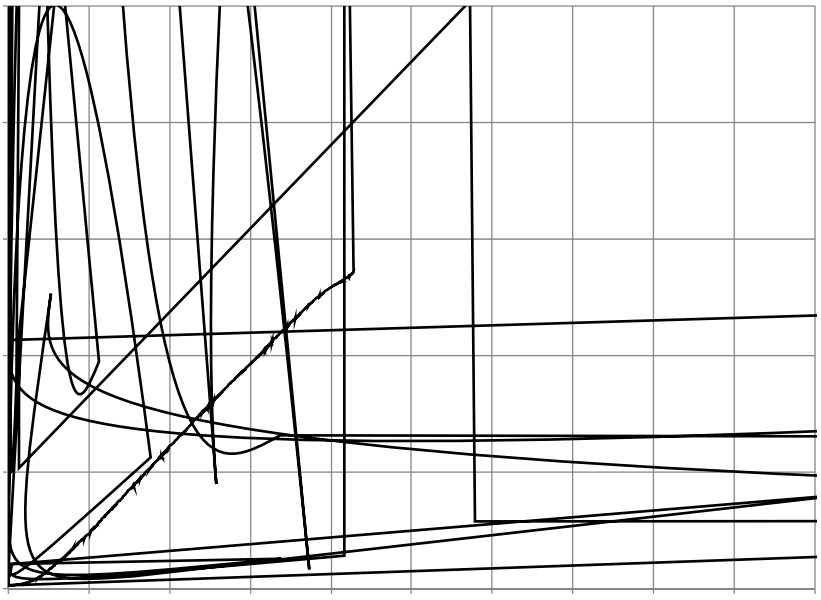


Figure 6-3: 90 Days Soak, RT

Figure 6-4: 90 Days Soak, ET

Figure 6-3: 90 Minutes Soak, RT & ET

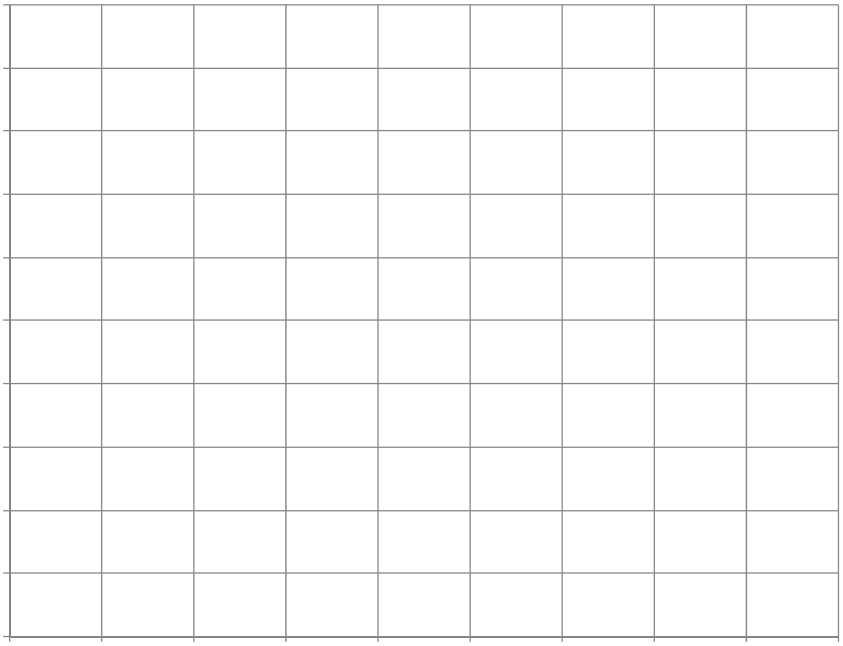


Figure 6-5: Control Tests per section 6.1, RT & ET

7. MOISTURE CONDITIONING CHARTS

7.1 Single Shear Bearing 1– Thinnest Panel*

8. DMA Results

The Wet DMA specimens were prepared by Newport and tested by three test labs (Newport, NIAR and third party test lab). On the other hand the Dry DMA Specimens were prepared and tested at NIAR Composites Lab. The charts and graphs below are only examples. The remaining files can be obtained from the CD provided with this report.

	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]
Newport Dual Cantilever				
Average	115.11	239.20	134.77	274.59
Standard Deviation	3.04	5.47	2.95	5.31

	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]
Newport 3-pt bend				
Average	118.78	245.81	131.81	269.26
Standard Deviation	4.26	7.66	3.47	6.25
Third Party Lab 3-pt bend				
Average	117.53	243.55	132.59	270.67
Standard Deviation	2.18	3.93	1.30	2.34
NCAMP 3-pt bend				
Average	108.45	227.21	123.87	254.96
Standard Deviation	1.50	2.69	1.53	2.76
Three Labs 3-pt bend Results				
Average	114.97	238.95	129.18	264.53
Standard Deviation	5.79	10.42	4.72	8.50

7.66 3.47 Average Standard Deviation 114.97 238.95 129.18 284.96 272.3849 -1.541 -49(0)0(0)0(0)0

Sample #	(mm)	(inch)	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]	Moisture Content %
50mm Span							
Lot# 51588, 8-1	2.70	0.106	117.19	242.94	138.85	281.93	1.63
Lot# 51621, 1-2	2.55	0.100	116.37	241.47	138.04	280.47	1.66

Sample #	(mm)	(inch)	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]	Moisture Content %
20mm Span							
Lot# 51588, Short 8-4	1.35	0.053	116.31	241.36	131.56	268.81	1.63
Lot# 51588, Short 8-1	1.38	0.054	124.09	255.36	134.81	274.66	1.66
Lot# 51621, Short 1-4	1.26	0.050	110.15	230.27	124.29	255.72	1.61
Lot# 51621, Short 1-1	1.30	0.051	120.83	249.49	132.34	270.21	1.70
Lot# 51733, Short 3-2	1.32	0.052	122.16	251.89	131.71	269.08	1.62
Lot# 51733, Short 3-4	1.33	0.052	118.00	244.40	129.69	265.44	1.69
Lot# 51733, Short 3-3	1.30	0.051	118.70	245.66	132.59	270.66	1.61
Lot# 51733, Short 3-5	1.31	0.052	118.36	245.05	132.19	269.94	1.67
Lot# 51733, Short 3-5	2.56	0.100	123.93	255.07	137.03	278.65	1.60
Lot# 64390, Short 0-3	1.28	0.050	113.62	236.52	128.53	263.35	1.63
Lot# 64390, Short 0-2	1.30	0.051	120.48	248.86	135.19	275.34	1.60
Average			118.78	245.81	131.81	269.26	1.64
Standard Deviation			4.26	7.66	3.47	6.25	0.04

Sample #	(mm)	(inch)	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]	Moisture Content %
50mm Span							

Sample #	(mm)	(inch)	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]	Moisture Content %
20mm Span							
Lot# 51588, Short 8-2	1.28	0.050	108.27	226.89	124.14	255.45	1.72
Lot# 51588, Short 8-3	1.36	0.054	108.32	226.98	126.31	259.36	1.83
Lot# 51621, Short 1-2	1.30	0.051	109.64	229.35	124.74	256.53	1.83
Lot# 51621, Short 1-3	1.36	0.054	107.63	225.73	123.81	254.86	1.77

DMA Results Summary

Third Party Lab 3-point bend Results of Wet Samples

Sample #	Thickness (mm)	Thickness (inch)	Onset Storage Modulus Tg [°C]	Onset Storage Modulus Tg [°F]	Peak of Tangent Delta Tg [°C]	Peak of Tangent Delta Tg [°F]	Moisture Content %
20mm Span							
Lot# 51588, short 8-2	1.30	0.051	114.78	238.60	131.99	269.58	1.70
Lot# 51621, short 1-2	1.29	0.051	116.88	242.39	131.71	269.07	1.46
Lot# 51733, short 3-2	1.33	0.052	119.75	247.55	134.53	274.15	1.73
Lot# 64390, short 0-2	1.32	0.052	118.71	245.67	132.16	269.88	1.77
Average			117.53	243.55	132.59	270.67	1.67
Standard Deviation			2.18	3.93	1.30	2.34	0.14

Sample #	Thickness (mm)	Thickness (inch)	Onset Storage Modulus Tg [°C]	Onset Storage Modulus Tg [°F]	Peak of Tangent Delta Tg [°C]	Peak of Tangent Delta Tg [°F]	Moisture Content %
50mm Span							
Lot# 51588, long 8-1	1.35	0.053	117.44	243.39	130.86	267.54	1.79
Lot# 51588, long 8-2	2.72	0.107	120.72	249.30	137.36	279.24	1.67
Lot# 51621, long 1-1	1.31	0.052	115.73	240.31	129.44	265.00	1.66
Lot# 51733, long 3-1	1.30	0.051	114.54	238.18	130.01	266.02	1.84
Lot# 51733, long 3-2	2.52	0.099	115.61	240.10	128.60	263.48	1.80
Lot# 64390, long 0-1	1.30	0.051	116.14	241.05	130.29	266.53	1.87
Lot# 64390, long 0-1	2.53	0.100	118.56	245.41	135.09	275.17	1.67
Average			116.96	242.53	131.67	269.00	1.76
Standard Deviation			2.11	3.80	3.26	5.87	0.09

Conditioning: Wet

Test Parameters:

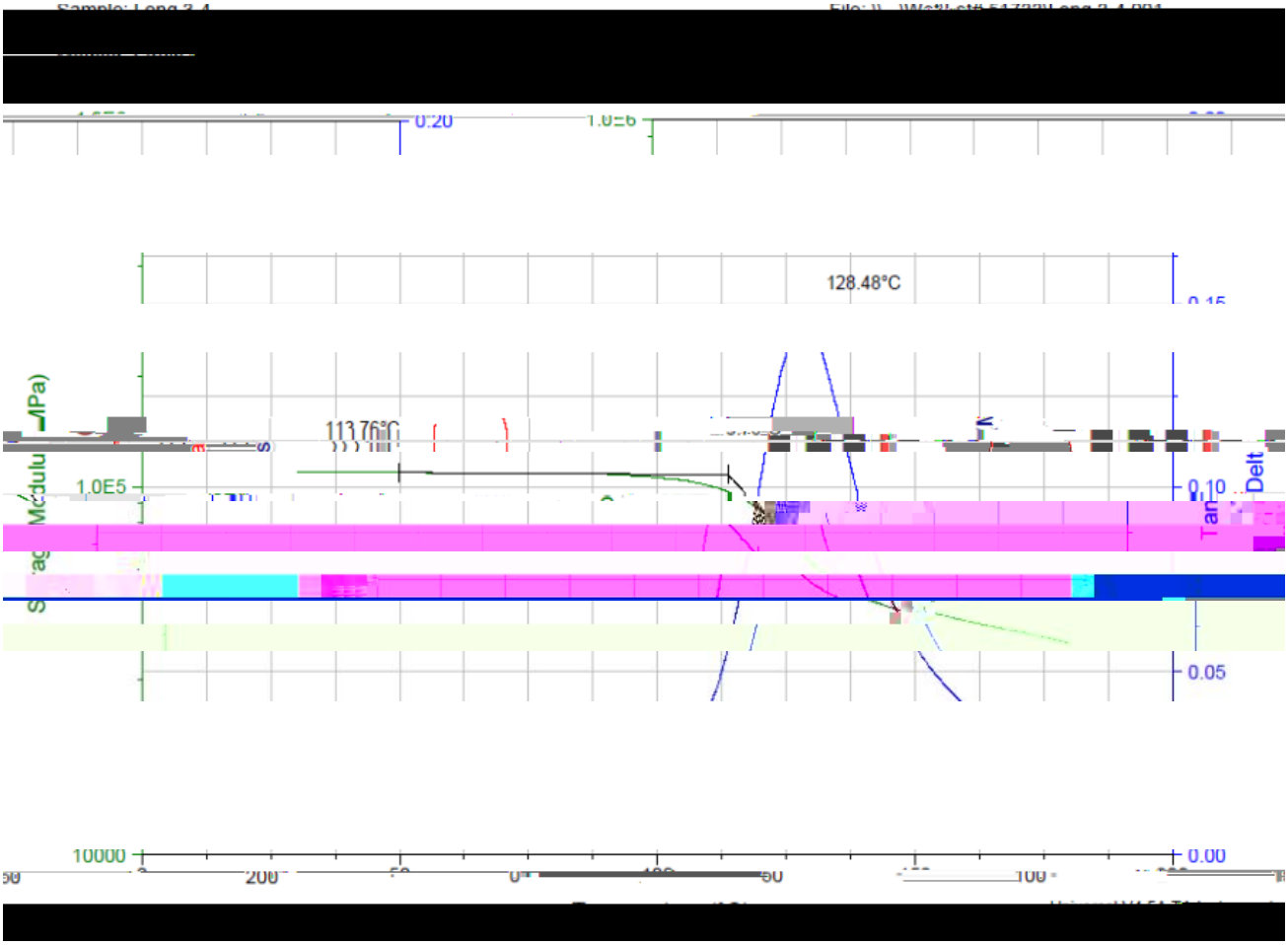
Machine: TA DMA Q800

Sample #	Tg [°C]	Tg [°F]	Tg [°C]	Tg [°F]
WFDA 1F (UNI-OHT3-A-C1-DMA DRY)	150.24	302.43	173.87	344.97

Table 8-2: DMA Dry Results

8.1 DMA Wet Sample Batch A

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



8.2 DMA Dry Sample Batch A

9. Physical Test Results

	D3171-06 Fiber Content by Matrix Digestion (Test Method I Procedure B)							D2734-97 Void Content	
Sample Name	Dry Spec. Weight [g]	Filter Weight [g]	Filter +Fiber Weight [g]	Fiber Weight [%]	Fiber Density [g/cc]	Resin Weight [%]	Fiber Volume [%]	Resin Density [g/cc]	Void Content Volume [%]
NEW-K11-WSU-FHC1-A-C1									
FA71-1	1.2038	24.4437	25.1744	60.70	1.804	39.30	51.57	1.246	0.09
FA71-2	1.2157	23.6708	24.4028	60.21	1.804	39.79	51.18	1.246	-0.15
FA71-3	1.1889	22.6466	23.3719	61.01	1.804	38.99	52.35	1.246	-0.80
NEW-K11-WSU-UNT3-A-C2									
FAC2-1	1.1738	23.9608	24.6606	59.62	1.804	40.38	50.69	1.246	-0.40
FAC2-2	1.1662	22.4249	23.1322	60.65	1.804	39.35	51.72	1.246	-0.31
FAC2-3	1.1698	24.3944	25.0866	59.17	1.804	40.83	50.36	1.246	-0.67
NEW-K11-WSU-OHC3-A-C2									
FAI2-1	0.8747	24.2916	24.8186	60.25	1.804	39.75	50.94	1.246	0.39
FAI2-2	0.8597	24.1342	24.6402	58.86	1.804	41.14	49.87	1.246	-0.34
FAI2-3	0.8903	22.8280	23.3535	59.03	1.804	40.97	49.67	1.246	0.40
NEW-K11-WSU-SBS1-A-C1									
FAq1-1	1.3556	23.7228	24.5509	61.09	1.804	38.91	51.63	1.246	0.75
FAq1-2	1.2169	23.6175	24.3629	61.25	1.804	38.75	51.90	1.246	0.58
FAq1-3	1.3287	22.4778	23.2751	60.01	1.804	39.99	51.05	1.246	-0.30
NEW-K11-WSU-FHC1-B-C1									
FB71-1	1.2298	23.4432	24.1737	59.40	1.804	40.60	50.44	1.246	-0.35
FB71-2	1.2368	22.6071	23.3489	59.98	1.804	40.02	51.26	1.246	-0.79
FB71-3	1.1844	23.7419	24.4475	59.57	1.804	40.43	50.76	1.246	-0.64
NEW-K11-WSU-UNT1-B-C1									
FBA1-1	1.0993	24.3600	25.0156	59.64	1.804	40.36	50.35	1.246	0.31
FBA1-2	1.1082	21.9055	22.5700	59.96	1.804	40.04	50.88	1.246	-0.07
FBA1-3	1.1243	22.0406	22.7148	59.97	1.804	40.03	50.90	1.246	-0.10
NEW-K11-WSU-OHC3-B-C1									
FBI1-1	1.1662	23.7755	24.4673	59.32	1.804	40.68	50.51	1.246	-0.66
FBI1-2	1.2316	22.5652	23.2877	58.66	1.804	41.34	49.86	1.246	-0.73
FBI1-3	1.1902	23.6958	24.3875	58.12	1.804	41.88	49.35	1.246	-0.83
NEW-K11-WSU-SBS1-B-C1									
FBq1-1	1.0325	22.4218	23.0519	61.03	1.804	38.97	52.17	1.246	-0.40
FBq1-2	1.1490	23.7081	24.4145	61.48	1.804	38.52	52.30	1.246	0.26
FBq1-3	1.4034	23.9166	24.7679	60.66	1.804	39.34	51.68	1.246	-0.20
NEW-K11-WSU-UNT1-C-C2									
FCA2-1	1.0882	23.7333	24.3860	59.98	1.804	40.02	51.08	1.246	-0.42
FCA2-2	1.0834	23.7240	24.3727	59.88	1.804	40.12	51.13	1.246	-0.74
FCA2-3	1.0478	23.6722	24.3018	60.09	1.804	39.91	51.00	1.246	-0.05
NEW-K11-WSU-OHC3-C-C1									

*Remaining results required per section 4 of the test plan can be found on the CD accompanying this report.

Table 9-1: Physical Test Results

10. Deviations

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