DOE / MSU COMPOSITE MATERIAL FATIGUE DATABASE

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DOE/MSU Composite Material Database Introduction

A detailed guide to use of the database and test methods may be found in References 9 and 26 at the end of this section. Presently there are 26 commercial and over 135 Montana State University - Bozeman (MSU) manufactured fiberglass, carbon and glass-carbon hybrid composites which have been fatigue tested for this database. Presently, over 9000 tests have been performed. Test methods are outlined in papers listed at the end of this section. Additions to the current version of the database include spectrum loading, delamination resistance, large tow carbon fiber composites and stress rupture.

Materials presently in the database include lay-up combinations of 0^O, $\pm45^O$ and $0^O/\pm45^O$ fabrics tested in the strongest (longitudinal) and weakest (transverse) directions. The commercial materials were generally hand lay-up and the MSU were resin transfer molded (RTM). The database contains results from cyclic fatigue tests using a constant stress amplitude sine waveform with R-values of 0.1 (tension-tension), 10 (compression-compression) and -1 (tension-compression). The $(0)_2$ and $(90)_4$ high cycle (typically 100 million cycle range), part of the database has R-values of: 0.1, 0.5, 2, 10, -0.5 and -1.
The R-value is defined by:

$$R = \frac{Minimum\ \ cyclic\ \ stress}{Maximum\ \ cyclic\ \ stress} \qquad \textbf{(1)}$$

where tensile stress is treated as a positive value and the compressive stress is negative. Thermal failures of the polymer matrix materials were avoided by using forced air cooling and low testing frequencies, generally less than 20 Hz, with specialized test geometries for higher frequencies. Generally the tension (R = 0.1) coupons used a 100 mm gage length and the compression (R = 10) and reversed (R = -1) coupons used a 13 mm gage length with unsupported edges and a 25 mm width.

Each test material was given a letter or letter and number designation which uniquely identified the material and individual test coupons. All materials are E - glass or carbon fabric reinforced thermoset polymer matrix composites unless otherwise noted. A brief description of the database structure and the description of each composite is given below.

Tables 1 through 8 summarize the materials included in this database by fiber volume fraction (V_F), ply configuration, matrix material and description of the fabric used including fabric manufacturer. Additional information about the material is listed before the material test summary.

Table 9 summarizes the material properties of industrial materials typical of those used in the wind turbine blade structures and provided by various blade manufacturers. This summary lists the material, fiber volume fraction, ultimate compressive strength, compressive fatigue sensitivity coefficient (b_C), compressive strain for failure at one million cycles, ultimate tensile strength, tensile fatigue sensitivity coefficient (b_T), tensile strain for failure at one million cycles and the initial elastic modulus in the direction tested.

Table 10 summarizes the static longitudinal, transverse and simulated shear properties for seven fabrics used in the MSU manufactured composites. These properties have been used in hand calculations and standard laminate analysis programs for fiber volume fractions between 0.44 and 0.49. It should be noted that this table was generated with a coupon testing rate of 0.25 mm/s, which enhanced data acquisition, versus the standard database rate of 13 mm/s.

Tables 11 and 12 summarize the 3-D properties and strengths of a D155 composite.

Tables 13 through 17 summarize the material properties of the materials manufactured at MSU.

Table 18 summarizes the materials tested at an R value of R = -1.

Table 19 summarizes the data from the high cycle fatigue tests and includes the strain to failure at 1 million cycles and strain to failure at 100 million cycles for longitudinal and transverse directions of a 0° composite.

The individual coupon test results are listed and summarized using eight columns with the following example data structure:

(Col.1)	(Col.2)	(Col.3)	(Col.4)	(Col.5)	(Col.6)	(Col.7)	(Col.8)
TEST & SAMPLE ID #	MAXIMUM STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	NOTES
63 102J	561	*	25	23.7	1.60	1	25
70 105J	129	0.1	10	26.2	0.31	11,000,000	25 R
86 101NT	54	0.1	1	8.62	1.34	6,479	25
149 132N	86	-1	5	22.8	0.36	105,505	25
215 125P	-207	10	10	28.0	-0.63	14,121	25

Col. 1: Lists the MSU mechanical test reference number and the test coupon reference label. If the sample ID label is succeeded by the letter T, the material was tested in the transverse direction or ninety degrees to the major zero degree fiber direction.

Col. 2: This column indicates the maximum stress in megapascals (MPa) which was applied to the coupon. A positive number indicates tension while a negative number indicates compression. For a compression test the stress listed as maximum is actually the minimum stress. (A conversion factor is 1 MPa = 145.0326 psi)

Col. 3: Indicates the R - value of the fatigue test. An asterisk indicates a static, single cycle tension or compression test.

Col. 4: Lists the cyclic sine wave frequency (Hz) at which the coupon was tested in fatigue or, in the case of a static test, the constant displacement ramp rate in millimeters per second (mm/s).

Col. 5: Lists the initial (first cycle) measured elastic modulus (E) of the coupon in the direction tested, in gigapascals (GPa).

Col. 6: Indicates the initial (first cycle) absolute maximum fatigue running strain (e) in percent or the percent strain to failure for a static test.

Col. 7: Indicates the total cycles to failure for the test coupon, where failure is defined as the inability of the test coupon to support the maximum absolute applied fatigue load.

Col. 8: Lists the test coupon width in millimeters (mm) and any other notation for comments.

The notations used in column 8 are summarized below:

H - Coupon had a 12.7 mm diameter circular hole in the middle of the gage length
R - Run out, coupon has significant fatigue cycles but has not yet failed, test stopped.
Z - Double coupon thickness, two coupons bonded together to increase thickness
- Coupons were post cured at a temperature of 110°C which was higher than the standard post curing temperature of 60°C.
±45 - Test coupon was tested with all the fibers orientated in the ±45 direction to obtain shear properties.
ZERO - Test coupon was tested with all fibers orientated in the zero degree load axis. Fabrics were taken apart and orientated in the zero direction.
90 - Test coupon was tested with all the fibers orientated in the 90 degree or transverse to the axis of loading.
tab - Coupon had additional tab material in the gripped area of the composite
tow - A complete glass strand from a particular fabric.
---- - Indicates that a value was unavailable.

Other notations used in the test material summary tables include:

V_F - Fiber volume content of the material in percent
UCS - Ultimate Compressive Strength of the material in MPa
UTS - Ultimate Tensile Strength of the material in MPa
b - fatigue sensitivity coefficient from a linear regression curve fit to the S-N data. Assuming a linear S - N curve on the semi - log plot, yields the equation, $S / S_O = 1 - b \log N$, where S is the maximum stress, S_O is the single cycle strength and N is the total cycles to failure.

b_C - Slope of the compressive fatigue (R = 10) trend line on a semi - log graph (compressive fatigue sensitivity coefficient)
b_T - Slope of the tensile fatigue (R = 0.1) trend line on a semi - log graph (tensile fatigue sensitivity coefficient)
b_R - Slope of the reversed loading (R = -1) fatigue trend line on a semi - log graph (completely reversed loading fatigue sensitivity coefficient)
E - Epoxy matrix material is used in the composite
P - Polyester matrix material is used in the composite
V - Vinyl ester matrix material is used in the composite
S.D. - Sample statistical standard deviation

Some of the fatigue data and the testing procedures followed to produce this database were discussed in the following reports (some of the references are available on the MSU Composites web page www.coe.montana.edu/composites/):

1. Mandell, J.F., Reed, R.M. Jr. and Samborsky, D.D., "Fatigue of Fiberglass Wind Turbine Blade Materials", Contractor Report SAND92-7005, Sandia National Laboratories, Albuquerque, NM (1992). [http://infoserve.library.sandia.gov/sand_doc/1992/927005.pdf]

2. Mandell, J.F., and Samborsky, "DOE/MSU Composite Material Fatigue Database: Test Methods, Materials, and Analysis", Contractor Report SAND97-3002, Sandia National Laboratories, Albuquerque, NM (1997).
[http://infoserve.sandia.gov/sand_doc/1997/973002.pdf]

3. Mandell, J.F., Reed, R.M., and Samborsky, D.D., "High Cycle Fatigue of Wind Turbine Blade Materials," in SED-Vol 12, *Wind Energy 92*, P.S. Veers, S.M. Hock, eds., ASME, New York, p. 105 (1992).

4. Mandell, J.F., Reed, R.M. Jr., Samborsky, D.D., and Pan, Q., "Fatigue Performance of Wind Turbine Blade Materials," in SED-Vol 14, *Wind Energy 93*, S. Hock, ed., ASME, New York, 191-198. (1993).

5. Mandell, J.F., Creed, R.M. Jr., Pan, Q., Combs, D.W., and Shrinivas, M., "Fatigue of Fiberglass Generic Materials and Substructures" in SED-Vol 15, *Wind Energy 94*, W.D. Musial, S.M. Hock and D.E. Berg, eds., ASME, New York, pp. 207-213 (1994).

6. Mandell, J.F., Combs, D.E., and Samborsky, D.D., "Fatigue of Fiberglass Beam Substructures", *Wind Energy 1995*, W.D. Musial, S.M. Hock, and D.E. Berg, Eds., SED-Vol. 16, ASME, 99 - 106 (1995).

7. Samborsky, D., and Mandell, J.F., “Fatigue Resistant Fiberglass Laminates for Wind Turbine Blades,” *Wind Energy 1996,* ASME, 46-51 (1996).

8. Sutherland, H.J., and Mandell, J.F., “Application of the U.S. High Cycle Fatigue Database To Wind Turbine Blade Lifetime Predictions” *Wind Energy 1996,* ASME, pp. 78-84 (1996).

9. Mandell, J.F., Samborsky, D.D., and Cairns, D.S., “Advanced Wind Turbine Blade Structure Development Program at Montana State University,” *Wind Energy 1997*, ASME/AIAA, 189-196 (1997).

10. Cairns, D.S., Mandell, J.F., Scott, M.E., and Macagnano, J.Z., “Design Considerations for Ply Drops in Composite Wind Turbine Blades” *Wind Energy 1997*, ASME/AIAA, pp. 197-208. (1997).

11. Cairns, D. S., Haugen, D. J., Mandell, J. F., and Samborsky, D. D., “Fracture of Skin/Stiffener Intersections in Composite Wind Turbine Structures,” *Wind Energy 1998*, ASME/AIAA, pp. 334 - 343. (1998).

12. Mandell, J. F., Samborsky, D. D., Combs, D.W., Scott, M.E., and Cairns, D. S, “Fatigue of Composite Material Beam Elements Representative of Wind Turbine Blade Substructure”, NREL Contractor Report SR-500-24379, November 1998. [http://www.nrel.gov/docs/fy99osti/24379.pdf]

13. Mandell, J. F., Samborsky, D. D., Scott, M.E., and Cairns, D. S, “Effects of Structural Details on Delamination and fatigue Life of Fiberglass Laminates,” *Wind Energy 1998*, ASME/AIAA, pp. 323 - 327. (1998).

14. Samborsky, D. D., Mandell, J. F., and Cairns, D. S, “Selection of Reinforcing Fabrics for Wind Turbine Blades,” *Wind Energy 1999,* AIAA-99-0024, ASME/AIAA, (1999).

15. Mandell, John F., Samborsky, Daniel D., Sutherland, Herbert J., “Effects of Materials Parameters and Design Details on the Fatigue of Composite Materials for Wind Turbine Blades”, 1999 European Wind Energy Conference, 1-5 March 1999, Nice, France, pp. 628-633.

16. Mandell, J. F., Samborsky, D.D., Li, Mei, Orozco, Ricardo, and Cairns, D.S, “Selection of Fiberglass Matrix Resins for Increased Toughness and Environmental Resistance in Wind Turbine Blades,” *Wind Energy 2000,* ASME/AIAA, pp. 354-366.

17. Wahl, N., Samborsky, D.D., Mandell, J.F., and Cairns, D.S., “Spectrum Fatigue Lifetime and Residual Strength for Fiberglass Laminates in Tension,”*Wind Energy 2001,* AIAA-2001-0025, ASME/AIAA (2001) pp. 49-59.

18. Wahl, N., Samborsky, D.D., Mandell, J.F., and Cairns, D.S., "Effects of Modeling Assumptions on the Accuracy of Spectrum Fatigue Lifetime Predictions for a Fiberglass Laminate,"*Wind Energy 2002*, AIAA-2002-0023, ASME/AIAA. (2002) pp. 19-26.

19. Mandell, J. F., Samborsky, D.D., and Cairns, D.S, "Fatigue of Composite Materials and Substructures for Wind Turbine Blades," Contractor Report SAND2002-0771, Sandia National Laboratories, Albuquerque, NM (2002).

20. Wahl, N.,, Mandell, J.F., and Samborsky, D.D.,"Spectrum Fatigue Lifetime and Residual Strength for Fiberglass Laminates,"Contractor Report SAND2002-0546, Sandia National Laboratories, Albuquerque, NM (2002).

21. Mandell, John F., Samborsky, Daniel D., Wang, Lei and Wahl, Neil K., "New Fatigue Data for Wind Turbine Blade Materials," 2003 ASME Wind Energy Symposium, ASME/AIAA. AIAA-2003-0692, pp. 167-179.

22. Mandell, John F., Cairns, Douglas S., Samborsky, Daniel D., Morehead, Robert B and. Haugen, Darrin J., "Prediction of Delamination in Wind Turbine Blade Structural Details," 2003 ASME Wind Energy Symposium, ASME/AIAA. AIAA-2003-0697, pp. 202-213.

23. Mandell, J.F. Samborsky, D.D., and Wang, L., "Effects of Fiber Waviness on Composites for Wind Turbine Blades," Proceedings of the 48th International SAMPE Symposium, Vol. 48, SAMPE 2003, Long Beach, CA, May 11-15, 2003. pp. 2653 - 2678, ISBN 0-938-99494-8, (2003)

24. Mandell, J.F., Samborsky, D.D., Wahl, N.K., and Sutherland, H.J., "Testing and Analysis of Low Cost Composite Materials Under Spectrum Loading and High Cycle Fatigue Conditions," Proceedings of The 14th International Conference on Composite Materials (ICCM-14), Society of Manufacturing Engineers, San Diego, California, July 14 - 18, 2003. Paper 1811. (2003)

25. Avery, D. P., Samborsky D. D., Mandell, J. F. and Cairns, D. S., "Compression Strength of Carbon Fiber Laminates Containing Flaws with Fiber Waviness," 2004 ASME Wind Energy Symposium, ASME/AIAA., AIAA-2004-0174, pp. (2004)

26. Sutherland, H.J., Mandell, J.F., "The Effect of Mean Stress on Damage Predictions for Spectral Loading of Fiberglass Composite Coupons," EWEC Conference, April 19-21, 2004, TUDelft, Delft, the Netherlands. (to be published)

Material Manufacturers and Contact Information

Glass fabrics used in this database were obtained from the following companies:

Brunswick Technologies Inc. (BTI), Brunswick, Maine, www.brunswicktech.com
CollinsCraft Composites Group Inc., Walhalla, SC, www.cofab.com
Owens Corning Fabrics (Knytex), New Braunfels, Texas, www.owenscorning.com
Ahlstrom Corporation, www.ahlstrom.com

Carbon fabrics were obtained from:

Textile Products Inc., Anaheim, CA, www.textileproducts.com
Zoltek Corporation, Saint Louis, MO, www.zoltek.com
Toray Industries Inc., www.toray.co.jp/e/

Prepreg materials were obtained from:

Hexcel Corporation, www.hexcelcomposites.com
Structural Polymer Systems Limited (SP Systems) , www.spsystems.com
Newport Adhesives and Composites, Inc.

Resin systems were obtained from:

Polyester

Interplastics Corporation, www.interplastic.com
Alpha Owens Corning, www.aoc-resins.com
Ashland Chemicals, www.ashland.com

Vinyl esters

Dow Chemical Inc., www.dow.com
Reichhold, www.Reichhold.com

Epoxy

Shell Chemical, www.shell.com
Applied Poleramic Incorporated, Benicia, CA
Jeffco Products, www.jeffcoproducts.com
Structural Polymer Systems Limited (SP Systems) , www.spsystems.com

For further information, assistance, comments or suggestions, please contact:

Daniel Samborsky, DanielS@coe.montana.edu
Dr. John Mandell, Johnm@coe.montana.edu
MSU Composites Group Homepage: www.coe.montana.edu/composites/

Montana State University, Chemical Engineering Department
306 Cobleigh Hall, Bozeman, Montana, USA, 59717, ph: 406-994-2221

Table 1. Lay-up and Summary of Commercial Composite Materials

				R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	Matrix	UCS, MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
A	30	$[0]_5$	P	-313	-1.5	----	----	566	2.6	0.111	0.87	21.5	407 g/m^2 0's, A1012, CoRezyn 63-AX-050 polyester
B	25	$[0]_5$	V	-287	-1.4	----	----	581	2.8	0.135	0.99	21.0	407 g/m^2 0's, A1012, Hetron 922L-25 Vinyl ester
F	35	$[(\pm45/0)_3]_S$	P	-364	-2.1	----	----	357	2.1	0.130	0.48	17.2	1,081 g/m^2 Triax (48%- 0's), Hexcel XH120 Center two plies dropped off (6 plies→ 4 plies), CoRezyn 63-AX-050 polyester resin
G	36	$[(0/\pm45)_3]_S$	P	-258	-1.4	----	----	361	1.9	0.129	0.45	19.3	
H	39	$[(\pm45/0)_3]_S$	P	-435	-1.8	0.10	-0.72	513	2.1	0.114	0.52	24.0	1,081 g/m^2 Triax , (70%- 0's, 30%- ±45's), Hexcel XH120, Center two plies have butt joint (6 plies → 4 plies)
J	39	$[(0/\pm45)_3]_S$	P	-410	-1.7	----	----	440	1.8	0.118	0.52	24.2	
L	51	$[0]_3$	P	-407	-1.2	----	----	742	2.4	0.135	0.70	33.6	0's - A260's
M	38	$[0/\pm45]_4$	V	-286	-1.4	----	----	516	2.5	0.141	0.40	20.7	747 g/m^2 Triax (50%-0's)
N	37	$[0/\pm45]_4$	P	-318	-1.7	0.096	-0.70	468	2.4	0.140	0.46	19.3	
NT		$[90/\mp45]_4$		-131	-1.6	----	----	87	1.1	0.100	0.43	8.1	
P	40	$[(0/\pm45)/M/0]_S$	V	-466	-2.1	0.094	-0.66	667	3.0	0.134	0.48	22.5	747 g/m^2 Triax (0/±45), 203 g/m^2 Mat(M), 0's -A260 (69%-0's)
R	30	$[0/\pm45]_4$	P	-330	-2.0	----	----	441	2.7	0.104	0.98	16.5	0's - DN105, 45 - DB120 (47%-0's)
T	30	$[0/\pm45]_5$	P	-290	-1.6	----	----	362	2.1	0.116	0.65	17.7	Folded edge Triax (CDB200), CoRezyn 63-AX-051 polyester resin
U	27	$[0/\pm45]_5$	P	-354	-1.7	----	----	372	1.8	0.138	0.36	21.2	Cut edge Triax (CDB222), CoRezyn 63-AX-051 polyester resin
Matrix Abbreviations: P -Polyester, V-Vinyl ester													

Table 2. Lay-up and Summary of Commercial Composite Materials

				R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	Matrix	UCS, MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
V	33	$[0/\pm45]_5$	P	-379	-1.9	----	----	374	1.9	0.133	0.43	20.0	Folded edge Triax (CDB222),CoRezyn 63-AX-051 polyester resin
W	33	$[0/\pm45]_5$	P	-336	-1.7	----	----	341	1.8	0.116	0.64	19.3	Cut edge Triax (CDB200), CoRezyn 63-AX-051 polyester resin
X	35	$[0_2/M/\pm45/0_2]$	P	-438	-1.2	0.070	-1.00	612	2.4	0.091	1.05	25.4	85%-0's (A260), 10%-±45's (407 g/m^2), 5%-Mat(M) (203 g/m^2)
XT		$90_2/M/\mp45/90_2$		-159	-1.2	----	----	43	0.52	0.110	0.23	8.3	
Y	34	$[0_2/M/\pm45/0_2]$	E	-454	-1.8	0.059	-1.00	626	2.5	0.102	0.97	25.0	
YT		$90_2/M/\mp45/90_2$		-107	-1.5	----	----	34	0.49	0.106	0.17	7.0	
EE	54	$[M/\pm45/0]_S$	E	-538	-1.7	----	----	543	1.7	0.132	0.60	31.4	65%-0's, 18%- 45's, 17%- Mat
EEAV	48	$[M/\pm45/0]_S$	V	-645	-2.3	0.077	-1.30	583	2.1	0.100	0.75	28.2	71%-0's, 18%- 45's, 11%- Mat
EEAP	49	$[M/\pm45/0]_S$	P	-729	-2.5	0.088	-1.25	511	1.8	0.101	0.82	29.0	70%-0's, 19%- 45's, 11%- Mat
EEBP	43	$[M/\pm45/0]_S$	V	-417	-1.6	----	-----	515	1.9	0.100	0.75	26.6	57%-0's, 26%- 45's, 17%- Mat
EECP	49	$[M/\pm45/0]_S$	V	-419	-1.5	----	----	526	1.9	0.100	0.70	28.3	65%-0's, 20%- 45's, 15%- Mat
HH	21	Short fiber	T	----	----	----	----	147	0.75	0.063	0.45	19.6	Injection molded short carbon fiber
CYC	65	$[(\pm45)_2/(0)_{10}]_S$	T	-668	-0.66	0.055	-0.45	----	----	----	----	102	Injected molded carbon fiber
MM1	55	$(0)_N$	E	-714	-1.8	----	----	1036	2.6	0.122	0.69	40.0	From Infusion spar cap
MM2	54	$(0)_N$	E	-809	-2.0	----	----	924	2.3	0.113	0.71	40.0	From Wet Lay-up spar cap

Matrix Abbreviations: E -Epoxy, P -Polyester, V-Vinyl ester, T - Thermoplastic
Materials EE, EEAV, EEAP, EEBP and EECP were obtained from a production wind turbine blade.

Table 3. Lay-up and Summary of MSU Manufactured (RTM) Fiberglass Materials

				R = 10				R = 0.1					
Material	$V_{F,}$ %	Ply Configuration	Matrix	UCS, MPa	ϵ_{MIN} %	b_c	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
AA	31	$[(\pm45/0)_3(\mp45/0)_2]$	P	-320	-1.7	0.062	-0.95	448	2.4	0.140	0.50	18.8	CDB200 Triax (48% 0's, 52% ±45)
AA2	42	$[(0/\pm45)_2]_S$	P	-316	-1.4	----	----	484	2.2	----	----	22.8	CDB200 Triax (48% 0's, 52% ±45)
AA3	48	$[(\pm45/0)_3]_S$	P	-284	-1.8	----	----	478	2.0	0.113	0.32	24.7	CDB200 Triax (48% 0's, 52% ±45)
AA4	38	$[(\pm45/0)_2]_S$	P	-449	-1.2	----	----	377	1.8	0.105	0.64	21.5	TV3400 Triax (BTI)(50% 0's, 50% ±45)
BB	43	$[\pm45/0_2/+45]_S$	P	-308	-1.3	----	----	725	2.9	0.131	0.80	25.2	0's-A130 (62%), 45's-DB120
CC	40	$[\pm45/0_2/+45]_S$	P	-459	-2.1	----	----	570	2.6	0.121	0.80	21.7	0's-D100 (55%), 45's-DB120
CC2	46	$[\pm45/0_3/+45]_S$	P	-527	-2.0	----	----	711	2.7	0.118	0.79	26.6	0's-D100 (63%), 45's-DB120
CC3	44	$[0/\pm45/0_2/+45]_S$	P	-541	-2.1	----	----	682	2.6	0.112	0.85	26.3	0's-D100 (63%), 45's-DB120
CH	47	$[(\pm45)_3]_S$	P	-178	-1.3	0.105	-0.50	145	1.1	0.104	0.46	13.6	45's-DB240
CH2	44	$[\pm45/0/\pm45]_S$	P	-342	-2.1	0.110	-0.70	362	2.2	0.127	0.65	16.7	0's-D155 (24%), 45's-DB240
CH3	42	$[\pm45/0/\pm45]_S$	P	-318	-1.9	0.127	-0.60	336	3	0.112	0.64	16.8	0's-D155 (24%), 45's-DB240
CH4	39	$[(\pm45)_4]_S$	P	-171	-1.5	0.112	-0.48	155	6	0.124	0.48	11.4	45's-DB120
CH5	28	$[(\pm45)_3]_S$	P	-190	-2.2	0.105	-0.85	139	9	0.123	0.54	8.5	45's-DB120
CH6	44	$[\pm45/0/\pm45]_S$	P	-408	-1.9	0.100	-0.80	502	3.1	0.139	0.50	21.5	0's-D155 (39%), 45's-DB120
CH7	55	$[(\pm45)_2]_S$	P	-168	-1.0	0.113	-0.30	114	5	0.110	0.27	17.0	45's-DB400
CH8	37	$[(\pm45)_2]_S$	P	-146	-1.5	0.151	-0.35	93	10	0.113	0.38	10.0	45's-DB400
CH9	40	$[(\pm45)_3]_S$	P	-174	-1.7	0.106	-0.67	151	7	0.133	0.51	10.3	45's-DB120
CH10	32	$[(\pm45)_3]_S$	P	-163	-2.0	0.126	-0.64	120	7	0.108	0.58	8.1	45's-DB240
CH11	50	$[(\pm45)_2]_S$	P	-189	-1.4	0.106	-0.58	134	6	0.114	0.38	13.4	45's-DB240
CH12	33	$[\pm45/0/\pm45]_S$	P	-451	-2.6	0.092	-1.15	398	6	0.099	0.94	17.4	0's-D155 (39%), 45's-DB120

Matrix Abbreviations: P -Ortho-polyester (CoRezyn 63-AX-051)
Owens Corning Fabrics: D100 - 339 g/m^2 , D155 - 527 g/m^2 , DB120 - 393 g/m^2 , DB240 - 837 g/m^2 , DB400 - 1349 g/m^2, CDB200 (Triax) - 759 g/m^2
Brunswick Technologies Inc. Fabric - TV3400 (Triax) - 1150 g/m^2

Table 4. Lay-up and Summary of MSU Manufactured (RTM) Fiberglass Materials

				R = 10				R = 0.1					
Material	V_{F}, %	Ply Configuration	Matrix	UCS, MPa	ϵ_{MIN} %	b_c	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
CH13	51	$[\pm45/0/\pm45]_S$	P	-385	-1.7	0.107	-0.60	423	2.8	0.138	0.48	23.2	0's-D155 (24%), 45's-DB240
CH14	39	$[\pm45/0/\pm45]_S$	P	-412	-2.0	0.081	-1.00	517	3.4	0.134	0.75	21.0	0's-D155 (39%), 45's-DB120
CH15	32	$[\pm45/0/\pm45]_S$	P	-345	-2.3	0.100	-1.02	309	3.6	0.103	0.85	14.8	0's-D092 (28%), 45's-DB120
CH16	34	$[\pm45/0/\pm45]_S$	P	-309	-1.7	0.085	-0.80	360	2.8	0.129	0.68	18.5	0's-D092 (28%), 45's-DB120
CH17	42	$[\pm45/0/\pm45]_S$	P	-301	-1.7	0.079	-0.94	359	3.6	0.139	0.40	17.6	0's-D092 (28%), 45's-DB120
CH18	45	$[\pm45/0/\pm45]_S$	P	-298	-1.7	0.105	-0.74	294	3.1	0.129	0.50	17.2	0's-D092 (16%), 45's-DB240
CH19	33	$[\pm45/0/\pm45]_S$	P	-252	-2.1	0.122	-0.65	193	3.9	0.102	0.70	11.9	0's-D092 (16%), 45's-DB240
CH20	26	$[(\pm45_3)]_S$	P	-230	-2.1	----	----	133	1.6	0.118	0.38	10.9	45's-DBM1204B
CH23	32	$[\pm45/0/\pm45]_S$	P	-448	-2.4	0.106	-0.90	394	2.2	0.140	0.40	18.5	0's-D155 (39%), 45's-DBM1204B
CH25	32	$(\pm45)_7$	P	-172	-1.8	----	----	92.7	1.0	----	----	9.50	45's-DB120
CH26	33	$(\pm45)_3/0/(\pm45)_3$	P	-313	-2.5	----	----	260	2.1	----	----	12.5	0's-D155(10%), 45's-DB240
CH27	35	$(\pm45)_2/0/\pm45/0/(\pm45)_2$	P	-418	-2.9	----	----	417	2.9	----	----	14.5	0's-D155 (20%), 45's-DB240
CH28	38	±45/0/±45/0/±45/0/±45	P	-475	-2.6	----	----	564	3.1	----	----	18.0	0's-D155 (32%), 45's-DB240
DD	51	$(0/\pm45/0_3/\pm45/0)$	P	-788	-2.5	----	----	910	2.9	0.135	0.60	31.3	0's-D155 (76%), 45's-DB120
DD2	44	$(0/\pm45/0)_S$	P	-581	-2.2	0.079	-1.15	752	2.8	0.110	0.95	27.0	0's-D155 (72%), 45's-DB120
DD2A	45	$(0/\pm45/0)_S$	P	----	----	----	----	986	3.5	0.122	0.94	28.0	
DD4	48	$(0/\pm45/0)_S$	P	-541	-1.8	----	----	886	2.9	0.136	0.55	31.0	
DD5	37	$(0/\pm45/0)_S$	P	-534	-2.1	----	----	724	2.9	0.104	1.15	25.2	
DD5E	36	$(0/\pm45/0)_S$	E	-521	-2.2	0.056	-1.42	674	2.9	0.110	1.20	23.6	
DD5E3	36	$(0/\pm45/0)_S$	E3	-583	-2.5	0.072	-1.36	776	3.3	----	----	23.8	

Matrix Abbreviations: E -Epoxy (Shell Epon 9410), E3 - SP Systems Prime 20 Epoxy, P -Ortho-polyester (CoRezyn 63-AX-051)
Owens Corning Fabrics: D092 - 310 g/m^2, D155 - 527 g/m^2, DB120 - 393 g/m^2, DB240 - 837 g/m^2, DBM1204B -420 g/m^2

Table 5. Lay-up and Summary of MSU Manufactured (RTM) Fiberglass Materials

				R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	Matrix	UCS, MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
DD5E4	35	$(0/\pm45/0)_S$	E4	-584	-2.3	----	----	757	3.2	----	----	23.7	0's-D155 (72%), 45's-DB120
DD5P	37	$(0/\pm45/0)_S$	P	-574	-2.4	0.072	-1.35	661	2.8	0.101	1.16	24.2	
DD5PT		$(90/\mp45/90)_S$		-148	-1.7	----	----	66	0.61	0.100	0.30	8.80	
DD5V	37	$(0/\pm45/0)_S$	V	-530	-2.2	0.057	-1.48	675	3.2	0.102	1.11	23.7	
DD5V2	35	$(0/\pm45/0)_S$	V2	-605	-2.7	0.064	-1.66	787	3.4	0.102	1.39	22.3	
DD5V3	36	$(0/\pm45/0)_S$	V3	-601	-2.4			796	3.1			24.9	
DD6	32	$(0/\pm45/0)_S$	P	-505	-2.4	0.071	-1.40	605	2.7	0.100	1.15	21.1	
DD7	54	$(0/\pm45/0)_S$	P	-581	-1.8	0.072	-1.03	832	2.7	0.147	0.40	32.0	
DD8	44	$(0/\pm45/0)_S$	P	-582	-2.2	----	----	778	2.4	0.102	0.90	27.1	Same as DD9 and DD10
DD8A	45	$(0/\pm45/0)_S$	P	----	----	----	----	----	----	----	----	29.8	0's-D155 (no weft stitching thread), DB120 (tested at R=0.1, 345 MPa)
DD8B	43	$(0/\pm45/0)_S$	P	----	----	----	----	----	----	----	----	26.2	0's-D155 (no stitching), DB120 (no stitching <u>between</u> +45 and -45 plies) (tested at R=0.1, 345 MPa)
DD9	56	$(0/\pm45/0)_S$	P	-556	-1.6	----	----	907	2.6	0.137	0.46	34.6	0's-D155 (72%), 45's-DB120 All fabric weft stitching thread was removed
DD10	62	$(0/\pm45/0)_S$	P	-552	-1.3	0.053	-0.90	956	2.3	0.143	0.35	42.5	
DD11	30	$(0/\pm45/0)_S$	P	-319	-1.6	0.090	-0.70	592	3.0	0.100	1.20	20.0	0's-A130 (68%), 45's-DB120
DD11A	29	$(\pm45/0_4/\mp45)$	P	-350	-1.8	----	----	604	3.1	----	----	19.5	
DD11E3	32	$(0/\pm45/0)_S$	E3	-265	-1.3	0.090	-0.58	624	3.1	----	----	20.4	
DD11E4	34	$(0/\pm45/0)_S$	E4	-318	-1.3	----	----	----	----	----	----	23.8	
DD12	41	$(0/\pm45/0)_S$	P	-302	-1.1	----	----	723	2.7	0.114	0.85	26.4	

Matrix Abbreviations:E3 - SP Systems Prime 20 Epoxy, E4 -Jeffco 1401-12/4101-17 Epoxy, P -Ortho-polyester (COR63AX051), V-Vinyl ester (Derakane 411C), V2 -Vinyl ester (Derakane 8084), V3 - Reichhold DION 9800 Urethane-modified Vinyl Ester. Owens Corning Fabrics: A130 - 444 g/m^2 , D155 - 527 g/m^2 , DB120 - 393 g/m^2

Table 6. Lay-up and Summary of MSU Manufactured (RTM) Fiberglass Materials

				R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	Matrix	UCS, MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
DD13	46	$(0/\pm45/0)_S$	P	-314	-1.1	0.094	-0.45	821	2.8	0.130	0.80	29.5	
DD14	43	$(0/\pm45/0)_S$	P	-428	-1.7	----	----	728	2.9	0.133	0.60	25.1	0'S-CM1701 (72%), 45'S-DB120
DD15	37	$(0/\pm45/0)_S$	P	-428	----	----	----	----	----	----	----	----	
DD16	33	$(90/0/\pm45/0)_S$	P	-418	-2.3	0.074	-1.28	672	3.7	0.120	0.103	18.2	0's-D155 (53%), 90's-D155 (26%) 45's-DB120 (21%)
DD17	38/53	$(0/\pm45/0)_S$	P	-420	-1.9	0.082	-0.96	782	3.5	0.148	0.45	22.3	0's-D155 (72%), 45's-DB120 Has surface indentation (flaw)
DD17A	34/42	$(0/\pm45/0)_S$	P	-265	-1.1	0.074	-0.63	646	3.0	0.121	0.80	23.4	0's-A130 (68%), 45's-DB120 Has surface indentation (flaw)
DD18	34/40	$(0/\pm45/0)_S$	P	-508	-2.3	----	----	730	3.5	0.116	1.00	22.6	0's-D155 (72%), 45's-DB120, Has center flaw, one 90° (D155) tow
DD18A	36/43	$(0/\pm45/0)_S$	P	-325	-1.4	----	----	700	3.1	0.120	0.90	22.7	0's-D155 (68%), 45's-DB120, Has center flaw, one 90°(D155) tow across width
DD19	34/47	$(0/\pm45/0)_S$	P	-375	-1.7	0.073	-0.96	710	3.3	0.129	0.75	22.0	0's-D155 (72%), 45's-DB120, Has center flaw, two 90° (D155) tows across width
DD19A	35/50	$(0/\pm45/0)_S$	P	-293	-1.3	0.079	-0.66	651	3.1	0.140	0.60	23.2	0's-A130 (68%), 45's-DB120, Has center flaw, two 90°(D155) tows across width
DD19B	35/50	$(0/\pm45/0)_S$	P	----	----	----	----	694	3.0	0.134	0.70	24.5	0's-A130 (68%), 45's-DB120, Has centered 8 mm x 19 mm flaw (two 0°(D155) tows)
DD20	34	$[0_2/\pm45/0]_S$	P	-313	-1.4	----	----	587	2.8	0.137	0.50	22.2	0's - Collins Craft A1010 (73%), 45's -DB120
DD20A	38			----	----	----	----	639	2.7	0.140	0.55	25.5	
DD22	31	$[0_2/\pm45/0]_S$	P	-389	-2.0	----	----	549	2.8	0.100	1.13	19.6	0's- D092 (70%), 45's- DB120 (30%)

Matrix Abbreviations: P -Ortho-polyester (CoRezyn 63-AX-051). Owens Corning Fabrics: A130 - 444 g/m^2 , CM1701 - 587 g/m^2, D155 - 527 g/m^2 , DB120 - 393 g/m^2 ,D092 - 310 g/m^2. CollinsCraft Fabrics - A1010 - 351 g/m^2

Table 7. Lay-up and Summary of MSU Manufactured (RTM) Fiberglass Materials

				R = 10				R = 0.1					
	V_F, %	Ply Configuration	Matrix	UCS MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
DD24	39	$(0/\pm45/0_3/\pm45/0)$	P	-511	-2.1	----	----	730	3.0	0.115	0.94	23.9	0's - Collins Craft UC1010V, 45's -DB120 (70% 0's)
DD25	46	$(0/\pm45/0)_S$	P	-483	-1.7	----	----	743	2.9	0.126	0.65	28.1	0's - CollinsCraft UC1018GV, Glass veil, 45's -DB120 (76% 0's)
DD25A	49	$(0/\pm45/0)_S$	P	-629	-2.2	----	----	783	2.9	0.121	0.75	28.5	0's - Collins Craft UC1018V, Polyester veil, 45's -DB120 (76% 0's)
DD25B	31	$(0/\pm45/0)_S$	P	-419	-2.2	----	----	514	2.8	0.102	1.03	19.3	
DD25D	33/52	$(0/\pm45/0)_S$	P	----		----	----	478	2.0	0.123	0.58	23.9	Same as DD25A, Surface Indentation
DD26	47	$(0/\pm45/0)_S$	P	-567	-1.9	0.082	-0.96	853	2.8	0.121	0.85	30.0	0's - Collins Craft UC1018V, Polyester veil, 45's -DB120, with a different polyester binder. (76% 0's)
DD27A	32	$(0/\pm45)_S$	P	-381	-1.9	----	----	566	3.0	0.136	0.61	20.5	0's- 42024L/M50, 1250 g/m^2 (76%), 45's- 62002, 390 g/m^2 (24%)
DD27B	42	$(0/\pm45)_S$	P	-321	-1.2	----	----	617	3.0	0.133	0.60	25.9	
DD27C	43	$(0/\pm45)_S$	P	-423	-1.6	----	----	751	3.0	----	----	26.5	

Matrix Abbreviations: P -Ortho-polyester (CoRezyn 63-AX-051), V-Vinyl ester (Derakane 411C), Owens Corning Fabrics: D155 - 527 g/m^2 , DB120 - 393 g/m^2 , CollinsCraft Fabrics -UC1010 - 424 g/m^2 , UC1018/V (polyester veil) - 644 g/m^2 , UC1018/GV (glass veil)- 678 g/m^2

Table 8. Lay-up and Summary of MSU Manufactured (RTM) Fiberglass Materials

				R = 10				R = 0.1					
	V_F, %	Ply Configuration	Matrix	UCS MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
FFA	36	$(\pm45/0/0/\pm45)_S$	P	-553	-2.3	----	----	716	3.0	0.123	0.80	24.2	0's-D155 (56%), 45's-DB120 (44%)
FFB	36	$(0/\pm45/0/\pm45)_S$	P	-506	-2.2	----	----	621	2.9	0.112	0.80	23.4	
FFC	36	$(0/\pm45/\pm45/0)_S$	P	-499	-2.2	----	----	624	2.9	0.121	0.79	22.9	
FFD	36	$(0/0/\pm45/\pm45)_S$	P	-542	-2.4	----	----	636	2.9	0.120	0.83	23.1	
FFF	36	$(\pm45/\pm45/0/0)_S$	P	-596	-2.5	----	----	664	2.9	0.123	0.80	23.9	
GG	40	$(0_2/\pm45/0_2)$	P	-628	-2.2	----	----	970	3.4	0.116	1.10	28.0	0's-D155 (84%), 45's-DB120 (16%)
ROV2	35	$(0/90)_4$	P	-244	-1.1	----	----	362	1.7	0.110	0.72	21.5	0/90, 600 g/m^2, balanced construction
ROV3	40	$(0/90)_5$	P	-203	-0.97	----	----	422	2.0	0.120	0.65	20.9	0/90, 814 g/m^2, balanced construction
ROV4	53	$(0/90)_8$	P	-314	-1.2	----	----	505	1.9	0.150	0.35	26.7	0/90, 814 g/m^2, balanced construction

Matrix Abbreviations: P -Ortho-polyester (CoRezyn 63-AX-051). Owens Corning Fabrics: D155 - 527 g/m^2 , DB120 - 393 g/m^2 , DB240 - 837 g/m^2.

Table 9. Lay-up and Summary of MSU Manufactured (RTM) Unidirectional Fiberglass Materials

				R = 10				R = 0.1					
Material	V_{F}, %	Ply Configuration	Matrix	UCS, MPa	ϵ_{MIN} %	b_c	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric Description
A060	46	$[0]_{10}$	P	-315	-1.0	----	----	579	1.8	0.094	0.80	31.4	0's - A060 (100%)
A130	53	$[0]_{8}$	P	-334	-0.87	----	----	868	2.4	----	----	38.2	0's - A130 (100%)
A130C	36	$[0]_{6}$	P	-373	-1.2	0.062	-0.70	728	2.5	0.091	1.10	31.6	
A130G	55	$[0]_{14}$	P	-423	-0.95	----	-----	1,203	2.7	0.133	0.70	44.4	
A260	37	$[0]_{4}$	P	-440	-1.4	----	-----	776	2.8	0.090	1.11	31.1	0's - A260 (100%)
CM1701	38	$[0]_{5}$	P	-573	-1.9	0.084	-0.93	796	2.7	0.126	0.64	30.5	0's - CM1701A (100%)
DO72A	33	$[0]_{10}$	P	-560	-2.0	0.075	-1.11	799	2.8	0.106	1.04	28.3	0's - DO72 (100%)
DO92	39	$[0]_{10}$	P	-773	-2.4	----	----	952	2.9	----	----	32.9	0's - DO92 (100%)
DO92B	39	$[0]_{9}$	P	-675	-2.0	----	-----	908	2.8	0.104	1.03	33.8	
DO92D	33	$[0]_{7}$	P	-540	-2.1	----	-----	731	2.9	0.090	1.25	25.4	
DO92F	49	$[0]_{12}$	P	-679	-1.7	----	-----	1,112	2.9	0.121	0.70	40.8	
DO92G	52	$[0]_{14}$	P	-692	-1.6	0.085	-0.97	1,163	2.8	0.132	0.60	44.5	
D155	45	$[0]_{6}$	P	-746	-2.2	----	----	987	2.9	----	----	34.7	0's-D155 (100%)
D155B	40	$[0]_{5}$	P	-653	-2.1	0.077	-1.10	854	3.0	0.102	1.12	31.5	
D155C	47	$[0]_{7}$	P	-794	-2.0	----	-----	1,187	3.5	0.120	0.90	38.9	
D155G	58	$[0]_{8}$	P	-765	-1.6	0.057	-1.00	1,314	2.8	0.138	0.64	47.0	
D155H	51	$[0]_{7}$	P	-755	-2.0	----	-----	1,121	2.8	0.099	1.07	38.3	0's-D155 (100%) All fabric weft stitching removed
D155J	58	$[0]_{9}$	P	-776	-1.6	----	-----	1,142	2.6	0.108	0.80	47.9	
D155K	33	$[0]_{7}$	P	-551	-2.0	----	----	861	3.1	0.114	0.98	28.1	0's-D155 (100%)

Matrix Abbreviations: P -Ortho-polyester (CoRezyn 63-AX-051)
Owens Corning Fabrics: A060-206 g/m^2 , A130 - 444 g/m^2 , CM1701 - 587 g/m^2, D072 - 230 g/m^2 , D092 - 310 g/m^2 , D155 - 527 g/m^2 , DB120 - 393 g/m^2

Table 10. Lay-up and Summary of Fiberglass Materials with Symmetric Angle Plies

				R = 10				R = 0.1						
Material	V_F %	Angle of D155 fabric	Matrix	UCS MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX} %	b_T	ϵ for 10^6 cycles, %	E, GPa	ν_{XY}	Fabric Description
D155B2	40	$(0)_5$	P	-653	-2.1	0.077	-1.10	773	2.6	0.093	1.12	29.3	0.32	D155 Fabric (100%) fabric orientated to balanced angles
10D155	35	$(\pm10)_3$	P	-384	-1.4	----	-----	277	0.99	0.068	0.62	27.9	0.38	
20D155	38	$(\pm20)_3$	P	-287	-1.2	----	-----	268	1.2	0.079	0.55	24.2	0.56	
30D155	40	$(\pm30)_3$	P	-176	-0.99	0.065	-0.48	186	1.5	0.098	0.43	17.7	0.67	
40D155	39	$(\pm40)_3$	P	-132	-1.2	0.095	-0.50	144	14	0.109	0.41	11.4	0.62	
45D155	39	$(\pm45)_3$	P	-138	-1.4	0.089	-0.65	107	24	0.109	0.40	9.79	0.57	
50D155	38	$(\pm50)_3$	P	-138	-1.6	0.085	-0.78	65	19	0.092	0.38	8.62	0.51	
60D155	40	$(\pm60)_3$	P	-141	-1.8	0.081	-0.94	37	0.64	0.074	0.25	7.65	0.35	
70D155	39	$(\pm70)_3$	P	-136	-1.9	----	-----	27	0.47	0.076	0.19	7.24	0.21	
80D155	37	$(\pm80)_3$	P	-153	-2.1	----	-----	26	0.35	0.087	0.17	7.16	0.10	
90D155	37	$(90)_6$	P	-123	-1.7	0.062	-1.07	26	0.35	0.081	0.19	7.24	0.09	
45D155P2	36	$(\pm45)_3$	P2	-149	-1.5	0.085	-0.71	136	14	0.119	0.45	10.3	0.57	
45D155V2	40	$(\pm45)_3$	V2	-160	-1.4	----	----	96	11	0.109	0.35	11.4	0.56	
45D155V	41	$(\pm45)_3$	V	-154	-1.4	----	----	121	20	0.110	0.40	10.7	----	
90D155V2	37	$(90)_6$	V2	-171	-1.9	----	----	54	0.59	0.107	0.21	8.85	----	
90D155V	41	$(90)_6$	V	-167	-1.6	----	----	49	0.57	0.108	0.18	10.3	----	
90D155E2	36	$(90)_6$	E2	-152	-2.1	----	----	40	0.55	0.110	0.18	7.28	----	

Matrix Abbreviations: E2 -Epoxy (SC14), P -Ortho-polyester (CoRezyn 63-AX-051), P2 -Iso-polyester (CoRezyn 75-AQ-010), V-Vinyl ester (Derakane 411C), V2 -Vinyl ester (Derakane 8084). All R = 10 test coupons were 25 mm wide with a 13 mm gage length and unsupported edges.

ν_{XY} - Poissons Ratio

Table 11. Lay-up and Summary of R = -1 Materials

Material	V_F, %	Ply Configuration	Matrix	b_R,[1]	ϵ for 10^6 cycles, %	E, GPa	
H	39	$[(\pm 45/0)_3]_S$	P	0.092	0.42	24.0	1,081 g/m^2 Triax (70%- 0's, 30%- ±45's), Hexcel XH120, Center two plies have butt joint (6 plies → 4 plies)
N	37	$[0/\pm 45]_4$	P	0.123	0.30	21.0	747 g/m^2 Triax (50%-0's)
P	40	$[(0/\pm 45)/M/0]_S$	V	0.106	0.41	28.9	747 g/m^2 Triax (0/±45), 203 g/m^2 Mat(M), 0's -A260 (69%-0's)
EEAV	48	$[M/\pm 45/0]_S$	V	0.100	0.70	28.2	71%-0's, 18%- 45's, 11%- Mat
AA	31	$[(\pm 45/0)_3(\mp 45/0)_2]$	P	0.134	0.40	18.8	CDB200 Triax (48% 0's, 52% ±45)
DD4	48	$(0/\pm 45/0)_S$	P	0.125	0.50	31.0	0's-D155 (72%), 45's-DB120
DD5E	36		E2	0.109	0.65	23.6	
DD5P	37		P	0.117	0.57	24.2	
DD5V2	35		V2	0.117	0.68	22.3	
DD16		$(90/0/\pm 45/0)_S$	P	0.124	0.64	18.2	0's, 90's - D155 (53%), 45's-DB120
DD11	30	$(0/\pm 45/0)_S$	P	0.095	0.60	20.0	0's-A130 (68%), 45's-DB120
DD11E3	32		E3	0.087	0.55	20.4	
45D155	39	$(\pm 45)_3$	P	0.148	0.25	9.79	D155 Fabric (100%) fabric orientated to balanced angles

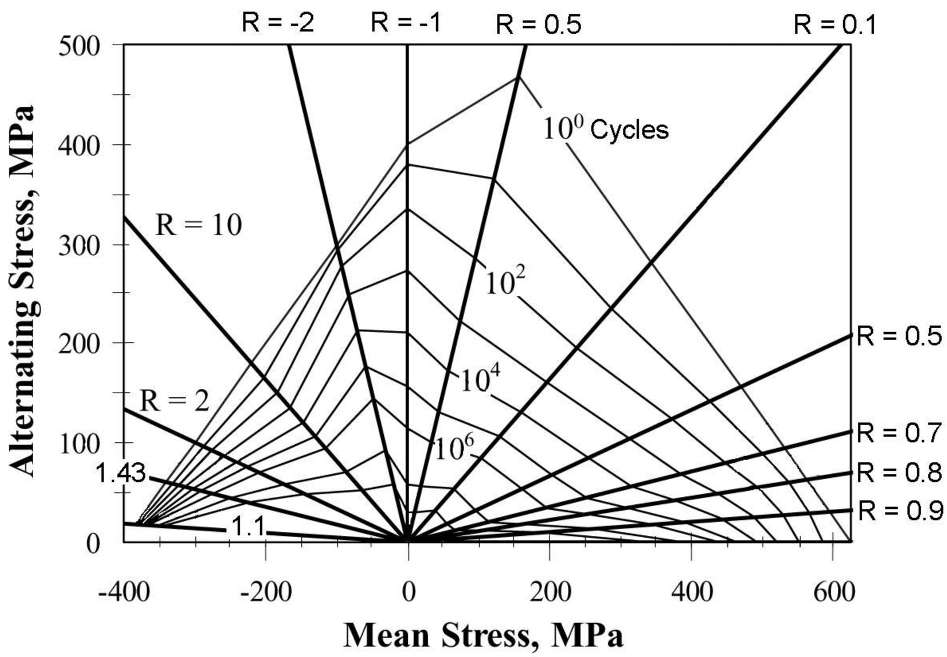
[1] No static test values were used in the linear regression curve fit. All test coupons were 25 mm wide with a 13 mm gage length with unsupported edges. Matrix Abbreviations: E2 -Epoxy (SC14), E3 - SP Systems Prime 20 Epoxy, P -Ortho-polyester (CoRezyn 63-AX-051), V-Vinyl ester (Derakane 411C), V2 -Vinyl ester (Derakane 8084), E3 - SP Systems Prime 20 Epoxy

Table 12. Lay-up and Summary of High Cycle Materials

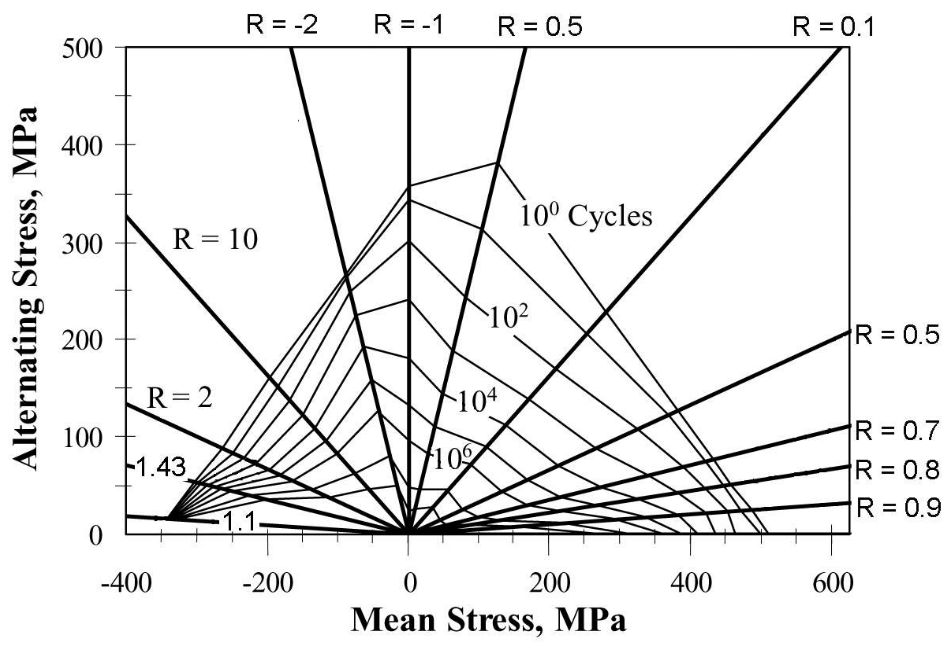
Material	V_F %	Matrix	R	UCS, MPa	ϵ_{MIN} %	UTS, MPa	ϵ_{MAX} %	ϵ for 10^6 cycles, %	ϵ for 10^8 cycles, %	E, GPa	Fabric Description
Longitudinal $[0]_2$	52[1]	P	0.1	----	----	1470	3.2	0.90	0.67	46.2	0's - D155 (100%)
	48		0.5	----	----	1357	3.5	1.36	1.00	39.2	
	52		-1	-584	-1.5	1390	3.6	0.55	0.40	39.2	
	48		10	-789	-2.2	----	----	-0.90	-0.80	35.7	
	52		2	-789	-2.2	----	----	-1.3	-1.20	35.4	
	48		-0.5	-716	-1.8	1470	3.7	0.65	0.52	40.2	
Transverse $[90]_4$	38	P	0.1	----	----	21	0.24	0.14	0.12	8.62	90's - D100 (100%)
			0.5	----	----	22	0.25	0.16	0.13	8.70	
			-1	----	----	18	0.20	0.08	0.07	8.80	
			10	-117	-1.3	----	----	-0.70	-0.62	9.00	
			2	-116	-1.3	----	----	-0.95	-0.80	9.00	
DD5P $(0/\pm45/0)_S$	36	P	0.1	-574	-2.4	661	2.8	1.15	0.73	23.6	0's-D155 (72%), 45's-DB120
			0.5					1.30	1.06		
			-1					0.62	0.45		

[1] The $[0]_2$, R = 0.1 test coupons were thickness tapered, which increased the fiber volume in the gage length to 67%

Goodman Diagrams for Material DD16



(a) Mean Lifetime



(b) 95/95 Lifetime

Mean and 95/95 Goodman Diagrams for Material DD16 (Reference 26)

Table 13. Lay-up and Summary of Glass Prepreg MaterialS

			R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	UCS MPa	ϵ_{MIN} %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{Max}, %	b_T	ϵ for 10^6 cycles, %	E, GPa	Prepreg Description
PP	56	0_{15}	-788	-1.7	----	----	1287	2.7	0.119	0.78	47.0	3M-SP250E Prepreg
PP45	54	$(\pm 45)_{2S}$	-160	-0.9	----	----	155	0.87	0.101	0.34	17.9	
PPDD5	56	$(0_3/\pm 45/0_3)_S$	-796	-2.0	----	----	1088	2.8	0.122	0.74	39.6	
Hexcel M9.6	48	0_3	-505	-1.2	----	----	1166	2.7	----	----	43.0	Hexcel M9.6/32%/1200/G
	46	$(\pm 45)_{2S}$	-153	-1.3	----	----	160	1.6	0.114	0.42	11.7	Hexcel M9.6/35%/BB600/G
	59	$(\pm 45)_{2S}$	-147	-0.93	----	----	142	0.9	0.107	0.32	15.8	
GGP1	68	(0/±45/0)	-617	-1.5	----	----	1348	3.2	----	----	42.2	0 - Hexcel M9.6/32%/1200/G ±45 - Hexcel M9.6/35%/BB600/G
GGP2	51		-729	-2.1	----	----	1002	3.0	----	----	35.1	
GGP4	53	(±45/0/±45)	-277	-1	----	----	778	2.8	0.107	1.01	27.9	

Table 14. Lay-up and Summary of Carbon Materials.

			R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	UCS MPa	ϵ_{Min}, %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{Max}, %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric or Prepreg Description
PREPREG												
M9.1/40%/500/C	52	0	----	----	----	----	1765	1.6	----	----	112	Hexcel M9.1/40%/500/C
	50	0_3	-744	-0.7	----	----	1813	1.5	----	----	106	
	50	0_4	-788	-0.71	----	----	1664	1.4	----	----	111	
	49	$(\pm 45)_{2S}$	----	----	----	----	110	0.8	----	----	13.4	
SE84LV/HSC	54	$(0)_{3C}$	----	----	----	----	2125	1.8	----	----	124	SP - SE84LV/HSC/450/400/37%
SE84LV/SC300C	53	$(0)_{5C}$	-1310	-1.1	----	----	1743	1.4	----	----	125	SE84LV/SC300C/300/400/37%
Fortafil	53	$(0)_{9C}$	----	----	----	----	1703	1.5	----	----	117	Fortafil 8804 resin, 38%, 150 g/m^2
FABRICS												
CA	48	0_{12}	-578	-0.49	----	----	1511	1.3	0.071	0.71	119	AS4-6K (TPI 4416), Derakane 8084
UNI21	32	0	-357	-0.69	----	----	657	----	----	----	51.6	Zoltek UNI21 Carbon , Derakane 8084
	40	0_4	-542	-0.64	0.068	-0.35	965	1.2	----	----	84.1	
UNI25	45	0	----	----	----	----	1270	1.4	0.038	1.10	88.0	Zoltek UNI25 Carbon , Derakane 8084
UNI25A	45	0_4	-535	-0.62	0.054	-0.41	895	1.1	----	----	86.2	

Table 15. Lay-up and Summary of Hybrid Materials Manufactured Using Carbon and Glass Prepregs.

			R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	UCS	ϵ_{Min}, %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX}, %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric or Prepreg Description
CGB2	52	$(0_C/\pm45_G/0_C)$	-610	-0.90	----	----	1330	2.0	----	----	68.0	C -Hexcel M9.1/40%/500/C ±45 -Hexcel glass M9.6/35%/BB600/G
CGB3	50	$(\pm45_G/0_{3C}/\mp45_G)$	-647	-0.90	0.049	-0.63	1356	1.9	----	----	71.5	
CGB4	43	$[\pm45_G/0_{5C}/\pm45_G]$	-828	-1.0	----	----	1325	1.7	----	----	82.2	G= Hexcel glass M9.6/35%/BB600/G, C = SP carbon SE84LV/HSC/450/400/37%, (72% Toray T600 Fiber Carbon)
CGB5	49	$[\pm45_G/0_{5C}/\pm45_G]$	-831	-1.2	----	----	1130	1.7		----	69.9	G= Hexcel glass M9.6/35%/BB600/G, C = SP Systems carbon SE84LV/SC300C/300/400/37% (63% Toray S300 Fiber Carbon)
CGB6 (has dry DB120 ±45°)	65	$[\pm45_G/0_{5C}/\pm45_G]$	-1027	-1.0	----	----	1948	2.0		----	102	G= Owens Corning Fabrics DB120 45's, C = SP Systems carbon prepreg SE84LV/HSC/450/400/37% (80% T600 Fiber Carbon)

Table 16. Lay-up and Summary of Hybrid Materials Manufactured Using Carbon and Glass Fabrics.

			R = 10				R = 0.1					
Material	V_F, %	Ply Configuration	UCS	ϵ_{Min}, %	b_C	ϵ for 10^6 cycles, %	UTS, MPa	ϵ_{MAX}, %	b_T	ϵ for 10^6 cycles, %	E, GPa	Fabric or Prepreg Description
CGD4	51	$(\pm45_G/0_{3C}/\mp45_G)$	-588	-0.71	----	----	1096	1.4	----	----	82.2	Toray carbon fabric 0°, ACM-13-2 (300-48K-10C yarn), ±45 DB120, Derakane 8084 vinyl ester. (76% Carbon)
CGD4E	50	$(\pm45_G/0_{3C}/\mp45_G)$	-684	-0.81	----	----	1159	1.4	----	----	84.7	Toray carbon fabric 0°, ACM-13-2 , DB120 ±45°, SP Systems Prime 20 Epoxy resin. (76% Carbon)
CGD5E	35	$(\pm45_G/0_{3C}/\mp45_G)$	-565	-1.2	----	----	764	1.7	----	----	48.9	Fortafil 652 carbon fabric 0°, 450 g/m^2, DB120 ±45°, 393 g/m^2 SP Systems Prime 20 Epoxy resin. (71% Carbon)
CGD5E2	51	$(\pm45_G/0_{3C}/\mp45_G)$	-546	-0.73	----	----	1136	1.5	----	----	74.9	Fortafil 652 carbon fabric 0°, 450 g/m^2, DB120 ±45°, 393 g/m^2 SP Systems Prime 20 Epoxy resin. (71% Carbon)
DD23	45	$(0_{2G}/\pm45_G/0_G/0_C)_S$	-494	-1.8	----	----	647	2.4	0.092	1.03	27.4	C - AS4-6K(TPI 4416) carbon G - 0's - D155, ±45's - DB120, Derakane 411C-50, (16% Carbon)
CG	56	$[0_{2G}/0_{2C}/0_G/0_{2C}/0_{2G}]$	-475	-0.73	----	----	920	1.4	0.083	0.72	65.5	C - AS4-6K(TPI 4416) carbon G - 0's - D155, ±45's - DB120, Derakane 8084, (32% Carbon)
JJ	46	$(\pm45/0_{3C}/\mp45)$	-411	-0.72	----	----	897	1.6	0.064	0.92	57.4	C-Zoltek UNI21, ±45's - DB120, Derakane 8084, (% Carbon)
Textile Products Inc., uni carbon fabric, style 4416, AS4-6K+5.5uni sticky string, 220 g/m^2												

Table 17. Laminate Analysis and FEA Input Ply Properties in Material Principle Directions for E - Glass and carbon fabrics used in the MSU RTM composites (static longitudinal, transverse and simulated shear properties).

			Longitudinal Direction								Shear	Transverse Direction			
			Elastic Constants				Tension		Compression			Tension		Compression	
Fabric	lay-up	V_F %	E_L GPa	E_T GPa	υ_{LT}	G_{LT} GPa	UTS_L MPa	ϵ_{max} %	UCS_L MPa	ϵ_{min} %	τ_{TU} MPa	UTS_T MPa	ϵ_U %	UCS_T MPa	ϵ_U %
A130	$[0]_8$	45	36.3	8.76	0.32	3.48	858	2.53	-334	-0.92	85.3	33.8	0.39	-93.3	-1.05
D092	$[0]_{10}$	45	35.3	8.76	0.31	4.15	959	2.98	-773	-2.19	141	38.3	0.44	-133	-1.52
D155	$[0]_6$	45	35.0	8.99	0.31	4.10	987	2.83	-746	-2.02	97.7	27.2	0.32	-123	-1.67
DB120*	$[0]_{16}$	44	26.6	7.52	0.39	4.12	610	2.49	-551	-2.08	84.9	24.9	0.33	-114	-2.00
DB240*	$[0]_8$	46	31.0	7.34	0.35	3.74	697	2.67	-528	-1.74	68.7	19.7	0.27	-122	-1.69
0/90ROV*	$[0/90]_4$	49	23.9	23.9	0.26	4.08	382	2.27	-223	-0.93	99.1	382	2.27	-223	-0.93
UNI25	[0]	45	89.7	6.80	0.27	2.36	1213	1.35	-535	-0.60	30	20.5	0.31	-100	-1.47
ACM-13-2	[0]	46	----	----	----	3.34	----	----	----	----	86	----	----	----	----
UT70-60	[0]	35	----	----	----	2.88	----	----	----	----	67	----	----	----	----
M9.1 carbon	[0]	50	115	7.77	0.33	3.71	1813	1.58	-744	-0.65	110	23.5	0.30	-104	-1.34
M9.6 glass	[0]	44	43.0	9.77	0.32	3.31	1166	2.71	-505	-1.2	81	36.3	0.37	-174	-1.78

Notes: All coupons for this Table were tested at 0.25 mm/s, with a 100 mm gage length. Compression tests used a 13 mm gage length with unsupported edges.
E_L - Longitudinal modulus, υ_{LT} - Poisson's ratio, G_{LT} and τ_{TU} - Shear modulus and ultimate shear stress from a simulated shear (±45) ASTM D3518 test.
UTS_L - Ultimate longitudinal tensile strength, ϵ_{MAX} - Ultimate tensile strain, UCS_L - Ultimate longitudinal compressive strength
ϵ_{MIN} - Ultimate compressive strain. Coupons had a 13 mm gage length.
* DB120 and DB240 fabrics were separated into a +45° and a -45° orientation and then rotated to 0 degrees to form a unidirectional material. The reasoning behind the testing of the DB120 and DB240 fabrics is that the fabric stitching operation causes a noticeable waviness in the fabric. If the properties of straight fiber tows are used to model the ±45 directions, the calculated values would be higher than what actually would be present due to this in-plane waviness. The 0°/90° ROV material was tested as a balanced 0°/90° fabric. 300-48K = Toray 300-48K-10C carbon, T700-12K = Toray T700S-12K carbon, M9.1 carbon = Hexcel carbon prepreg M9.1/40%/500/C, M9.6 glass = Hexcel glass prepreg M9.6/32%/1200/G

The properties in Table 17 are for materials with a fiber volume content of about 45%. The elastic constants can be adjusted to other fiber contents using an approximate micromechanics theory such as Halpin Tsai. The longitudinal modulus, E_L, would adjust approximately linearly with fiber volume fraction, V_f, over the range of 20 to 60 percent fiber. Thus, the following equations (2-5) can be used to adjust for other fiber volumes.
The * in the formulae indicates the property at the 45 percent fiber volume from Table 17. The transverse modulus, E_T, and shear modulus, G_{LT}, would change less rapidly with fiber content. The following adjustments should provide approximate values at different fiber contents, assuming that the fiber modulus and Poisson's ratio are 68.9 GPa and 0.22 respectively, and the matrix modulus and Poisson's ratio are 3.1 GPa and 0.35 respectively. More information about these calculations can be found in Reference 2.

Equations for adjustment of material properties from a fiber volume of 45 percent (Table 16).

$$\frac{E_L}{E_L^*} = \left(\frac{1}{32.71}\right)(3.1 + 65.8 V_F) \qquad (2)$$

$$\frac{E_T}{E_T^*} = \frac{1}{2.206} \frac{(1 + 0.836\ V_F)}{(1 - 0.836\ V_F)} \qquad (3)$$

$$\frac{G_{LT}}{G_{LT}^*} = \frac{1}{2.809} \frac{(1 + 1.672\ V_F)}{(1 - 0.836\ V_F)} \qquad (4)$$

$$\frac{\nu_{LT}}{\nu_{LT}^*} = \frac{1}{0.318} (0.35 - 0.15\ V_F) \qquad (5)$$

Table 18. Physical 3-D Constants of Material D155, V_F = 36 and 44%.

Physical Constants of Material D155, V_F = 36%			
Property and test plane	Test Values	Average	Standard Deviation
E_L, GPa (LT plane)	28.1, 27.0, 29.8	28.3	1.4
E_L, GPa (LZ plane)	28.0, 28.3, 27.6	28.0	0.4
E_T, GPa (TZ plane)	8.00, 7.31, 7.93	7.75	0.38
E_Z, GPa (ZX plane)	7.10, 7.65, 7.38	7.38	0.28
NU_{LT}	0.329, 0.320, 0.301	0.32	0.01
NU_{LZ}	0.305, 0.338, 0.331	0.33	0.02
NU_{TZ}	0.466, 0.395, 0.449	0.44	0.04
G_{LT}, GPa	3.31, 3.35, 3.23	3.30	0.06
G_{LZ}, GPa	3.03, 2.72, 2.70	2.82	0.19
G_{TZ}, GPa	2.78, 3.12, 1.76	2.55	0.71
Physical Constants of Material D155, V_F = 44%			
Property and test plane	Test Values	Average	Standard Deviation
E_L, GPa (LT plane)	31.9, 35.4, 33.6	33.6	1.8
E_L, GPa (LZ plane)	34.5, 34.3, 34.5	34.4	0.1
E_T, GPa (TZ plane)	8.14, 8.96, 7.52	8.21	0.72
E_Z, GPa (ZX plane)	7.58, 8.00, 8.00	7.86	0.24
NU_{LT}	0.289, 0.291, 0.290	0.29	0.01
NU_{LZ}	0.302, 0.314, 0.308	0.31	0.01
NU_{TZ}	0.373, 0.371, 0.366	0.37	0.01
G_{LT}, GPa	5.76, 3.94, 3.74	4.48	1.11
G_{LZ}, GPa	3.88, 4.40, 3.07	3.78	0.67
G_{TZ}, GPa	2.96, 2.70, 2.20	2.62	0.39

Shear properties determined by V-notched beam (ASTM 5379)

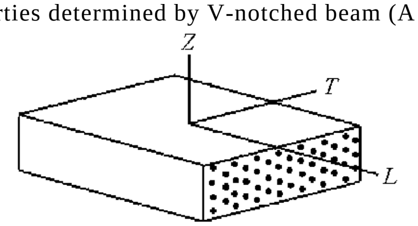
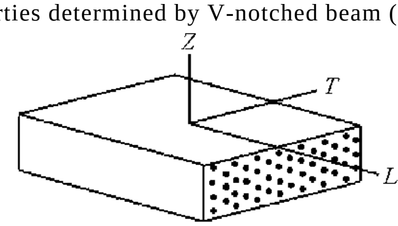


Table 19. Physical 3-D Strengths of Material D155, V_F = 36 and 44%.

Strengths of Material D155, V_F = 36%			
Property and test plane	Test Values	Average	Standard Deviation
UTS_L, MPa (LT plane)	891, 814, 883, 838	856	37
UTS_L, MPa (LZ plane)	679, 672, 685, 646	671	17
UTS_T, MPa (TZ plane)	26.6, 36.0, 30.4, 32.9, 29.0	31.0	3.6
UTS_Z, MPa (ZT plane)	21.7, 18.7, 20.4, 18.1	19.7	1.6
UTS_Z, MPa (ZL plane)	19.4, 17.7, 22.3, 17.1, 15.2	18.4	2.7
τ_{LT}, MPa	95.1, 82.1, 78.8	85.3	8.7
τ_{LZ}, MPa	79.6, 77.3, 77.1, 63.2	74.3	7.5
τ_{TZ}, MPa	19.9, 17.6, 12.0	16.5	4.0
Strengths of Material D155, V_F = 44%			
Property and test plane	Test Values	Average	Standard Deviation
UTS_L, MPa (LT plane)	991, 1000, 1045	1,012	29
UTS_L, MPa (LZ plane)	881, 855, 896	877	21
UTS_T, MPa (TZ plane)	33.3, 29.3, 28.6, 32.1, 29.7	30.6	2.0
UTS_Z, MPa (ZT plane)	12.0, 13.4, 13.4, 12.3	12.8	0.7
τ_{LT}, MPa	67.5, 79.1, 73.1	73.2	5.8
τ_{LZ}, MPa	75.0, 66.2, 70.8	70.7	4.4
τ_{TZ}, MPa	13.6, 17.0, 20.1	16.9	3.3
Shear properties determined by V-notched beam (ASTM 5379)			



SUMMARY OF COMMERCIAL MATERIAL FATIGUE TESTS

MATERIAL A

Lay-up = $[0]_5$, V_F = 0.30, Ave. thickness = 3.68 mm, S.D. = 0.13 mm, CoRezyn 63-AX-050 Polyester

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5	105A	125	0.1	10	----	----	1,996,768	25 tab
6	108A	190	0.1	5	----	----	593,319	25 tab
7	110A	335	0.1	1	----	----	674	25 tab
23	111A	279	0.1	5	20.0	1.40	17,700	50 tab
25	112A	212	0.1	10	22.3	----	138,596	50 tab
30	121A	591	*	13	22.4	2.83	1	25 tab
31	120A	567	*	13	19.9	2.82	1	25 tab
32	119A	538	*	13	20.4	2.64	1	25 tab
36	114A	186	0.1	10	21.0	0.90	1,612,585	50 tab
37	113A	186	0.1	10	22.6	0.85	920,132	50 tab
97	137A	548	*	6	22.0	2.20	1	25 tab
98	136A	579	*	6	23.2	2.30	1	25 tab
180	138A	-323	*	6	----	----	1	25 tab
181	139A	-319	*	6	----	----	1	25 tab
182	140A	-298	*	6	----	----	1	25 tab
The following tests (2914-2925) were thickness tapered (versus standard ASTM D3039 coupons)								
2914	301A	551	*	13	----	----	1	25 tab
2915	309A	552	*	13	----	----	1	25 tab
2916	303A	611	*	13	----	----	1	25 tab
2917	305A	345	0.1	2	22.8	1.63	2,080	25 tab
2918	304A	345	0.1	2	25.8	1.44	1,244	25 tab
2919	308A	345	0.1	2	25.8	1.35	779	25 tab
2920	306A	276	0.1	4	22.4	1.23	19,034	25 tab
2921	311A	276	0.1	4	24.0	1.12	38,474	25 tab
2922	307A	190	0.1	12	23.8	0.66	18,865,901	25 tab
2923	310A	207	0.1	12	28.9	0.72	3,000,000	25 R tab
2924	312A	276	0.1	5	22.2	1.20	21,100	25 tab
2925	316A	207	0.1	12	----	----	8,266,515	25 tab

MATERIAL B

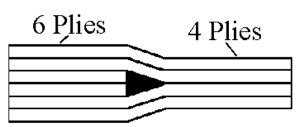
Lay-up = $[0]_5$, V_F = 0.248, Ave. thickness = 3.45 mm, S.D. = 0.26 mm, Hetron 922L-25 Vinyl ester

9	103B	370	0.1	1	21.8	2.06	2,584	25 tab
12	108B	267	0.1	5	22.5	1.21	9,173	25 tab
13	109B	328	0.1	5	20.9	1.60	2,640	25 tab
15	111B	387	0.1	0.1	18.6	1.82	7	25 tab
16	112B	256	0.1	5	20.1	1.29	38,133	25 tab
17	113B	332	0.1	5	21.4	1.53	2,841	25 tab
18	114B	372	0.1	1	19.5	1.90	415	25 tab
20	116B	321	0.1	5	19.2	1.6	3,008	25 tab
21	107B	321	0.1	4	22.6	1.4	32,640	25 tab
22	117B	229	0.1	10	----	----	655,147	50 tab
24	118B	343	0.1	1	16.3	2.12	981	50 tab
26	119B	571	*	13	22.3	2.63	1	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
27	123B	622	*	13	21.4	2.73	1	25 tab
28	124B	571	*	13	21.2	2.76	1	25 tab
29	125B	582	*	13	22.8	2.77	1	25 tab
33	120B	229	0.1	10	21.2	1.08	16,156	50 tab
34	121B	237	0.1	5	19.2	1.24	206,864	50 tab
35	122B	229	0.1	10	23.1	0.99	671,330	50 tab
38	126B	190	0.1	10	20.8	0.90	2,310,849	50 tab
39	129B	154	0.1	15	19.9	0.76	40,000,000	50 R tab
40	130B	188	0.1	10	22.6	0.79	7,475,243	50 tab
56	135B	187	0.1	10	22.3	0.84	2,720,584	25 tab
57	133B	152	0.1	15	21.7	0.70	37,906,456	25 R tab
58	127B	619	*	25	22.4	2.90	1	25 tab
61	137B	568	*	25	20.3	2.79	1	25 tab
64	138B	245	*	25	----	----	1	25 tab
66	138B	343	0.1	1	20.9	1.64	6,085	25 tab
99	128B	560	*	6	19.9	2.82	1	25 tab
100	131B	559	*	6	24.4	2.29	1	25 tab
183	139B	-265	*	6	----	----	1	25 tab
184	140B	-283	*	6	----	----	1	25 tab
185	141B	-278	*	6	----	----	1	25 tab
186	142B	-303	*	6	----	----	1	25 tab
187	143B	-307	*	6	----	----	1	25 tab

MATERIAL F

Lay-up = $[(\pm45/0)_3]_S$, V_F = 0.350, Had two center triax plies dropped, Ave. thickness = 4.88 mm (thin), 7.24 mm (thick), S.D. = 0.13 mm (thin) 0.16 mm (thick), CoRezyn 63-AX-050 Polyester. Maximum stress and strain recorded on smallest cross sectional area.



41	105F	370	*	13	17.8	2.80	1	25 tab

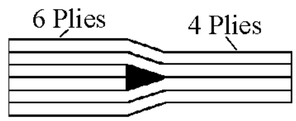
Test numbers 44 and 55 do not have a ply drop and are of the thin (4 ply) sections.

44	106F	363	*	13	14.6	2.55	1	25 tab
45	108F	339	*	13	19.2	2.37	1	25 tab
47	109F	195	0.1	5	----	----	2,689	25 tab
49	101F	102	0.1	5	----	----	95,101	50 tab
51	104F	78	0.1	10	----	----	1,615,838	50 tab
53	103F	78	0.1	10	----	----	2,487,507	50 tab
55	111F	102	0.1	10	----	----	108,029	25 tab
188	119F	-373	*	6	----	----	1	25 tab
189	120F	-364	*	6	----	----	1	25 tab
190	121F	-340	*	6	----	----	1	25 tab
191	122F	-378	*	6	----	----	1	25 tab

TEST &	SAMPLE ID #	MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL G

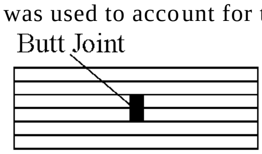
Lay-up = $[(0/\pm45)_3]_S$, V_F = 0.360, Has two center triax plies dropped, Ave. thickness = 4.83 mm (thin), 7.26 mm (thick), S.D. = 0.13 mm (thin) 0.17 mm (thick). CoRezyn 63-AX-050 Polyester. Maximum stress, strain and modulus were recorded on smallest cross sectional area.



42	105G	397	*	13	15.9	2.49	1	25 tab
43	106G	366	*	13	16.4	2.71	1	25 tab
46	108G	332	*	25	----	----	1	25 tab
48	107G	190	0.1	5	----	----	2,637	25 tab
50	101G	103	0.1	10	----	----	69,052	50 tab
52	102G	77	0.1	10	----	----	1,669,945	50 tab
Test numbers 54 and 67 do not have a ply drop and are of the thin (4 ply) sections.								
54	109G	103	0.1	10	----	----	65,372	25 tab
67	110G	78	0.1	10	17.8	0.43	11,160,358	25 tab
107	104G	352	*	6	19.6	1.50	1	25 tab
108	105G	358	*	6	20.4	1.75	1	25 tab
Tests 1925 - 1927 used the smaller cross sectional area with no joint.								
1925	200G	-266	*	13	----	----	1	25 tab
1926	201G	-228	*	13	----	----	1	25 tab
1927	202G	-280	*	13	----	----	1	25 tab

MATERIAL H

Lay-up = $[(\pm45/0)_3]_S$, V_F = 0.389, Ave. thickness = 6.58 mm, S.D. = 0.4 mm, Had two center triax plies cut to simulate a butt joint. CoRezyn 63-AX-050 Polyester. Stress, strain and modulus were recorded the on average cross sectional area, no reduction multiplier was used to account for the center cut plies.

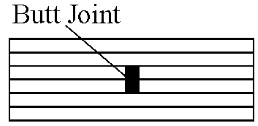


59	101H	429	*	25	25.8	2.24	1	25 tab
60	102H	597	*	25	18.8	2.42	1	25 tab
69	104H	172	0.1	5	25.2	0.68	45,360	25 tab
Tests 71, 72, 73 and 74 did not have a joint in the test gage section								
71	106H	485	*	5	24.6	2.1+	1	25 tab
72	107H	592	*	6	----	----	1	25 tab
73	108H	531	*	6	----	----	1	25 tab
74	109H	598	*	6	----	----	1	25 tab
Test 75 is a transverse test, tested in the $[(\pm45/90)_3]_S$ direction								
75	110HT	47	*	6	----	----	1	25 tab
76	105H	86	0.1	10	28.2	0.30	10,000,000	25 R tab
89	111H	87	0.1	15	23.4	0.43	20,500,167	25 tab
91	113H	207	0.1	1	27.2	0.73	16,137	25 tab
92	114H	131	0.1	10	24.0	0.60	69,425	25 tab
95	115H	162	0.1	10	20.8	0.76	11,417	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
144	121H	103	-1	5	25.0	0.41	1,824,012	25 tab
147	122H	138	-1	5	25.2	0.55	21,713	25 tab
148	117H1	138	-1	5	23.2	0.59	15,930	25 tab
192	116H	-431	*	6	----	----	1	25 tab
193	117H	-425	*	6	----	----	1	25 tab
Tests 221 and 222 involved coupons with a center 13 mm diameter hole, gross section stresses and no joint.								
221	117H2	-262	*	10	----	----	1	50 H tab
222	119H	-153	10	5	----	----	2,400	50 HR tab
235	123H	-138	10	15	25.8	-0.51	19,996	25 tab
Tests 236, 238, 240, 241, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253 do not have a joint								
236	126H	-138	10	20	24.5	-0.38	4,385,009	25 R tab
238	120H	-207	10	15	27.7	----	91,656	25 tab
239	116H	-138	10	15	24.5	-0.56	6,000,000	25 R tab
240	119H	-138	10	20	23.5	-0.58	30,000,000	25 R tab
241	133H	138	0.1	15	----	----	1,401,491	25 tab
242	137H	138	0.1	15	----	----	5,420,000	25 R tab
243	136H	172	0.1	10	----	----	502,598	25 tab
244	131H	172	0.1	10	----	----	1,104,989	25 tab
245	132H	207	0.1	10	24.8	0.86	96,327	25 tab
246	135H	207	0.1	10	25.0	0.83	79,610	25 tab
247	130H	241	0.1	10	25.7	0.95	15,703	25 tab
248	139H	276	0.1	5	23.2	1.20	2,921	25 tab
249	143H	276	0.1	5	27.7	1.04	1,668	25 tab
250	140H	345	0.1	5	23.4	1.53	742	25 tab
251	138H	-207	10	15	26.8	-0.76	4,578	25 tab
252	141H	-207	10	15	24.6	-0.85	3,918	25 tab
253	149H	138	0.1	20	23.8	0.57	8,222,998	25 tab
254	150H	138	0.1	15	----	----	11,500,000	25 R tab
Tests 258, 259 and 260 do not have a joint								
258	118H	707	*	6	24.2	----	1	25 tab
259	150H	734	*	6	27.7	----	1	25 tab
260	151H	744	*	6	28.8	----	1	25 tab
269	125H	446	*	6	24.2	----	1	25 tab
270	128H	438	*	6	25.0	----	1	25 tab
4773	305H	103	-1	4	----	----	530,122	25
4774	302H	103	-1	4	----	----	379,953	25
4775	303H	138	-1	2	----	----	31,448	25

MATERIAL J

Lay-up = $[(0/\pm45)_3]_S$, V_F = 0.386, Ave. thickness = 6.63 mm, S.D. = 0.52 mm, CoRezyn 63-AX-050 Polyester, Stress and strain recorded on average cross sectional area, no multiplier was used to account for the center cut plies.



62	101J	475	*	25	27.0	2.83	1	25 tab
63	102J	398	*	25	23.7	2.60	1	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
68	104J	172	0.1	5	22.8	0.77	17,882	25 tab
70	105J	86	0.1	10	26.2	0.31	11,000,000	25 R tab
81	106J	65	0.1	15	22.6	0.26	18,000,000	25 R tab
82	107J	75	0.1	15	27.3	0.28	30,300,000	25 R tab
93	108J	124	0.1	10	23.1	0.54	153,500	25 R tab
127	110J	103	0.1	15	24.2	0.42	1,460,000	25 tab
194	111J	-403	*	6	----	----	1	25 tab
195	112J	-417	*	6	----	----	1	25 tab
Tests 220 and 223 involved coupons with a center 13 mm diameter hole, gross section stresses and no joint.								
220	113J	-169	*	3	----	----	1	50 H tab
223	114J	-102	10	10	----	----	6,500,000	50 HR tab
Tests 261, 262, 263 do not have a joint								
261	140J	723	*	6	26.3	----	1	25 tab
262	141J	711	*	6	25.7	----	1	25 tab
263	142J	689	*	6	24.2	----	1	25 tab
268	115J	446	*	6	24.5	----	1	25 tab

MATERIAL L

Lay-up = $[0]_3$, V_F = 0.509, Ave. thickness = 2.46 mm, S.D. = 0.26 mm, Polyester

77	101L	410	0.1	1	35.4	1.18	2,580	25 tab
78	103L	406	0.1	1	30.9	1.32	593	25 tab
79	102L	276	0.1	5	31.5	0.87	59,081	25 tab
80	104L	266	0.1	5	29.0	0.97	45,848	25 tab
83	109L	325	0.1	10	34.5	0.91	153,402	25 tab
84	127L	259	0.1	10	32.4	0.93	856,066	25 tab
101	117L	740	*	6	30.8	2.40	1	25 tab
102	119L	745	*	6	36.6	2.21	1	25 tab
196	122L	-325	*	6	----	----	1	25 tab
197	123L	-332	*	6	----	----	1	25 tab
198	125L	-328	*	6	----	----	1	25 tab
199	126L	-351	*	6	----	----	1	25 tab
231	126L	-361	*	6	----	----	1	50 tab
232	127L	-444	*	6	----	----	1	50 tab
233	128L	-416	*	6	----	----	1	50 tab
The following tensile coupons in this material were thickness tapered (versus standard ASTM D3039)								
2926	130L	807	*	13	37.4	2.20	1	25 tab
2927	134L	767	*	13	31.9	2.45	1	25 tab
2928	133L	683	*	13	39.6	1.75	1	25 tab
2929	131L	414	0.1	2	39.4	1.10	1,651	25 tab
2930	106L	414	0.1	2	40.0	1.09	2,814	25 tab
2931	125L	414	0.1	2	43.3	1.03	4,755	25 tab
2932	111L	345	0.1	4	38.5	0.92	14,578	25 tab
2933	135L	345	0.1	4	39.1	0.91	9,731	25 tab
2934	129L	276	0.1	10	38.4	0.74	187,213	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL M

Lay-up = $[0/\pm 45]_4$, V_F = 0.381, Ave. thickness = 3.10 mm, S.D. = 0.10 mm, Vinyl ester

TEST	SAMPLE ID #	MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
129	101M	69	0.1	15	21.4	0.32	17,764,694	50 tab
130	102M	76	0.1	15	21.0	0.36	6,899,599	50 tab
131	104M	525	*	60	21.0	2.62	1	50 tab
132	113M	507	*	60	20.2	2.90	1	50 tab
133	112M	138	0.1	10	21.6	0.66	18,650	50 tab
134	106M	138	0.1	10	21.2	0.66	22,360	50 tab
135	109M	207	0.1	5	19.3	1.12	2,319	50 tab
136	103M	207	0.1	5	19.1	1.12	2,855	50 tab
137	114M	276	0.1	5	20.1	1.43	687	50 tab
138	105M	276	0.1	5	19.2	1.44	879	50 tab
139	115M	103	0.1	15	21.0	0.49	86,249	50 tab
140	107M	103	0.1	15	20.9	0.49	174,168	50 tab
141	118M	86	0.1	15	20.5	0.41	397,000	50 tab
142	110M	86	0.1	15	22.4	0.39	266,000	50 tab
143	108M	76	0.1	15	21.4	0.36	2,498,512	50 tab
200	124M	-275	*	6	----	----	1	25 tab
201	123M	-295	*	6	----	----	1	25 tab
202	122M	-289	*	6	----	----	1	25 tab
203	125M	-284	*	6	----	----	1	25 tab
228	126M	-267	*	3	----	----	1	50 tab
229	127M	-291	*	6	----	----	1	50 tab
230	128M	-301	*	6	----	----	1	50 tab

MATERIAL N

Lay-up = $[0/\pm 45]_4$, V_F = 0.366, Ave. thickness = 3.23 mm, S.D. = 0.08 mm, Polyester

Tests 85 - 88, 96, 105, 106, 109, 110, 114, 3054 were transverse tests, tested in the $[90/\pm 45]_4$ direction

TEST	SAMPLE ID #	MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
85	111NT	86	*	6	----	3.28	1	25 tab
86	101NT	54	0.1	1	8.62	1.34	6,479	25 tab
87	102NT	68	0.1	1	7.86	1.70	470	50 tab
88	104NT	35	0.1	5	8.55	0.45	511,047	50 tab
96	103NT	21	0.1	15	9.10	0.23	34,000,000	50 R tab
103	011N	482	*	6	20.9	2.97	1	25 tab
104	012N	468	*	6	20.9	2.84	1	25 tab
105	113NT	87	*	6	6.90	3.82	1	25 tab
106	114NT	90	*	6	9.17	2.29	1	25 tab
109	111NT	54	0.1	1	8.83	1.15	7,950	50 tab
110	112NT	68	0.1	1	6.69	1.42	711	50 tab
111	117N	388	0.1	1	17.0	2.74	27	25 tab
112	116N	276	0.1	1	18.2	1.63	626	25 tab
113	120N	276	0.1	5	17.3	1.70	811	25 tab
114	114NT	35	0.1	15	8.20	0.42	1,634,579	50 tab
115	118N	207	0.1	5	19.2	1.08	5,684	25 tab
116	119N	207	0.1	5	19.7	1.05	4,871	25 tab
117	010N	138	0.1	10	20.1	0.73	25,371	50 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
118	009N	138	0.1	10	19.5	0.71	25,781	50 tab
119	129N	138	0.1	10	20.4	0.69	37,597	50 tab
120	128N	138	0.1	10	19.2	0.72	29,230	50 tab
121	131N	103	0.1	15	18.4	0.56	231,826	50 tab
122	130N	86	0.1	15	19.8	0.42	1,336,695	50 tab
123	006N	345	0.1	1	19.2	1.82	150	50 tab
124	126N	76	0.1	15	19.7	0.39	1,648,137	50 tab
125	008N	69	0.1	15	19.9	0.34	7,825,000	50 tab
126	121N	103	0.1	15	19.0	0.54	165,980	50 tab
128	127N	69	0.1	15	19.3	0.35	4,005,593	50 tab
145	116N	462	*	60	20.2	2.81	1	50 tab
146	117N	459	*	60	18.9	2.75	1	50 tab
For reversed and compression loading, a gage length of 38 mm was used.								
149	132N	86	-1	5	22.8	0.36	105,505	50 tab
150	133N	86	-1	10	21.5	0.38	240,528	50 tab
151	134N	138	-1	5	21.5	0.61	5,570	50 tab
152	137N	138	-1	5	24.6	0.56	13,337	50 tab
153	135N	69	-1	15	21.9	0.29	1,189,053	50 tab
154	136N	69	-1	15	23.4	0.29	1,282,726	50 tab
155	138N	-138	10	15	23.5	-0.61	1,098,374	50 tab
156	139N	-103	10	20	23.5	-0.44	26,707,000	50 R tab
158	145N	-103	10	20	25.6	-0.41	25,738,868	50 tab
159	140N	-138	10	15	23.5	-0.60	367,505	50 tab
160	143N	-172	10	10	25.0	-0.69	292,181	50 tab
161	142N	-172	10	10	23.7	-0.74	32,227	50 tab
208	151N	-318	*	13	----	----	1	25 tab
209	152N	-334	*	13	----	----	1	25 tab
210	153N	-301	*	13	----	----	1	25 tab
3054	201NT	-131	*	13	----	----	1	25 tab

MATERIAL P

Lay-up = $[0/\pm45/M/0]_S$, V_F = 0.404, Ave. thickness = 3.78 mm, S.D. = 0.23 mm, Vinyl ester

163	108P	612	*	60	28.1	2.73	1	25 tab
164	107P	716	*	60	26.8	2.89	1	25 tab
165	105P	103	0.1	15	23.3	0.44	2,808,490	50 tab
166	108P	103	0.1	15	27.8	0.38	5,985,000	50 tab
168	101P	276	0.1	5	22.1	1.27	7,251	50 tab
169	103P	276	0.1	5	24.6	1.12	6,354	50 tab
170	102P	207	0.1	10	26.1	0.82	38,469	50 tab
171	106P	207	0.1	10	26.3	0.80	28,198	50 tab
172	107P	345	0.1	5	25.9	1.40	1,467	50 tab
173	104P	345	0.1	5	24.0	1.45	1,773	50 tab
174	111P	414	0.1	5	19.0	2.22	296	50 tab
175	112P	138	0.1	15	26.9	0.52	900,000	50 tab
176	126P	674	*	60	28.8	2.60	1	25 tab
177	115P	414	0.1	5	29.1	0.93	216	50 tab
178	113P	138	0.1	15	23.4	0.60	715,000	50 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
179	116P	76	-1	20	29.2	0.26	15,000,000	50 R tab
For reversed and compression loading, a gage length of 38 mm was used.								
204	132P	-288	*	6	----	----	1	25 tab
205	133P	-333	*	6	----	----	1	25 tab
206	136P	-319	*	6	----	----	1	25 tab
207	137P	-343	*	6	----	----	1	25 tab
211	120P	138	-1	10	29.4	0.44	139,604	50 tab
212	123P	207	-1	5	29.5	0.70	938	50 tab
213	121P	207	-1	5	27.2	0.74	1,320	50 tab
214	122P	138	-1	10	28.3	0.46	76,483	50 tab
215	125P	-207	10	10	28.0	-0.63	14,121	50 tab
216	124P	-138	10	20	30.9	-0.40	6,000,000	50 R tab
217	119P	-207	10	10	30.4	-0.63	21,177	50 tab
218	117P	-172	10	20	25.0	-0.82	1,094,359	50 tab
219	118P	-172	10	20	31.4	-0.51	8,020,000	50 R tab
224	119P	-138	10	20	----	----	1,189,000	50 R tab
225	130P	-396	*	3	----	----	1	50 tab
226	131P	-477	*	6	----	----	1	50 tab
227	132P	-526	*	6	----	----	1	50 tab

MATERIAL R

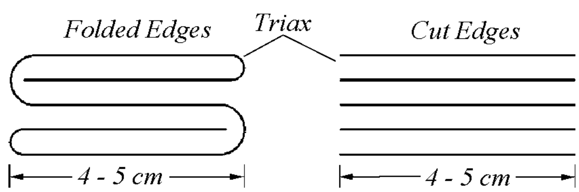
Lay-up = $[0/\pm45]_4$, V_F = 0.300, Ave. thickness = 3.56 mm, S.D. = 0.07 mm, Polyester

237	109R	138	0.1	15	16.0	0.93	8,170,168	50 tab
255	101R	412	*	6	16.6	2.50	1	25 tab
256	102R	427	*	6	16.6	2.63	1	25 tab
257	107R	138	0.1	15	17.0	0.82	7,842,000	50 tab
264	105R	276	0.1	5	14.8	2.13	925	50 tab
265	111R	483	*	6	17.7	3.41	1	50 tab
266	108R	207	0.1	10	16.3	1.31	6,967	50 tab
267	104R	207	0.1	10	16.9	1.31	6,035	50 tab
271	103R	138	0.1	15	15.7	0.90	820,153	50 tab
272	112R	172	0.1	15	17.1	1.0	972,000	50 tab
273	106R	190	0.1	10	----	----	230,233	50 tab
274	110R	190	0.1	10	----	----	115,056	50 tab
276	114R	155	0.1	15	----	----	4,932,613	50 tab
277	118R	345	0.1	1	17.4	2.52	60	50 tab
278	117R	345	0.1	1	----	----	41	50 tab
279	125R	276	0.1	2	----	----	1,072	50 tab
280	126R	207	0.1	7	----	----	17,096	50 tab
281	119R	190	0.1	10	----	----	505,551	50 tab
282	124R	155	0.1	15	----	----	1,942,442	50 tab
284	120R	436	*	6	----	----	1	50 tab
285	121R	426	*	6	----	----	1	50 tab
1928	200R	-287	*	13	----	----	1	25 tab
1929	201R	-297	*	13	----	----	1	25 tab
1930	202R	-286	*	13	----	----	1	25 tab
3080	403R	-317	*	13	----	----	1	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3081	402R	-321	*	13	----	----	1	25 tab
3082	401R	-353	*	13	----	----	1	25 tab
4460	405R	207	0.1	4	----	----	10,713	50 tab
4461	406R	207	0.1	4	----	----	202,846	50 tab
4462	407R	207	0.1	4	----	----	35,270	50 tab
4463	408R	207	0.1	4	----	----	43,407	50 tab
4464	409R	190	0.1	4	----	----	473,815	50 tab
4465	410R	190	0.1	4	----	----	519,652	50 tab
4466	411R	276	0.1	2	----	----	2,473	50 tab

MATERIAL T

Lay-up = $[0/\pm45]_5$, V_F = 0.302, Ave. thickness = 4.34 mm, S.D. = 0.22 mm, Polyester. Materials T, U, V and W involved folded fabric edges (T and U) and cut fabric edges to study coupon edge effects.



1306	T1	366	*	6	----	----	1	50 tab
1307	T2	145	0.1	15	----	----	64,333	50 tab
1308	T3	100	0.1	15	----	----	701,345	50 tab
1309	T5	86	0.1	15	----	----	2,069,625	50 tab
1310	T6	101	0.1	15	----	----	1,731,348	50 tab
1311	T7	145	0.1	10	----	----	56,979	50 tab
1312	T8	107	0.1	15	----	----	615,110	50 tab
1313	T9	369	*	6	----	----	1	50 tab
1916	T200	252	*	13	17.7	3.47	1	25 tab
1917	T201	-313	*	13	----	----	1	25 tab
1918	T202	-267	*	13	----	----	1	25 tab

MATERIAL U

Lay-up = $[0/\pm45]_5$, V_F = 0.273, Ave. thickness = 4.55 mm, S.D. = 0.18 mm, Polyester. Materials T, U, V and W involved folded fabric edges (T and U) and cut fabric edges to study test coupon edge effects.

1314	U1	336	*	6	----	----	1	50 tab
1315	U2	138	0.1	--	----	----	14,573	50 tab
1316	U3	102	0.1	--	----	----	114,237	50 tab
1317	U4	86	0.1	15	----	----	400,500	50 tab
1318	U5	69	0.1	15	----	----	2,278,230	50 tab
1319	U6	102	0.1	15	----	----	178,679	50 tab
1320	U7	69	0.1	10	----	----	2,422,608	50 tab
1321	U8	138	0.1	10	----	----	16,591	50 tab
1322	U9	421	*	6	----	----	1	50 tab
1931	U200	416	*	13	21.2	2.51	1	25 tab
1932	U201	-364	*	13	----	----	1	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1933	U202	-345	*	13	----	----	1	25 tab

MATERIAL V

Lay-up = $[0/\pm45]_5$, V_F = 0.338, Ave. thickness = 3.33 mm, S.D. = 0.30 mm, Polyester. Materials T, U, V and W involved folded fabric edges (T and U) and cut fabric edges to study test coupon edge effects.

1323	V1	460	*	6	19.7	2.4	1	50 tab
1324	V2	489	*	6	19.8	2.5	1	50 tab
1325	V3	138	0.1	5	----	----	28,861	50 tab
1326	V4	138	0.1	5	----	----	35,501	50 tab
1327	V5	172	0.1	1	----	----	11,273	50 tab
1328	V6	172	0.1	1	----	----	12,339	50 tab
1329	V7	103	0.1	10	----	----	123,370	50 tab
1330	V8	103	0.1	10	----	----	111,873	50 tab
1331	V9	86	0.1	15	----	----	950,987	50 tab
1332	V10	86	0.1	15	----	----	871,319	50 tab
1333	V11	69	0.1	15	----	----	7,871,024	50 tab
1334	V15	86	0.1	15	----	----	848,378	50 tab
1335	V16	86	0.1	15	----	----	791,827	50 tab
1336	V17	103	0.1	10	----	----	222,481	50 tab
1337	V18	172	0.1	1	----	----	11,370	50 tab
1338	V20	138	0.1	5	----	----	23,829	50 tab
1339	V27	382	*	6	18.5	2.1	1	25 tab
1340	V30	377	*	6	19.7	1.91	1	25 tab
1341	V31	393	*	6	20.1	1.96	1	25 tab
1919	V200	-363	*	13	----	----	1	25 tab
1920	V201	-392	*	13	----	----	1	25 tab
1921	V202	-383	*	13	----	----	1	25 tab

MATERIAL W

Lay-up = $[0/\pm45]_5$, V_F = 0.327, Ave. thickness = 3.43 mm, S.D. = 0.07 mm, Polyester. Materials T, U, V and W involved folded fabric edges (T and U) and cut fabric edges to study coupon edge effects.

1342	W1	172	0.1	2	19.0	0.91	25,839	50 tab
1343	W2	172	0.1	2	19.1	0.9	30,040	50 tab
1344	W5	138	0.1	10	----	----	311,392	50 tab
1345	W6	138	0.1	10	----	----	154,745	50 tab
1346	W7	103	0.1	15	----	----	5,040,762	50 tab
1347	W8	359	*	6	----	----	1	50 tab
1348	W9	435	*	6	----	----	1	50 tab
1349	W10	121	0.1	10	----	----	502,900	50 tab
1350	W11	121	0.1	10	----	----	1,071,927	50 tab
1351	W12	103	0.1	15	----	----	3,464,238	50 tab
1352	W13	86	0.1	15	----	----	27,537,000	50 R tab
1922	W200	-302	*	13	----	----	1	25 tab
1923	W201	-355	*	13	----	----	1	25 tab
1924	W202	-351	*	13	----	----	1	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL X

Lay-up = $[0_2/M/\pm45/0_2]$, V_F = 0.352, Ave. thickness = 4.52 mm, S.D. = 0.24 mm, Polyester

304	107X	624	*	13	25.6	2.59	1	25 tab
305	102X	595	*	13	23.7	2.51	1	25 tab
306	103X	617	*	13	24.6	2.97	1	25 tab
309	112X	276	0.1	10	23.0	1.26	255,862	25 tab
310	105X	414	0.1	5	25.5	1.76	1,753	25 tab
311	106X	414	0.1	5	23.0	1.86	953	25 tab
312	104X	345	0.1	5	25.9	1.32	15,414	25 tab
313	108X	345	0.1	5	25.2	1.36	11,550	25 tab
314	101X	241	0.1	20	25.4	0.94	6,492,710	25 tab
315	109X	276	0.1	10	26.3	1.06	127,309	25 tab

Tests 316-320, 328, 330-335, 337, 363, 485-489, 1837, 1838 were transverse tests, tested in the $[90_2/M/\pm45/90_2]$ direction

316	116XT	39	*	13	7.7	0.83	1	25 tab
317	118XT	45	*	13	7.6	0.72	1	25 tab
318	117XT	43	*	13	7.9	0.92	1	25 tab
319	119XT	28	0.1	2	9.0	0.28	1,083	25 tab
320	124XT	21	0.1	15	8.3	0.24	50,606	25 tab
321	110X	241	0.1	20	25.0	0.97	5,000,000	25 R tab
322	114X	241	0.1	20	26.0	0.91	21,000,000	25 R tab
323	113X	241	0.1	20	26.7	0.90	20,000,000	25 R tab
327	151X	-241	10	10	27.4	-0.84	3,175,600	25 tab
328	126XT	19	0.1	15	9.1	0.25	614,730	50 tab
329	142X	-207	10	25	26.3	-0.68	21,000,000	25 R tab
330	130XT	19	0.1	10	8.6	0.27	436,440	50 tab
331	132XT	17	0.1	20	8.3	0.21	785,700	50 R tab
332	128XT	17	0.1	20	8.5	0.23	1,132,780	50 R tab
333	134XT	28	0.1	2	8.3	0.37	2,074	50 tab
334	129XT	28	0.1	2	8.4	0.34	1,545	50 tab
335	135XT	17	0.1	20	7.3	0.24	897,103	50 tab
336	144X	-241	10	10	26.7	-0.94	3,500,000	25 R tab
337	133XT	14	0.1	15	8.0	0.19	10,377,400	50 tab
363	131XT	14	0.1	15	8.0	0.17	11,247,700	50 tab
378	159X	-435	*	13	25.0	-1.74	1	25 Z
379	158X	-430	*	13	26.8	-1.70	1	25 Z
380	165X	-450	*	13	26.1	-1.98	1	25 Z
381	161X	-310	10	2	23.4	-1.41	12,455	25 Z
382	164X	-310	10	2	25.7	-1.37	12,865	25 Z
383	157X	-276	10	5	24.8	-1.20	271,161	25 Z
384	160X	-276	10	5	24.2	-1.07	333,581	25 Z
385	156X	-276	10	10	25.9	-1.10	161,397	25 Z
386	162X	-241	10	10	26.1	-0.93	1,472,970	25 Z
482	139X	414	0.1	5	25.6	1.67	1,223	25 tab
483	152X	345	0.1	5	25.7	1.45	11,786	25 tab
484	153X	276	0.1	10	26.6	1.06	169,031	25 tab
485	136XT	24	0.1	5	9.3	0.26	21,745	50 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
486	123XT	24	0.1	5	9.0	0.25	15,040	50 tab
487	125XT	47	*	13	10.1	0.52	1	25 tab
488	120XT	24	0.1	5	10.1	0.24	18,858	25 tab
489	121XT	19	0.1	10	9.5	0.22	587,181	25 tab
705	177X	-310	10	2	24.5	1.39	14,129	25 tab
1837	201XT	-170	*	13	----	----	1	25 tab
1838	127XT	-149	*	13	----	----	1	25 tab

MATERIAL Y

Lay-up = $[0_2/M/\pm45/0_2]$, V_F = 0.345, Ave. thickness = 4.62 mm, S.D. = 0.48 mm, Epoxy

286	111Y	583	*	100	23.1	2.72	1	25 tab
287	117Y	591	*	100	21.3	3.12	1	25 tab
288	105Y	611	*	100	22.5	2.91	1	25 tab
289	112Y	276	0.1	25	27.4	0.53	251,141	25 tab
290	108Y	207	0.1	25	24.4	0.79	1,412,113	25 tab
291	118Y	345	0.1	15	23.6	1.33	23,109	25 tab
292	113Y	345	0.1	15	25.9	1.28	18,000	25 tab
293	104Y	345	0.1	15	23.9	1.24	16,762	25 tab
294	116Y	414	0.1	4	27.2	1.83	628	25 tab
295	106Y	276	0.1	25	25.1	1.11	73,530	25 tab
296	102Y	414	0.1	4	22.4	1.71	821	25 tab
297	107Y	276	0.1	25	20.8	1.27	128,578	25 tab
298	115Y	276	0.1	25	20.4	0.93	237,864	25 tab
299	119Y	207	0.1	25	25.9	0.77	1,607,127	25 tab
300	114Y	661	*	13	24.3	2.80	1	25 tab
301	110Y	687	*	13	28.1	2.54	1	25 tab
302	109Y	620	*	13	24.2	2.56	1	25 tab
303	101Y	207	0.1	15	25.3	0.87	15,000,000	25 R tab
481	170Y	-276	10	5	24.3	1.13	62,517	25 tab
490	125Y	414	0.1	4	29.7	1.70	1,486	25 tab
491	121Y	345	0.1	5	29.7	1.54	36,812	25 tab
493	123Y	276	0.1	5	28.7	1.01	423,059	25 tab
494	127Y	207	0.1	15	26.6	0.86	10,000,000	25 R tab

Tests 495 - 512, 1839 - 1841 were transverse tests tested in the $[90_2/M/\pm45/90_2]$ direction

495	141YT	29	*	13	7.7	0.67	1	50 tab
496	145YT	29	*	13	7.5	0.79	1	50 tab
497	146YT	30	*	13	6.8	0.85	1	50 tab
498	152YT	21	0.1	2	7.1	0.48	4,103	50 tab
499	144YT	21	0.1	2	7.0	0.41	2,716	50 tab
500	147YT	17	0.1	10	6.5	0.34	26,513	50 tab
501	143YT	17	0.1	10	7.5	0.29	47,049	50 tab
502	140YT	24	0.1	1	7.2	1.35	208	50 tab
503	151YT	24	0.1	1	7.1	1.22	277	50 tab
504	148YT	14	0.1	15	6.9	0.25	252,205	50 tab
505	142YT	14	0.1	15	6.3	0.22	432,161	50 tab
506	149YT	14	0.1	15	6.9	0.20	657,472	50 tab
507	157YT	24	0.1	1	7.2	1.37	173	50 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
508	153YT	21	0.1	2	6.6	0.37	2,033	50 tab
509	155YT	17	0.1	10	6.6	0.26	31,204	50 tab
510	159YT	33	*	13	7.6	----	1	50 tab
511	161YT	32	*	13	7.5	----	1	50 tab
512	160YT	35	*	13	7.5	----	1	50 tab
543	168Y	-391	*	13	----	----	1	25
544	181Y	-389	*	13	----	----	1	25
545	176Y	-341	*	13	----	----	1	25
546	171Y	-369	*	13	----	----	1	25
547	172Y	-276	10	10	----	----	87,235	25
548	167Y	-310	10	5	----	----	354	25
549	166Y	-241	10	20	21.5	1.18	4,000,000	25 R
492	170Y	-276	10	5	24.3	1.13	62,517	25
686	193Y	-329	*	13	----	----	1	25 Z
687	182Y	-359	*	13	----	----	1	25 Z
688	184Y	-355	*	13	----	----	1	25 Z
689	178Y	-310	10	2	----	----	568	25 Z
690	197Y	-293	10	2	----	----	12,145	25 Z
691	200Y	-293	10	5	----	----	3,011	25 Z
692	190Y	-293	10	2	----	----	4,652	25 Z
693	187Y	-310	10	2	----	----	672	25 Z
694	199Y	-276	10	10	----	----	187,512	25 Z
695	196Y	-483	*	25	----	----	1	25
696	193Y	-450	*	25	----	----	1	25
697	192Y	-431	*	25	----	----	1	25
699	201Y	-258	10	15	----	----	632,624	25
701	173Y	-258	10	15	23.9	-1.09	833,939	25
702	169Y	-258	10	15	26.3	-0.98	1,477,548	25
706	195Y	-241	10	20	----	----	1,672,575	25
1839	201YT	-95	*	13	----	----	1	25 tab
1840	202YT	-116	*	13	----	----	1	25 tab
1841	203YT	-112	*	13	----	----	1	25 tab

MATERIAL EE

Lay-up = $[M/\pm45/0]_S$, V_F = 0.541, Ave. thickness = 3.53 mm, S.D. = 0.10 mm, Epoxy, Coupons taken from a pultruded blade section.

1178	EE101	565	*	13	28.8	2.23	1	20 tab
1179	EE102	546	*	13	34.5	1.76	1	20 tab
1180	EE103	518	*	13	30.7	1.78	1	20 tab
1181	EE104	345	0.1	2	32.1	1.14	570	20 tab
1182	EE112	310	0.1	4	29.2	1.07	1,085	20 tab
1183	EE105	276	0.1	5	30.1	0.93	4,076	20 tab
1184	EE111	207	0.1	10	32.8	0.65	34,583	20 tab
1185	EE110	138	0.1	20	33.2	0.43	1,857,630	20 tab
1186	EE107	345	0.1	2	----	----	402	13 tab
1187	EE109	276	0.1	5	----	----	2,936	13 tab
1188	EE108	310	0.1	5	----	----	2,033	13 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1189	EE106	207	0.1	10	----	----	23,385	13 tab
1190	EE119	310	0.1	5	----	----	1,840	13 tab
1191	EE121	276	0.1	5	----	----	2,377	13 tab
1192	EE114	207	0.1	10	----	----	58,110	13 tab
1193	EE115	172	0.1	15	----	----	496,094	13 tab
1194	EE120	172	0.1	15	----	----	287,688	13 tab
1195	EE125	241	0.1	5	----	----	10,021	13 tab
1196	EE126	241	0.1	5	----	----	8,786	13 tab
1197	EE116	172	0.1	20	----	----	224,138	13 tab
1198	EE128	-546	*	13	----	----	1	13 tab
1199	EE129	-550	*	13	----	----	1	13 tab
1200	EE113	138	0.1	20	----	----	3,804,099	13 tab
1201	EE131	-519	*	13	----	----	1	13 tab
1202	EE118	138	0.1	20	----	----	4,622,485	13 tab
1203	EE128	510	*	13	----	----	1	13 tab

MATERIAL EEAV

Lay-up = $[M/\pm45/0]_S$, V_F = 0.480, Ave. thickness = 3.36 mm, S.D. = 0.24 mm, Vinyl ester, Coupons taken from a pultruded blade section.

2716	EEAV105	619	*	13	29.0	2.47	1	20
2717	EEAV106	559	*	13	26.3	2.31	1	20
2718	EEAV101	569	*	13	26.6	2.33	1	20
2719	EEAV107	345	0.1	2	29.0	1.30	1,836	20
2720	EEAV109	345	0.1	2	28.1	1.31	3,260	20
2721	EEAV103	276	0.1	5	27.7	1.01	27,047	20
2722	EEAV108	276	0.1	5	29.2	1.01	43,424	20
2723	EEAV102	207	0.1	12	27.2	0.79	2,414,147	20
2724	EEAV144	207	0.1	20	28.6	0.74	1,366,767	20
2725	EEAV143	345	0.1	4	28.9	1.29	2,811	20
2726	EEAV145	276	0.1	5	29.8	1.00	35,462	20
2737	EEAV114	-657	*	13	----	----	1	25
2738	EEAV125	-666	*	13	----	----	1	25
2739	EEAV110	-614	*	13	----	----	1	25
2746	EEAV124	-448	10	5	----	----	7,498	25
2747	EEAV126	-448	10	5	----	----	5,539	25
2748	EEAV111	-448	10	5	----	----	3,169	25
2749	EEAV115	-345	10	20	----	----	5,000,000	25 R
2750	EEAV113	-396	10	12	----	----	93,149	25
2751	EEAV112	-396	10	12	----	----	38,280	25
2752	EEAV117	-396	10	12	----	----	72,451	25
2753	EEAV116	207	-1	5	----	----	145,367	25
2754	EEAV122	207	-1	10	----	----	231,003	25
2755	EEAV123	276	-1	2	----	----	1,866	25
2756	EEAV121	276	-1	2	----	----	3,412	25
2757	EEAV120	276	-1	2	----	----	2,875	25
2758	EEAV119	207	-1	5	----	----	92,539	25
2759	EEAV118	190	-1	10	----	----	74,105	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Tests 2760 - 2765 were transverse tests tested in the $[M/\pm45/90]_S$ direction								
2760	EEAV204T	76	*	13	15.9	0.48	1	25
2761	EEAV203T	81	*	13	14.6	0.63	1	25
2762	EEAV201T	86	*	13	14.2	0.71	1	25
2763	EEAV205T	-195	*	13	----	----	1	25
2764	EEAV206T	-197	*	13	----	----	1	25
2765	EEAV207T	-192	*	13	----	----	1	25

MATERIAL EEAP

Lay-up = $[M/\pm45/0]_S$, V_F = 0.490, Ave. thickness = 3.64 mm, S.D. = 0.10 mm, Polyester, Coupons taken from a pultruded blade section.

2797	EEAP101	505	*	13	29.5	2.0	1	20
2798	EEAP106	501	*	13	27.8	2.1	1	20
2799	EEAP109	529	*	13	30.2	2.0	1	20
2800	EEAP112	345	0.1	2	30.0	1.15	1,958	20
2801	EEAP102	345	0.1	2	27.0	1.20	890	20
2802	EEAP108	345	0.1	2	29.1	1.24	573	20
2803	EEAP111	276	0.1	4	31.2	0.90	9,912	20
2804	EEAP105	276	0.1	5	27.6	1.04	17,575	20
2805	EEAP104	276	0.1	5	29.2	1.03	15,403	20
2806	EEAP103	207	0.1	15	28.8	0.74	1,596,779	20
2807	EEAP110	207	0.1	15	28.3	0.73	2,483,304	20
2809	EEAP122	-716	*	13	----	----	1	25
2810	EEAP119	-750	*	13	----	----	1	25
2811	EEAP125	-721	*	13	----	----	1	25
2812	EEAP123	-448	10	4	----	----	6,703	25
2813	EEAP121	-448	10	4	----	----	16,229	25
2814	EEAP124	-448	10	4	----	----	18,158	25
2815	EEAP118	-396	10	10	----	----	110,507	25
2816	EEAP116	-396	10	10	----	----	140,415	25
2817	EEAP115	-362	10	10	----	----	696,647	25
2818	EEAP120	-396	10	10	----	----	59,096	25
2819	EEAP130	-362	15	15	----	----	1,445,447	25

MATERIAL EEBP

Lay-up = $[M/\pm45/0]_S$, V_F = 0.430, Ave. thickness = 2.90 mm, S.D. = 0.04 mm, Vinyl ester, Coupons taken from a pultruded blade section.

2727	EEB103	512	*	13	27.8	2.1	1	20
2728	EEB101	513	*	13	27.5	2.3	1	20
2729	EEB102	520	*	13	27.5	2.2	1	20
2730	EEB105	276	0.1	5	24.6	1.21	8,392	20
2731	EEB108	276	0.1	5	25.2	1.22	11,375	20
2732	EEB106	345	0.1	2	27.5	1.40	504	20
2733	EEB107	345	0.1	2	26.1	1.44	358	20
2734	EEB109	207	0.1	10	26.8	0.81	365,195	20
2735	EEB104	207	0.1	12	27.5	0.80	462,172	20

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2736	EEB141	276	0.1	4	25.8	1.20	12,141	20
2740	EEB125	-412	*	13	----	----	1	25
2741	EEB126	-449	*	13	----	----	1	25
2742	EEB112	-390	*	13	----	----	1	25

MATERIAL EECP

Lay-up = $[M/\pm45/0]_S$, V_F = 0.490, Ave. thickness = 2.48 mm, S.D. = 0.10 mm, Vinyl ester, Coupons taken from a pultruded blade section.

2703	EEC123	546	*	13	27.4	2.4	1	20
2704	EEC122	505	*	13	29.8	2.1	1	20
2705	EEC132	526	*	13	27.9	2.2	1	20
2706	EEC133	345	0.1	2	29.5	1.35	257	20
2707	EEC128	345	0.1	2	27.5	1.41	149	20
2708	EEC131	345	0.1	2	28.6	1.49	86	20
2709	EEC126	276	0.1	4	28.4	1.07	5,070	20
2710	EEC125	276	0.1	4	28.9	1.04	2,474	20
2711	EEC130	276	0.1	4	27.3	1.08	3,114	20
2712	EEC118	207	0.1	10	28.0	0.77	285,157	20
2713	EEC120	207	0.1	10	29.0	0.77	141,150	20
2714	EEC129	207	0.1	10	29.4	0.76	159,441	20
2715	EEC127	172	0.1	20	27.1	0.68	1,293,553	20
2743	EEC136	-434	*	13	----	----	1	25
2744	EEC101	-436	*	13	----	----	1	25
2745	EEC143	-387	*	13	----	----	1	25

MATERIAL HH

Lay-up = Injected short carbon fiber (7 to 9 μm diameter fibers, 0.4 - 0.5 mm long,) reinforced thermoplastic, V_F = 0.21, Ave. thickness = 2.50 mm, S.D. = 0.04 mm. Poisson's ratio (XY) = 0.37. Test coupons taken from actual wind turbine blades.

6200	HH20	103	0.1	8	—	0.53	209,271	4
6201	HH21	89.6	0.1	12	—	0.46	2,507,380	4
6202	HH22	103	0.1	8	—	0.53	111,847	4
6203	HH23	96.5	0.1	7	—	0.49	334,368	4
6204	HH24	103	0.1	6	—	0.53	36,708	4
6205	HH25	96.5	0.1	7	—	0.49	509,773	4
6206	HH26	96.5	0.1	8	—	0.49	123,724	4
6207	HH27	103	0.1	6	—	0.53	56,674	4
6208	HH28	89.6	0.1	4	—	0.46	640,960	4
6209	HH29	110	0.1	2	—	0.56	14,595	4
6210	HH30	110	0.1	2	—	0.56	7,763	4
6211	HH31	110	0.1	2	—	0.56	1,558	4
6212	HH32	103	0.1	5	—	0.53	53,583	4
6213	HH33	89.6	0.1	8	—	0.46	241,297	4
6214	HH10	137	*	0.02	19.6	0.99	1	4
6215	HH11	140	*	0.02	21.7	1	1	4
6216	HH12	141	*	0.02	17.9	1.16	1	4

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6217	HH13	150	*	0.02	18.3	1.33	1	4
6218	HH14	165	*	0.02	20.5	1.42	1	4
6219	HH34	142	*	0.02	18.8	1.11	1	4
6220	HH35	152	*	0.02	19.7	1.23	1	4
6221	HH36	120	*	0.02	18.7	0.88	1	4
6222	HH37	139	*	0.02	20.7	0.92	1	4
6223	HH38	128	*	0.02	19.2	0.88	1	4
6224	HH39	139	*	0.02	21.1	1.00	1	4
6225	HH40	142	*	0.02	20.3	1.04	1	4
6226	HH41	150	*	0.02	19.4	1.27	1	4
6227	HH42	137	*	0.02	17.2	1.08	1	4
6228	HH43	128	*	0.02	18.0	1.02	1	4
6229	HH44	142	*	0.02	19.4	1.17	1	4
6230	HH45	137	*	0.02	22.8	0.92	1	4
6231	HH46	137	*	0.02	20.8	1.03	1	4
6232	HH47	139	*	0.02	19.4	1.07	1	4
6233	HH48	132	*	0.02	17.2	1.14	1	4
6234	HH49	142	*	0.02	21.4	0.99	1	4

MATERIAL CYC

Lay-up = $[(\pm 45)_2/(0)_{10}]_S$, (83% zero's) V_F = 0.65, Hexcel Carbon AS4C fibers, Ave. thickness = 3.54 mm, S.D. = 0.06 mm, Thermoplastic, Polybutylene Terephthalate

8923	66-103	-652	*	13	----	----	1	25
8924	66-106	-642	*	13	----	----	1	25
8925	66-108	-706	*	13	----	----	1	25
8926	66-109	-671	*	13	----	----	1	25
8927	73-120	-552	10	1	----	----	2,196	25
8928	73-121	-552	10	1	----	----	470	25
8929	73-122	-552	10	1	----	----	191	25
8930	73-123	-483	10	2	----	----	15,647	25
8931	73-124	-448	10	8	----	----	4,000,000	25 R
8932	71-100	-483	10	2	----	----	9,936	25
8933	71-101	-448	10	8	----	----	6,000,000	25 R
8934	71-102	-483	10	2	----	----	45,241	25
8935	71-103	-552	10	1	----	----	703	25
8936	71-104	-483	10	2	----	----	27,246	25
8937	61-7	1154+	*	0.02	98.4	1.17	1	15
8938	75-1	1086+	*	0.02	105	1.04	1	15
8939	75-2	1255+	*	0.02	105	1.20	1	15
8940	65-103	1022+	*	0.02	91.8	1.10	1	20
8941	65-101	1094+	*	0.02	108	1.01	1	20
8942	65-102	1528	*	0.02	108	1.50	1	20
8943	61-1T	64.5	*	13	12.7	0.51	1	25 transverse
8944	61-3T	64.6	*	13	12.6	0.51	1	25 transverse
8945	61-4T	69.4	*	13	11.4	0.61	1	25 transverse

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL MM1

Lay-up = [0_N], V_F = 0.55, Infusion, Sections from spar caps, Epoxy

8955	MM1-105	1046	*	13	39.2	2.61	1	25
8956	MM1-104	1060	*	13	39.7	2.65	1	25
8957	MM1-106	1002	*	13	41.5	2.50	1	25
8958	MM1-110	621	0.1	1	43.0	1.44	1,787	25
8959	MM1-108	621	0.1	1	38.0	1.66	1,971	25
8960	MM1-103	621	0.1	1	36.9	1.77	1,990	25
8961	MM1-109	517	0.1	1	39.5	1.34	8,754	25
8961	MM1-107	517	0.1	1	39.7	1.29	5,967	25
8963	MM1-111	517	0.1	1	----	----	11,051	25
8964	MM1-100	345	0.1	2	43.5	0.80	279,554	25
8965	MM1-113	345	0.1	2	39.3	0.86	206,631	25
8966	MM1-112	345	0.1	2	40.6	0.87	358,126	25
8967	MM1-102	310	0.1	2	39.9	0.78	817,702	25

MATERIAL MM2

Lay-up = [0_N], V_F = 0.53, Wet lay-up, Sections from spar caps, Epoxy

8968	MM2-111	957	*	13	40.3	2.38	1	25
8969	MM2-107	912	*	13	38.4	2.27	1	25
8970	MM2-108	904	*	13	41.1	2.25	1	25
8971	MM2-110	621	0.1	1	41.8	1.49	280	25
8972	MM2-109	621	0.1	1	38.2	1.60	334	25
8973	MM2-114	621	0.1	1	----	----	391	25
8974	MM2-106	552	0.1	1	42.9	1.30	2,231	25
8975	MM2-104	517	0.1	1	39.6	1.34	2,432	25
8976	MM2-112	517	0.1	1	38.2	1.37	1,940	25
8977	MM2-101	517	0.1	1	40.9	1.30	6,008	25
8978	MM2-113	483	0.1	1	42.4	1.16	6,720	25
8979	MM2-119	483	0.1	1	40.1	1.20	16,313	25
8980	MM2-118	414	0.1	1	41.4	0.98	49,724	25
8981	MM2-116	414	0.1	1	38.6	1.07	65,894	25
8982	MM2-105	414	0.1	1	41.6	1.02	35,734	25
8983	MM2-117	345	0.1	2	39.4	0.87	373,374	25
8984	MM2-102	345	0.1	2	37.4	0.94	974,498	25
8985	MM2-115	345	0.1	2	37.3	0.93	450,026	25

SUMMARY OF MSU MANUFACTURED MATERIAL FATIGUE TESTS

MATERIAL AA

Lay-up = $[(\pm45/0)_2, (\pm45/0),(\pm45/0)_2]$, V_F = 0.315, Ave. thickness = 4.37 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

TEST &	SAMPLE ID #	MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
339	101AA	443	*	13	17.3	2.73	1	25 tab
340	102AA	453	*	13	16.7	2.90	1	25 tab
341	103AA	448	*	13	17.0	2.82	1	25 tab
342	104AA	387	*	13	16.7	2.81	1	25 tab
343	110AA	241	0.1	5	16.9	1.53	1,741	25 tab
344	111AA	241	0.1	5	17.5	1.61	1,459	25 tab
345	106AA	172	0.1	10	17.9	1.08	11,293	25 tab
346	108AA	172	0.1	10	16.8	1.12	14,316	25 tab
347	109AA	103	0.1	20	17.0	0.63	366,798	25 tab
348	105AA	138	0.1	15	18.1	0.82	81,207	25 tab
349	107AA	241	0.1	15	17.3	1.65	1,051	25 tab
350	112AA	103	0.1	20	16.8	0.64	352,093	25 tab
351	116AA	138	0.1	20	16.7	0.90	55,485	25 tab
352	113AA	138	0.1	15	16.9	0.86	65,926	25 tab
353	123AA	-288	*	13	17.1	-1.06	1	25 tab
354	129AA	-284	*	13	18.4	-1.02	1	25 tab
355	119AA	-310	*	13	19.2	-0.90	1	25 tab
356	122AA	-138	10	15	20.1	-0.68	4,658,000	25 R tab
357	126AA	-241	10	5	18.8	-1.36	8,700	25 tab
358	118AA	-241	10	5	19.9	-1.24	9,419	25 tab
359	128AA	-207	10	10	19.2	-1.31	64,783	25 tab
360	127AA	-207	10	10	19.3	-1.36	75,000	25 tab
361	121AA	-172	10	15	20.0	-0.91	5,000,000	25 R tab
362	124AA	-172	10	10	18.2	-0.91	3,477,199	25 tab
364	134AA	-327	*	13	19.4	-1.75	1	25 Z tab
365	133AA	-347	*	13	17.7	-2.00	1	25 Z tab
366	137AA	-366	*	13	19.1	----	1	25 Z tab
367	132AA	-276	10	3	19.6	-1.60	547	25 Z tab
368	131AA	-276	10	3	18.3	-1.61	462	25 Z tab
369	135AA	-241	10	5	----	----	5,973	25 Z tab
370	125AA	-190	10	10	18.3	-1.23	167,058	25 Z tab
371	120AA	-190	10	10	18.4	-1.04	139,700	25 ZR tab

The following coupons with a 13 mm diameter hole are listed using the NET area stress. These coupons (excluding the "#" tests) had an average hole diameter of 13.0 mm and a standard deviation of 0.4 mm.

372	141AA	207	0.1	13	18.3	0.83	1,200	50 HR tab
373	130AA	-190	10	5	----	----	151,283	25 Z tab
374	143AA	164	0.1	20	17.8	0.75	4,000	50 RH tab
375	145AA	121	0.1	5	19.7	0.48	42,000	50 RH tab
376	146AA	121	0.1	10	18.8	0.49	34,500	50 RH tab
377	144AA	103	0.1	15	19.7	0.40	97,692	50 H tab
387	150AA	444	*	13	19.4	2.04	1	25
388	152AA	468	*	13	17.9	2.47	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

Tests listed with a “#” indicate coupons post cured at 120 °C rather than the standard 60 °C. The average hole diameter for the tests with a “#” was 12.86 mm with a standard deviation of 0.41 mm.

389	153AA	373	*	13	19.7	2.70	1	50 H#
390	161AA	369	*	13	20.5	2.80	1	50 H#
391	160AA	370	*	13	21.6	2.60	1	50 H#
392	159AA	241	0.1	2	19.8	1.18	328	50 H#
393	157AA	241	0.1	2	20.9	1.11	270	50 H#
394	156AA	172	0.1	5	19.7	0.86	5,032	50 H#
395	155AA	172	0.1	5	20.4	0.75	4,620	50 H#
396	158AA	138	0.1	5	20.2	0.64	19,409	50 H#
397	154AA	138	0.1	5	20.3	0.66	24,375	50 H#
398	163AA	103	0.1	15	21.3	0.49	168,606	50 H#
399	164AA	103	0.1	15	21.2	0.48	154,275	50 H#
400	167AA	241	0.1	2	17.4	1.36	392	50 H#
401	165AA	172	0.1	5	17.9	0.91	2,163	50 H#
402	182AA	352	*	13	----	----	1	50 H
403	181AA	350	*	13	18.7	2.31	1	50 H
404	168AA	353	*	13	18.3	2.57	1	50 H
405	169AA	103	0.1	15	20.2	0.41	100,806	50 H
406	166AA	172	0.1	2	18.8	0.86	2,030	50 H
407	184AA	241	0.1	2	19.7	1.14	280	50 H
408	183AA	86	0.1	20	18.9	0.46	355,500	50 H

Tests involving compression or reversed loading used a 25 mm gage length

409	170AA	-205	*	13	19.8	-1.38	1	50 H
410	185AA	86	0.1	20	18.3	0.37	395,450	50 H
411	173AA	-257	*	13	20.8	-1.30	1	50 HZ
412	175AA	-257	*	13	19.5	-1.25	1	50 HZ
413	178AA	-243	*	13	20.0	-1.23	1	50 HZ
414	176AA	-207	10	2	19.9	-0.98	483	50 HZ
415	180AA	-138	10	5	19.0	-0.52	39,859	50 HZ
416	188AA	103	0.1	20	18.9	0.57	289,500	25 tab
417	185AA	103	0.1	25	16.6	0.62	252,137	25 tab
418	162AA	86	0.1	20	22.6	0.44	152,641	50 H#
419	190AA	138	0.1	5	17.2	0.68	7,527	50 H
420	189AA	138	0.1	5	17.3	0.66	7,294	50 H
421	192AA	-207	10	2	19.4	-0.70	508	50 HZ
422	196AA	-138	10	5	20.8	-0.45	45,064	50 HZ
423	187AA	86	0.1	10	19.8	0.46	1,097,890	25 tab
424	197AA	86	0.1	15	16.5	0.54	1,110,190	25 tab
425	171AA	-207	10	10	18.7	-1.08	59,130	25 Z
426	191AA	-207	10	2	19.8	-0.69	446	50 HZ
427	193AA	-138	10	5	20.0	-0.48	45,833	50 HZ
428	194AA	-172	10	5	18.3	-0.66	8,338	50 HZ
429	202AA	-371	*	13	17.9	-2.41	1	25 Z
430	203AA	-327	*	13	19.0	-2.20	1	25 Z
431	195AA	-172	10	10	18.6	-0.64	5,439	50 HZ
432	204AA	-190	10	10	18.1	-1.05	172,910	25 Z
433	200AA	-121	10	10	19.2	-0.46	1,400,699	50 HZ
434	186AA	86	0.1	20	19.2	0.46	1,063,690	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
435	205AA	-190	10	25	16.9	-1.11	240,000	25 Z
436	198AA	-121	10	15	15.2	-0.48	820,290	50 HZ
437	187AA	172	0.1	10	16.6	1.04	17,149	25 tab
438	209AA	241	0.1	2	16.9	1.43	187	50 H
439	210AA	103	0.1	15	16.7	0.62	61,628	50 H
440	207AA	172	0.1	10	18.1	0.72	2,757	50 H
441	211AA	172	0.1	5	18.9	0.76	2,700	50 H
442	206AA	138	0.1	5	17.8	0.63	9,650	50 H
443	208AA	86	0.1	15	17.9	0.45	276,248	50 H
444	213AA	241	0.1	2	18.6	1.15	237	50 H
445	218AA	-276	10	1	18.1	-1.56	380	25 Z
446	238AA	-241	10	5	18.6	-1.29	11,145	25 Z
447	199AA	-172	10	5	21.3	-0.64	7,345	50 HZ
449	240AA	207	-1	1	19.0	1.38	195	25 Z
450	230AA	207	-1	1	20.8	1.22	191	25 Z
451	239AA	190	-1	2	17.9	1.27	296	25 Z
452	232AA	172	-1	1	17.4	1.07	509	25 Z
453	221AA	172	-1	1	18.3	1.01	438	25 Z
454	216AA	138	-1	1	19.0	0.78	1,850	25 Z
455	217AA	138	-1	1	17.3	0.86	2,493	25 Z
456	241AA	190	-1	1	17.9	1.40	232	25 Z
457	136AA	138	-1	1	----	----	1,897	25 Z tab
458	224AA	138	-1	1	19.6	0.51	753	50 HZ
459	231AA	86	-1	1	21.8	0.28	33,341	50 HZ
460	222AA	172	-1	1	16.3	0.71	160	50 HZ
461	228AA	172	-1	1	21.7	0.58	218	50 HZ
462	227AA	172	-1	1	22.7	0.55	176	50 HZ
463	229AA	138	-1	1	19.7	0.49	860	50 HZ
464	225AA	138	-1	1	20.5	0.50	891	50 HZ
465	223AA	103	-1	1	20.1	0.39	8,513	50 HZ
466	236AA	103	-1	1	19.7	0.37	8,262	50 HZ
467	235AA	86	-1	1	22.0	0.29	33,347	50 HZ
468	237AA	103	-1	1	19.1	0.34	11,756	50 HZ
469	242AA	207	-1	1	19.0	1.20	168	25 Z tab
470	226AA	190	-1	1	18.0	1.17	208	25 Z tab
471	242AA	172	-1	1	18.4	1.08	376	25 Z tab
472	220AA	103	-1	1	18.6	0.58	25,488	25 Z tab
473	219AA	103	-1	1	18.8	0.57	21,992	25 Z tab
474	234AA	86	-1	2	19.2	0.32	56,945	50 HZ
475	233AA	-121	10	10	20.5	-0.57	10,000	50 HZ R
476	274AA	-190	10	15	18.5	-1.23	153,542	25 Z tab
477	115AA	86	-1	5	18.8	0.45	456,549	25 tab
478	117AA	86	-1	5	17.4	0.49	187,649	25 tab
479	269AA	86	-1	5	20.5	0.44	236,152	25
480	271AA	103	-1	2	18.5	0.56	34,956	25
Tests 513 - 527 involved a gage length of 76 mm (volume effect tests).								
513	275AA	506	*	13	22.8	2.25	1	25
514	276AA	510	*	13	21.6	2.36	1	25
515	277AA	518	*	13	22.1	2.35	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
516	278AA	524	*	13	22.5	2.34	1	25
517	279AA	517	*	13	21.9	2.37	1	25
518	280AA	552	*	13	23.0	2.40	1	25
519	281AA	530	*	13	23.5	2.26	1	25
520	282AA	540	*	13	22.4	2.41	1	25
521	283AA	491	*	13	22.4	2.20	1	25
522	284AA	557	*	13	23.7	2.35	1	25
523	285AA	536	*	13	22.8	2.35	1	25
524	286AA	542	*	13	23.3	2.32	1	25
525	287AA	506	*	13	24.0	2.10	1	25
526	288AA	512	*	13	21.4	2.39	1	25
527	289AA	507	*	13	23.0	2.21	1	25
Tests 528 - 542 involved a gage length of 38 mm and a coupon width of 13 mm (volume effect tests).								
528	296AA	476	*	6	21.1	2.24	1	13
529	301AA	511	*	6	22.6	2.27	1	13
530	293AA	479	*	6	21.9	2.19	1	13
531	299AA	579	*	6	23.7	2.75	1	13
532	298AA	501	*	6	22.3	2.25	1	13
533	304AA	500	*	6	22.7	2.21	1	13
534	297AA	554	*	6	25.9	2.29	1	13
535	290AA	526	*	6	22.1	2.39	1	13
536	303AA	513	*	6	23.7	2.17	1	13
537	295AA	543	*	6	23.7	2.30	1	13
538	291AA	498	*	6	23.2	2.14	1	13
539	300AA	484	*	6	24.0	2.02	1	13
540	292AA	478	*	6	23.2	2.05	1	13
541	294AA	517	*	6	22.1	2.33	1	13
542	302AA	538	*	6	23.2	2.10	1	13
Tests 550 - 565 involved a gage length of 114 mm and a coupon width of 38 mm (volume effect tests).								
550	306AA	551	*	19	22.0	2.60	1	38
551	310AA	537	*	19	20.8	2.59	1	38
552	314AA	539	*	19	21.2	2.54	1	38
553	312AA	578	*	19	23.9	2.43	1	38
554	307AA	534	*	19	22.4	2.39	1	38
555	318AA	539	*	19	21.4	2.52	1	38
556	316AA	530	*	19	21.9	2.42	1	38
557	320AA	509	*	19	22.3	2.28	1	38
558	308AA	584	*	19	22.8	2.56	1	38
559	315AA	541	*	19	23.0	2.35	1	38
560	305AA	559	*	19	23.0	2.43	1	38
561	311AA	548	*	19	21.5	2.54	1	38
562	319AA	555	*	19	21.4	2.59	1	38
563	313AA	519	*	19	21.2	2.45	1	38
564	309AA	552	*	19	22.6	2.45	1	38
565	336AA	529	*	19	20.8	2.54	1	38
Tests 566 - 580 involved a gage length of 152 mm and a coupon width of 50 mm (volume effect tests).								
566	324AA	533	*	25	21.0	2.54	1	50
567	329AA	540	*	25	20.7	2.62	1	50
568	334AA	547	*	25	20.8	2.63	1	50

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
569	322AA	557	*	25	21.6	2.58	1	50
570	333AA	550	*	25	21.5	2.55	1	50
571	331AA	511	*	25	21.1	2.42	1	50
572	327AA	544	*	25	22.0	2.47	1	50
573	325AA	514	*	25	22.4	2.29	1	50
574	330AA	523	*	25	21.8	2.40	1	50
575	321AA	546	*	25	21.8	2.50	1	50
576	332AA	548	*	25	22.1	2.48	1	50
577	326AA	528	*	25	20.8	2.50	1	50
578	323AA	561	*	25	23.4	2.39	1	50
579	337AA	518	*	25	21.9	2.37	1	50
580	335AA	550	*	25	21.8	2.53	1	50
Tests 581 - 595 involved a gage length of 19 mm and a coupon width of 6 mm (volume effect tests).								
581	338AA	517	*	3	----	----	1	6
582	339AA	503	*	3	----	----	1	6
583	340AA	468	*	3	----	----	1	6
584	341AA	490	*	3	----	----	1	6
585	342AA	546	*	3	----	----	1	6
586	343AA	508	*	3	----	----	1	6
587	344AA	559	*	3	----	----	1	6
588	345AA	569	*	3	----	----	1	6
589	346AA	539	*	3	----	----	1	6
590	347AA	535	*	3	----	----	1	6
591	348AA	524	*	3	----	----	1	6
592	349AA	473	*	3	----	----	1	6
593	350AA	555	*	3	----	----	1	6
594	351AA	571	*	3	----	----	1	6
595	352AA	498	*	3	----	----	1	6
Tests 596 - 610 involved a gage length of 38 mm and a coupon width of 13 mm (volume effect tests).								
596	353AA	481	*	6	----	----	1	13
597	354AA	575	*	6	----	----	1	13
598	355AA	519	*	6	----	----	1	13
599	356AA	506	*	6	----	----	1	13
600	357AA	568	*	6	----	----	1	13
601	358AA	508	*	6	----	----	1	13
602	359AA	573	*	6	----	----	1	13
603	360AA	482	*	6	----	----	1	13
604	361AA	532	*	6	----	----	1	13
605	362AA	491	*	6	----	----	1	13
606	363AA	519	*	6	----	----	1	13
607	364AA	522	*	6	----	----	1	13
608	365AA	497	*	6	----	----	1	13
609	366AA	490	*	6	----	----	1	13
610	367AA	528	*	6	----	----	1	13
Tests 611 - 625 involved a gage length of 57 mm and a coupon width of 19 mm (volume effect tests).								
611	368AA	556	*	10	----	----	1	19
612	369AA	528	*	10	----	----	1	19
613	370AA	536	*	10	----	----	1	19
614	371AA	565	*	10	----	----	1	19

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
615	372AA	483	*	10	----	----	1	19
616	373AA	528	*	10	----	----	1	19
617	374AA	544	*	10	----	----	1	19
618	375AA	547	*	10	----	----	1	19
619	376AA	561	*	10	----	----	1	19
620	377AA	506	*	10	----	----	1	19
621	378AA	559	*	10	----	----	1	19
622	379AA	563	*	10	----	----	1	19
623	380AA	532	*	10	----	----	1	19
624	381AA	543	*	10	----	----	1	19
625	382AA	530	*	10	----	----	1	19
Tests 626 - 640 involved a gage length of 95 mm and a coupon width of 32 mm (volume effect tests).								
626	383AA	539	*	16	----	----	1	32
627	384AA	572	*	16	----	----	1	32
628	385AA	549	*	16	----	----	1	32
629	386AA	508	*	16	----	----	1	32
630	387AA	554	*	16	----	----	1	32
631	388AA	533	*	16	----	----	1	32
632	389AA	555	*	16	----	----	1	32
633	390AA	526	*	16	----	----	1	32
634	391AA	503	*	16	----	----	1	32
635	392AA	520	*	16	----	----	1	32
636	393AA	525	*	16	----	----	1	32
637	394AA	497	*	16	----	----	1	32
638	395AA	527	*	16	----	----	1	32
639	396AA	511	*	16	----	----	1	32
640	397AA	519	*	16	----	----	1	32
Tests 641 - 655 involved a gage length of 114 mm and a coupon width of 38 mm (volume effect tests).								
641	398AA	525	*	19	----	----	1	38
642	399AA	509	*	19	----	----	1	38
643	400AA	555	*	19	----	----	1	38
644	401AA	553	*	19	----	----	1	38
645	402AA	544	*	19	----	----	1	38
646	403AA	491	*	19	----	----	1	38
647	404AA	521	*	19	----	----	1	38
648	405AA	514	*	19	----	----	1	38
649	406AA	532	*	19	----	----	1	38
650	407AA	513	*	19	----	----	1	38
651	408AA	527	*	19	----	----	1	38
652	409AA	542	*	19	----	----	1	38
653	410AA	492	*	19	----	----	1	38
654	411AA	522	*	19	----	----	1	38
655	412AA	477	*	19	----	----	1	38
Tests 656 - 670 involved a gage length of 10 mm and a coupon width of 3 mm (volume effect tests).								
656	413AA	380	*	2	----	----	1	3
657	414AA	468	*	2	----	----	1	3
658	415AA	389	*	2	----	----	1	3
659	416AA	357	*	2	----	----	1	3
660	417AA	365	*	2	----	----	1	3

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
661	418AA	448	*	2	----	----	1	3
662	419AA	378	*	2	----	----	1	3
663	420AA	476	*	2	----	----	1	3
664	421AA	456	*	2	----	----	1	3
665	422AA	384	*	2	----	----	1	3
666	423AA	354	*	2	----	----	1	3
667	424AA	441	*	2	----	----	1	3
668	425AA	394	*	2	----	----	1	3
669	426AA	437	*	2	----	----	1	3
670	427AA	386	*	2	----	----	1	3
Tests 671 - 685 involved a gage length of 133 mm and a coupon width of 44 mm (volume effect tests).								
671	428AA	537	*	22	----	----	1	44
672	429AA	528	*	22	----	----	1	44
673	430AA	503	*	22	----	----	1	44
674	431AA	540	*	22	----	----	1	44
675	432AA	520	*	22	----	----	1	44
676	433AA	546	*	22	----	----	1	44
677	434AA	535	*	22	----	----	1	44
678	435AA	546	*	22	----	----	1	44
679	436AA	559	*	22	----	----	1	44
680	437AA	525	*	22	----	----	1	44
681	438AA	547	*	22	----	----	1	44
682	439AA	533	*	22	----	----	1	44
683	440AA	523	*	22	----	----	1	44
684	441AA	520	*	22	----	----	1	44
685	442AA	552	*	22	----	----	1	44
Tests 707 - 716 involved a gage length of 13 mm and a coupon width of 3 mm (width effect tests).								
707	464AA	-323	*	2	----	----	1	3
708	465AA	-371	*	2	----	----	1	3
709	466AA	-311	*	2	----	----	1	3
710	467AA	-313	*	2	----	----	1	3
711	468AA	-330	*	2	----	----	1	3
712	469AA	-305	*	2	----	----	1	3
713	470AA	-319	*	2	----	----	1	3
714	471AA	-304	*	2	----	----	1	3
715	472AA	-326	*	2	----	----	1	3
716	473AA	-334	*	2	----	----	1	3
Tests 717 - 726 involved a gage length of 13 mm and a coupon width of 25 mm (width effect tests).								
717	474AA	-311	*	13	----	----	1	25
718	475AA	-313	*	13	----	----	1	25
719	476AA	-311	*	13	----	----	1	25
720	477AA	-302	*	13	----	----	1	25
721	478AA	-307	*	13	----	----	1	25
722	479AA	-306	*	13	----	----	1	25
723	480AA	-302	*	13	----	----	1	25
724	481AA	-320	*	13	----	----	1	25
725	482AA	-316	*	13	----	----	1	25
726	483AA	-313	*	13	----	----	1	25

Tests 727 - 746 involved a gage length of 13 mm and a coupon width of 19 mm (width effect tests).

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
727	484AA	-321	*	10	----	----	1	19
728	485AA	-334	*	10	----	----	1	19
729	486AA	-333	*	10	----	----	1	19
730	487AA	-329	*	10	----	----	1	19
731	488AA	-337	*	10	----	----	1	19
732	489AA	-314	*	10	----	----	1	19
733	490AA	-325	*	10	----	----	1	19
734	491AA	-322	*	10	----	----	1	19
735	492AA	-331	*	10	----	----	1	19
736	493AA	-323	*	10	----	----	1	19
737	494AA	-320	*	10	----	----	1	19
738	495AA	-318	*	10	----	----	1	19
739	496AA	-316	*	10	----	----	1	19
740	497AA	-331	*	10	----	----	1	19
741	498AA	-323	*	10	----	----	1	19
742	499AA	-332	*	10	----	----	1	19
743	500AA	-327	*	10	----	----	1	19
744	501AA	-313	*	10	----	----	1	19
745	502AA	-322	*	10	----	----	1	19
746	503AA	-320	*	10	----	----	1	19
Tests 747 - 756 involved a gage length of 13 mm and a coupon width of 13 mm (width effect tests).								
747	504AA	-358	*	6	----	----	1	13
748	505AA	-330	*	6	----	----	1	13
749	506AA	-347	*	6	----	----	1	13
750	507AA	-335	*	6	----	----	1	13
751	508AA	-351	*	6	----	----	1	13
752	509AA	-353	*	6	----	----	1	13
753	510AA	-355	*	6	----	----	1	13
754	511AA	-329	*	6	----	----	1	13
755	512AA	-339	*	6	----	----	1	13
756	513AA	-354	*	6	----	----	1	13
Tests 757 - 766 involved a gage length of 13 mm and a coupon width of 44 mm (width effect tests).								
757	514AA	-264	*	22	----	----	1	44
758	515AA	-262	*	22	----	----	1	44
759	516AA	-265	*	22	----	----	1	44
760	517AA	-263	*	22	----	----	1	44
761	518AA	-267	*	22	----	----	1	44
762	519AA	-273	*	22	----	----	1	44
763	520AA	-266	*	22	----	----	1	44
764	521AA	-264	*	22	----	----	1	44
765	522AA	-269	*	22	----	----	1	44
766	523AA	-266	*	22	----	----	1	44
Tests 1233 - 1242 involved a gage length of 13 mm and a coupon width of 50 mm (width effect tests).								
1233	443AA	-254	*	25	----	----	1	50
1234	444AA	-250	*	25	----	----	1	50
1235	445AA	-250	*	25	----	----	1	50
1236	446AA	-250	*	13	----	----	1	50
1237	447AA	-249	*	25	----	----	1	50
1238	448AA	-251	*	25	----	----	1	50

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1239	449AA	-252	*	25	----	----	1	50
1240	450AA	-256	*	25	----	----	1	50
1241	451AA	-249	*	25	----	----	1	50
1242	452AA	-250	*	25	----	----	1	50

Tests 1243 - 1253 involved a gage length of 13 mm and a coupon width of 6 mm (width effect tests).

1243	453AA	-374	*	13	----	----	1	6
1244	454AA	-356	*	13	----	----	1	6
1245	455AA	-368	*	13	----	----	1	6
1246	456AA	-375	*	13	----	----	1	6
1247	457AA	-390	*	13	----	----	1	6
1248	458AA	-366	*	13	----	----	1	6
1249	459AA	-356	*	13	----	----	1	6
1250	460AA	-366	*	13	----	----	1	6
1251	461AA	-380	*	13	----	----	1	6
1252	462AA	-364	*	13	----	----	1	6
1253	463AA	-372	*	13	----	----	1	6

MATERIAL AA2

Lay-up = $[(0/\pm45)_2]_S$, V_F = 0.419, Ave. thickness = 2.63 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

Tests 767 - 776 involved a gage length of 13 mm and a coupon width of 50 mm (width effect tests).

767	524AA2	-298	*	25	----	----	1	50
768	525AA2	-298	*	25	----	----	1	50
769	526AA2	-301	*	25	----	----	1	50
770	527AA2	-312	*	25	----	----	1	50
771	528AA2	-315	*	25	----	----	1	50
772	529AA2	-294	*	25	----	----	1	50
773	530AA2	-300	*	25	----	----	1	50
774	531AA2	-298	*	25	----	----	1	50
775	532AA2	-305	*	25	----	----	1	50
776	533AA2	-319	*	25	----	----	1	50

Tests 777 - 786 involved a gage length of 13 mm and a coupon width of 25 mm (width effect tests).

777	534AA2	-308	*	13	----	----	1	25
778	535AA2	-315	*	13	----	----	1	25
779	536AA2	-315	*	13	----	----	1	25
780	537AA2	-307	*	13	----	----	1	25
781	538AA2	-317	*	13	----	----	1	25
782	539AA2	-328	*	13	----	----	1	25
783	540AA2	-313	*	13	----	----	1	25
784	541AA2	-313	*	13	----	----	1	25
785	542AA2	-322	*	13	----	----	1	25
786	543AA2	-322	*	13	----	----	1	25

Tests 787 - 796 involved a gage length of 13 mm and a coupon width of 12 mm (width effect tests).

787	544AA2	-315	*	6	----	----	1	13
788	545AA2	-337	*	6	----	----	1	13
789	546AA2	-327	*	6	----	----	1	13
790	547AA2	-300	*	6	----	----	1	13
791	548AA2	-330	*	6	----	----	1	13
792	549AA2	-324	*	6	----	----	1	13

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
793	550AA2	-340	*	6	----	----	1	13
794	551AA2	-298	*	6	----	----	1	13
795	552AA2	-305	*	6	----	----	1	13
796	553AA2	-309	*	6	----	----	1	13
Tests 797 - 806 involved a gage length of 13 mm and a coupon width of 38 mm (width effect tests).								
797	554AA2	-310	*	19	----	----	1	38
798	555AA2	-317	*	19	----	----	1	38
799	556AA2	-289	*	19	----	----	1	38
800	557AA2	-293	*	19	----	----	1	38
801	558AA2	-299	*	19	----	----	1	38
802	559AA2	-295	*	19	----	----	1	38
803	560AA2	-296	*	19	----	----	1	38
804	561AA2	-312	*	19	----	----	1	38
805	562AA2	-301	*	19	----	----	1	38
806	563AA2	-282	*	19	----	----	1	38
Tests 807 - 827 involved a gage length of 13 mm and a coupon width of 19 mm (width effect tests).								
807	564AA2	-311	*	10	----	----	1	19
808	565AA2	-290	*	10	----	----	1	19
809	566AA2	-286	*	10	----	----	1	19
810	567AA2	-282	*	10	----	----	1	19
811	568AA2	-286	*	10	----	----	1	19
812	569AA2	-282	*	10	----	----	1	19
813	570AA2	-314	*	10	----	----	1	19
814	571AA2	-276	*	10	----	----	1	19
815	572AA2	-275	*	10	----	----	1	19
816	573AA2	-276	*	10	----	----	1	19
817	574AA2	-287	*	10	----	----	1	19
818	575AA2	-266	*	10	----	----	1	19
819	576AA2	-314	*	10	----	----	1	19
820	577AA2	-252	*	10	----	----	1	19
821	578AA2	-288	*	10	----	----	1	19
822	579AA2	-297	*	10	----	----	1	19
823	580AA2	-318	*	10	----	----	1	19
824	581AA2	-278	*	10	----	----	1	19
825	582AA2	-281	*	10	----	----	1	19
826	583AA2	-302	*	10	----	----	1	19
827	584AA2	-310	*	10	----	----	1	19
Tests 828 - 837 involved a gage length of 13 mm and a coupon width of 6 mm (width effect tests).								
828	585AA2	-209	*	13	----	----	1	6
829	586AA2	-230	*	13	----	----	1	6
830	587AA2	-215	*	13	----	----	1	6
831	588AA2	-213	*	13	----	----	1	6
832	589AA2	-221	*	13	----	----	1	6
833	590AA2	-211	*	13	----	----	1	6
834	591AA2	-226	*	13	----	----	1	6
835	592AA2	-244	*	13	----	----	1	6
836	593AA2	-216	*	13	----	----	1	6
837	594AA2	-221	*	13	----	----	1	6

Tests 838 - 847 involved a gage length of 13 mm and a coupon width of 4 mm (width effect tests).

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
838	595AA2	-281	*	2	----	----	1	4
839	596AA2	-239	*	2	----	----	1	4
840	597AA2	-252	*	2	----	----	1	4
841	598AA2	-271	*	2	----	----	1	4
842	599AA2	-222	*	2	----	----	1	4
843	600AA2	-235	*	2	----	----	1	4
844	601AA2	-236	*	2	----	----	1	4
845	602AA2	-241	*	2	----	----	1	4
846	603AA2	-260	*	2	----	----	1	4
847	604AA2	-232	*	2	----	----	1	4
Tests 848 - 857 involved a gage length of 13 mm and a coupon width of 32 mm (width effect tests).								
848	605AA2	-318	*	16	----	----	1	32
849	606AA2	-293	*	16	----	----	1	32
850	607AA2	-281	*	16	----	----	1	32
851	608AA2	-275	*	16	----	----	1	32
852	609AA2	-272	*	16	----	----	1	32
853	610AA2	-283	*	16	----	----	1	32
854	611AA2	-320	*	16	----	----	1	32
855	612AA2	-262	*	16	----	----	1	32
856	613AA2	-304	*	16	----	----	1	32
857	614AA2	-303	*	16	----	----	1	32
Tests 858 - 867 involved a gage length of 13 mm and a coupon width of 44 mm (width effect tests).								
858	615AA2	-268	*	22	----	----	1	44
859	616AA2	-304	*	22	----	----	1	44
860	617AA2	-322	*	22	----	----	1	44
861	618AA2	-294	*	22	----	----	1	44
862	619AA2	-306	*	22	----	----	1	44
863	620AA2	-269	*	22	----	----	1	44
864	621AA2	-283	*	22	----	----	1	44
865	622AA2	-309	*	22	----	----	1	44
866	623AA2	-305	*	22	----	----	1	44
867	624AA2	-317	*	22	----	----	1	44
868	625AA2	423	*	22	----	----	1	25
869	630AA2	448	*	22	----	----	1	25
Tests 870 - 877 involved a gage length of 76 mm and a coupon width of 25 mm (standard test).								
870	626AA2	517	*	13	23.0	2.67	1	25
871	627AA2	462	*	13	23.2	2.10	1	25
872	628AA2	494	*	13	22.7	2.18	1	25
873	629AA2	463	*	13	22.1	2.10	1	25
877	630AA2	430	*	13	21.1	2.04	1	25
Tests 879 - 888 involved a gage length of 76 mm and a coupon width of 25 mm (volume effect tests).								
879	631AA2	478	*	13	----	----	1	25
880	632AA2	478	*	13	----	----	1	25
881	633AA2	431	*	13	----	----	1	25
882	634AA2	489	*	13	----	----	1	25
883	635AA2	563	*	13	----	----	1	25
884	636AA2	420	*	13	----	----	1	25
885	637AA2	529	*	13	----	----	1	25
886	638AA2	524	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
887	639AA2	448	*	13	----	----	1	25
888	640AA2	446	*	13	----	----	1	25
Tests 890 - 906 involved a gage length of 38 mm and a coupon width of 13 mm (volume effect tests).								
890	642AA2	506	*	6	----	----	1	13
891	643AA2	486	*	6	----	----	1	13
892	644AA2	494	*	6	----	----	1	13
893	645AA2	494	*	6	----	----	1	13
895	647AA2	462	*	6	----	----	1	13
896	648AA2	437	*	6	----	----	1	13
897	649AA2	439	*	6	----	----	1	13
898	650AA2	506	*	6	----	----	1	13
900	652AA2	428	*	6	----	----	1	13
901	653AA2	469	*	6	----	----	1	13
902	654AA2	479	*	6	----	----	1	13
903	655AA2	472	*	6	----	----	1	13
904	656AA2	509	*	6	----	----	1	13
905	657AA2	474	*	6	----	----	1	13
906	658AA2	451	*	6	----	----	1	13
Tests 907 - 916 involved a gage length of 95 mm and a coupon width of 32 mm (volume effect tests).								
907	659AA2	-297	*	16	----	----	1	32
908	660AA2	-297	*	16	----	----	1	32
909	661AA2	-295	*	16	----	----	1	32
910	662AA2	-297	*	16	----	----	1	32
911	663AA2	-299	*	16	----	----	1	32
912	664AA2	-290	*	16	----	----	1	32
913	665AA2	-303	*	16	----	----	1	32
914	666AA2	-292	*	16	----	----	1	32
915	667AA2	-294	*	16	----	----	1	32
916	668AA2	-296	*	16	----	----	1	32
Tests 917 - 926 involved a gage length of 114 mm and a coupon width of 38 mm (volume effect tests).								
917	669AA2	-277	*	19	----	----	1	38
918	670AA2	-279	*	19	----	----	1	38
919	671AA2	-282	*	19	----	----	1	38
920	672AA2	-281	*	19	----	----	1	38
921	673AA2	-283	*	19	----	----	1	38
922	674AA2	-278	*	19	----	----	1	38
923	675AA2	-287	*	19	----	----	1	38
924	676AA2	-276	*	19	----	----	1	38
925	677AA2	-281	*	19	----	----	1	38
926	678AA2	-276	*	19	----	----	1	38

MATERIAL AA3

Lay-up = $[(\pm 45/0)_3,]_S$, V_F = 0.480, Ave. thickness = 3.45 mm, S.D. = 0.15 mm, CoRezyn 63-AX-051 Polyester

2367	AA3104	482	*	0.5	23.7	2.3	1	25
2368	AA3110	463	*	0.5	25.2	2.4	1	25
2369	AA3109	489	*	0.5	25.3	2.2	1	25
2370	AA3106	241	0.1	4	26.5	0.91	3,572	25
2371	AA3113	241	0.1	4	25.8	0.94	4,447	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2372	AA3111	241	0.1	4	22.7	1.06	2,986	25
2373	AA3114	172	0.1	8	23.9	0.81	25,183	25
2374	AA3108	172	0.1	8	29.5	0.57	17,683	25
2375	AA3102	172	0.1	8	23.4	0.81	23,753	25
2376	AA3107	103	0.1	15	25.2	0.44	900,000	25R
2377	AA3115	310	0.1	2	26.5	1.39	493	25
2378	AA3112	310	0.1	2	24.7	1.26	626	25
2379	AA3103	310	0.1	2	25.2	1.23	812	25
2627	AA3301	-340	*	13	----	----	1	25
2628	AA3302	-283	*	13	----	----	1	25
2629	AA3303	-280	*	13	----	----	1	25
2630	AA3304	-233	*	13	----	----	1	25

MATERIAL AA4

Lay-up = $[(\pm45/0)_2,]_S$, V_F = 0.326, Ave. thickness = 5.12 mm, S.D. = 0.13 mm, CoRezyn 63-AX-051 Polyester

3513	AA4104	310	*	13	22.0	2	1	25
3514	AA4101	427	*	13	21.9	2.10	1	25
3515	AA4102	365	*	13	21.4	1.85	1	25
3516	AA4107	404	*	13	20.5	2.19	1	25
3517	AA4109	241	0.1	2	18.3	1.36	1,203	25
3518	AA4113	241	0.1	2	21.2	1.19	3,002	25
3519	AA4111	241	0.1	2	19.5	1.42	2,752	25
3520	AA4110	207	0.1	4	22.0	1.08	24,288	25
3521	AA4112	207	0.1	4	19.1	1.15	19,180	25
3522	AA4116	207	0.1	4	18.5	1.26	15,966	25
3523	AA4120	172	0.1	5	20.5	0.90	179,566	25
3524	AA4118	172	0.1	5	----	----	127,836	25
3829	AA4136	-413	*	13	----	----	1	25
3830	AA4133	-442	*	13	----	----	1	25
3831	AA4131	-493	*	13	----	----	1	25

MATERIAL BB

Lay-up = $[\pm45/0_2/+45]_S$, V_F = 0.430, Ave. thickness = 2.67 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester

927	BB101	734	*	13	23.9	3.37	1	25
928	BB102	728	*	13	24.8	2.94	1	25
929	BB103	735	*	13	24.8	3.37	1	25
930	BB113	703	*	13	25.9	2.91	1	25 tab
931	BB109	414	0.1	2	25.4	1.63	550	25 tab
932	BB119	414	0.1	2	23.8	1.74	673	25 tab
933	BB118	414	0.1	2	25.0	1.71	512	25 tab
934	BB117	345	0.1	5	26.5	1.23	1,810	25 tab
935	BB124	345	0.1	5	27.3	1.26	2,415	25 tab
936	BB115	345	0.1	5	23.8	1.45	2,585	25 tab
937	BB123	276	0.1	10	26.8	1.09	18,755	25 tab
938	BB112	276	0.1	10	24.1	1.14	12,437	25 tab
939	BB114	276	0.1	10	25.2	1.20	11,302	25 tab
940	BB110	207	0.1	15	26.3	0.85	494,149	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
941	BB116	207	0.1	15	25.8	0.80	197,629	25 tab
942	BB111	207	0.1	15	25.8	0.81	390,137	25 tab
943	BB108	241	0.1	15	24.6	1.12	66,612	25 tab
944	BB121	241	0.1	15	24.3	1.02	47,939	25 tab
945	BB107	241	0.1	15	24.3	1.09	84,343	25 tab
946	BB122	193	0.1	20	25.2	0.78	1,100,000	25 tab
947	BB106	193	0.1	20	25.2	0.78	921,400	25 tab
948	BB120	193	0.1	20	25.6	0.82	1,320,150	25 tab
Tests 949 - 955 were transverse tests tested in the $[\pm45/90_2/+45]_S$ direction								
949	BB113T	101	*	13	11.3	1.00	1	25 tab
950	BB112T	104	*	13	11.3	0.94	1	25 tab
951	BB111T	111	*	13	11.3	0.99	1	25 tab
952	BB120T	-225	*	13	12.5	1.81	1	25
953	BB128T	-229	*	13	11.2	1.86	1	25
954	BB127T	-244	*	13	12.2	1.99	1	25
955	BB135T	-294	*	13	----	----	1	25
956	BB141	-325	*	13	----	----	1	25
957	BB143	-291	*	13	----	----	1	25
958	BB105	193	0.1	15	26.0	0.84	707,401	25 tab

MATERIAL CC

Lay-up = $[\pm45/0_2/+45]_S$, V_F = 0.397, Ave. thickness = 2.44 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

959	CC105	574	*	13	21.0	2.74	1	25
960	CC107	562	*	13	21.1	2.70	1	25
961	CC102	574	*	13	20.6	2.78	1	25
962	CC119	345	0.1	2	22.5	1.63	174	25 tab
963	CC108	345	0.1	2	21.0	1.84	124	25 tab
964	CC121	345	0.1	2	21.7	1.79	223	25 tab
965	CC118	276	0.1	4	21.9	1.55	1,787	25 tab
966	CC113	276	0.1	4	23.3	1.47	2,637	25 tab
967	CC104	276	0.1	4	21.2	1.30	3,029	25 tab
968	CC116	241	0.1	10	21.6	1.12	8,838	25 tab
969	CC117	241	0.1	10	23.3	1.14	6,956	25 tab
970	CC103	241	0.1	10	22.3	1.08	12,015	25 tab
971	CC112	207	0.1	15	21.9	0.99	25,203	25 tab
972	CC120	207	0.1	15	21.9	1.02	48,080	25 tab
973	CC124	207	0.1	15	21.6	1.05	32,670	25 tab
974	CC106	172	0.1	10	21.8	0.84	228,453	25 tab
975	CC114	172	0.1	15	23.2	0.74	205,864	25 tab
976	CC110	241	0.1	10	----	----	27,772	25 tab
977	CC115	207	0.1	10	----	----	158,287	25 tab
978	CC123	207	0.1	15	----	----	133,440	25 tab
979	CC109	207	0.1	15	----	----	243,962	25 tab
980	CC137	207	0.1	15	----	----	531,499	25
981	CC135	207	0.1	15	20.7	1.00	631,495	25
982	CC130	207	0.1	15	20.2	1.02	486,225	25
983	CC134	276	0.1	10	----	----	50,289	25
984	CC131	276	0.1	10	----	----	30,467	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
985	CC133	276	0.1	10	----	----	38,977	25
986	CC132	345	0.1	2	----	----	2,979	25
987	CC143	345	0.1	2	----	----	4,476	25
988	CC144	345	0.1	2	----	----	4,807	25
989	CC142	531	*	13	----	----	1	25
990	CC140	562	*	13	----	----	1	25
3052	CC160	-475	*	13	----	----	1	25
3053	CC161	-442	*	13	----	----	1	25

MATERIAL CC2

Lay-up = $[\pm45/0_3/+45]_S$, $V_F = 0.461$, Ave. thickness = 2.69 mm, S.D. = 0.03 mm, CoRezyn 63-AX-051 Polyester

991	CC2101	746	*	13	27.0	2.78	1	25
992	CC2103	730	*	13	26.9	2.86	1	25
993	CC2102	701	*	13	27.0	2.81	1	25
994	CC2105	414	0.1	5	25.6	1.62	4,104	25
995	CC2106	276	0.1	15	----	----	168,303	25
996	CC2116	276	0.1	10	----	----	132,591	25
997	CC2108	276	0.1	10	----	----	176,536	25
998	CC2111	414	0.1	15	----	----	2,231	25
999	CC2113	414	0.1	4	----	----	2,820	25
1000	CC2107	345	0.1	10	----	----	21,413	25
1001	CC2117	345	0.1	10	----	----	16,914	25
1002	CC2110	345	0.1	10	----	----	21,965	25
1003	CC2109	207	0.1	20	----	----	1,873,767	25
1004	CC2115	683	*	13	----	----	1	25
1005	CC2114	695	*	13	----	----	1	25
1006	CC2112	735	*	13	----	----	1	25
1842	CC2201	-555	*	13	----	----	1	25
1843	CC2202	-500	*	13	----	----	1	25
1844	CC2119	-526	*	13	----	----	1	25

MATERIAL CC3

Lay-up = $[0/\pm45/0_2/+45]_S$, $V_F = 0.444$, Ave. thickness = 2.74 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester

1007	CC3101	690	*	0.5	26.1	2.64	1	25
1008	CC3102	657	*	0.5	25.8	2.54	1	25
1009	CC3103	700	*	0.5	26.9	2.60	1	25
1010	CC3107	414	0.1	5	----	----	1,324	25
1011	CC3104	414	0.1	5	----	----	5,122	25
1012	CC3105	414	0.1	5	----	----	4,241	25
1013	CC3108	276	0.1	10	----	----	186,787	25
1014	CC3106	276	0.1	10	----	----	226,915	25
1015	CC3109	276	0.1	10	----	----	169,059	25
1016	CC3111	414	0.1	5	----	----	4,469	25
1017	CC3110	345	0.1	5	----	----	26,235	25
1018	CC3113	345	0.1	5	----	----	31,512	25
1019	CC3112	345	0.1	5	----	----	28,465	25
1020	CC3121	241	0.1	15	----	----	371,472	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1021	CC3120	241	0.1	20	----	----	428,636	25
1022	CC3124	207	0.1	15	----	----	2,016,665	25
1848	CC3200	-570	*	13	----	----	1	25
1849	CC3201	-539	*	13	----	----	1	25
1850	CC3202	-513	*	13	----	----	1	25

MATERIAL CH

Lay-up = $[(\pm 45)_3]_S$, V_F = 0.469, Ave. thickness = 3.86 mm, S.D. = 0.04 mm, CoRezyn 63-AX-051 Polyester

1254	CH108	135	*	13	15.4	1.2	1	25
1255	CH119	162	*	13	13.7	1.7	1	25
1256	CH112	139	*	13	12.8	1.5	1	25
1257	CH111	103	0.1	2	13.4	0.97	3,591	25
1258	CH105	103	0.1	2	12.3	0.93	1,545	25
1259	CH116	86	0.1	5	13.5	0.64	2,886	25
1260	CH109	69	0.1	5	13.5	0.51	37,378	25
1261	CH117	52	0.1	15	11.7	0.44	5,000,000	25 R
1262	CH114	103	0.1	2	13.6	0.94	920	25
1263	CH113	86	0.1	4	14.1	0.91	5,340	25
1264	CH107	86	0.1	4	14.3	0.92	4,604	25
1265	CH104	69	0.1	5	13.8	0.59	73,763	25
1266	CH106	69	0.1	5	14.3	0.64	28,432	25
1267	CH128	137	*	13	13.7	1.4	1	25
1268	CH125	62	0.1	10	14.1	0.51	327,862	25
1269	CH126	62	0.1	10	13.0	0.60	250,000	25
1270	CH110	62	0.1	10	14.0	0.55	171,332	25
1271	CH131	-190	*	0.1	----	----	1	25
1272	CH141	-179	*	0.1	----	----	1	25
1273	CH152	-171	*	0.1	----	----	1	25
1274	CH137	-124	10	2	----	----	433	25
1275	CH134	-124	10	2	----	----	870	25
1276	CH136	-86	10	5	----	----	61,185	25
1277	CH138	-86	10	10	----	----	31,317	25
1278	CH139	-69	10	20	----	----	1,317,352	25
1279	CH145	-103	10	5	----	----	5,030	25
1280	CH144	-103	10	5	----	----	9,428	25
1281	CH152	-124	10	2	----	----	956	25
1282	CH132	-103	10	5	----	----	6,653	25
1283	CH133	-69	10	20	----	----	1,125,335	25
1284	CH135	-86	10	10	----	----	76,452	25
1851	CH146	-171	*	13	----	----	1	25

MATERIAL CH2

Lay-up = $[(\pm 45/0/\pm 45)]_S$, V_F = 0.441, Ave. thickness = 3.78 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

1125	CH2116	354	*	13	16.0	2.21	1	25
1153	CH2101	365	*	13	17.2	2.12	1	25
1154	CH2107	367	*	13	17.9	2.05	1	25
1155	CH2103	241	0.1	2	16.4	1.80	396	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1356	CH2112	241	0.1	2	16.2	2.20	221	25
1357	CH2109	207	0.1	4	16.6	1.79	2,148	25
1358	CH2115	207	0.1	4	16.5	1.77	1,917	25
1359	CH2113	172	0.1	5	15.9	1.34	11,276	25
1360	CH2106	138	0.1	5	16.7	1.10	40,073	25
1361	CH2111	103	0.1	20	17.2	0.64	1,855,170	25
1362	CH2117	207	0.1	2	16.8	1.72	1,342	25
1363	CH2114	172	0.1	4	17.0	1.25	9,910	25
1364	CH2105	172	0.1	4	17.4	1.23	8,987	25
1365	CH2110	138	0.1	10	14.8	1.14	54,659	25
1366	CH2108	138	0.1	5	16.9	0.97	37,586	25
1367	CH2102	121	0.1	10	18.0	0.77	97,564	25
tests 1368, 1370, 1371, 1375 were transverse tests tested in the $[(\pm45/90/\pm45)]_S$ direction								
1368	CH2149T	117	*	13	12.4	2.64	1	25
1369	CH2104	370	*	13	16.5	2.85	1	25
1370	CH2146T	134	*	13	12.6	----	1	25
1371	CH2147T	122	*	13	12.3	----	1	25
1372	CH2129	-342	*	13	----	----	1	25
1373	CH2130	-333	*	13	----	----	1	25
1374	CH2128	-350	*	13	----	----	1	25
1375	CH2146T	-171	*	13	----	----	1	25
1376	CH2127	-276	10	2	----	----	39	25
1377	CH2156	-207	10	2	----	----	848	25
1378	CH2126	-207	10	2	----	----	1,972	25
1379	CH2118	-207	10	2	----	----	2,458	25
1380	CH2141	-172	10	5	----	----	19,691	25
1381	CH2122	-172	10	5	----	----	15,420	25
1382	CH2119	-138	10	20	----	----	871,785	25
1383	CH2121	-172	10	5	----	----	14,149	25
1384	CH2133	-155	10	10	----	----	166,026	25
1385	CH2125	-155	10	15	----	----	83,700	25

MATERIAL CH3

Lay-up = $[(\pm45/0/\pm45)]_S$, V_F = 0.415, Ave. thickness = 4.19 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

1386	CH3105	-326	*	13	----	----	1	25
1387	CH3117	-319	*	13	----	----	1	25
1388	CH3111	-309	*	13	----	----	1	25
1389	CH3106	-207	10	2	----	----	238	25
1390	CH3109	-207	10	2	----	----	159	25
1391	CH3110	-172	10	5	----	----	1,331	25
1392	CH3115	-172	10	4	----	----	760	25
1393	CH3108	-138	10	5	----	----	23,189	25
1394	CH3102	-138	10	5	----	----	14,301	25
1395	CH3103	-207	10	2	----	----	264	25
1396	CH3104	-172	10	4	----	----	982	25
1397	CH3107	-138	10	10	----	----	27,750	25
1398	CH3101	-121	10	15	----	----	141,901	25
1399	CH3112	-121	10	15	----	----	81,244	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1400	CH3118	-121	10	20	----	----	164,715	25
1472	CH3124	333	*	13	17.3	2.71	1	25
1473	CH3135	340	*	13	16.5	2.85	1	25
1474	CH3131	336	*	13	16.1	2.74	1	25
1475	CH3125	241	0.1	2	16.6	2.23	173	25
1476	CH3132	241	0.1	2	16.1	2.85	174	25
1477	CH3136	241	0.1	2	15.9	2.26	134	25
1478	CH3122	207	0.1	2	16.8	1.59	1,166	25
1479	CH3134	207	0.1	2	17.0	1.69	1,270	25
1480	CH3128	207	0.1	2	15.6	1.82	814	25
1481	CH3119	172	0.1	5	17.8	1.19	8,478	25
1482	CH3129	172	0.1	4	16.6	1.35	12,387	25
1483	CH3123	172	0.1	5	18.3	1.25	14,410	25
1484	CH3126	138	0.1	10	17.2	0.95	282,621	25
1485	CH3121	138	0.1	5	15.7	1.04	200,174	25
1486	CH3130	138	0.1	10	18.1	0.91	429,020	25

MATERIAL CH4

Lay-up = $[(\pm45)_4]_S$, V_F = 0.395, Ave. thickness = 2.92 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester

1445	CH4123	-173	*	13	----	----	1	25
1446	CH4133	-171	*	13	----	----	1	25
1447	CH4129	-173	*	13	----	----	1	25
1448	CH4140	-124	10	2	----	----	144	25
1449	CH4134	-124	10	1	----	----	188	25
1450	CH4141	-124	10	1	----	----	256	25
1451	CH4137	-103	10	2	----	----	1,313	25
1452	CH4142	-103	10	2	----	----	1,883	25
1453	CH4126	-103	10	2	----	----	873	25
1454	CH4128	-86	10	5	----	----	21,748	25
1455	CH4130	-86	10	5	----	----	13,364	25
1456	CH4131	-86	10	4	----	----	11,200	25
1457	CH4125	-69	10	15	----	----	206,018	25
1458	CH4135	-69	10	10	----	----	564,767	25
1459	CH4122	-69	10	15	----	----	485,632	25
1509	CH4106	160	*	13	11.0	6.41	1	25
1510	CH4114	157	*	13	11.2	5.15	1	25
1511	CH4115	149	*	13	11.4	6.35	1	25
1512	CH4117	103	0.1	2	11.4	1.70	198	25
1513	CH4107	103	0.1	2	11.0	1.80	287	25
1514	CH4110	103	0.1	2	12.4	1.40	314	25
1515	CH4118	86	0.1	4	11.7	1.38	1,319	25
1516	CH4111	86	0.1	2	12.1	0.99	2,311	25
1517	CH4113	86	0.1	4	10.9	1.24	1,186	25
1518	CH4102	69	0.1	10	11.2	0.82	7,072	25
1519	CH4119	69	0.1	10	10.7	0.79	10,172	25
1520	CH4103	69	0.1	10	12.2	0.64	15,843	25
1521	CH4101	52	0.1	20	11.1	0.52	342,135	25
1522	CH4116	52	0.1	20	----	----	224,519	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1523	CH4104	52	0.1	20	12.2	0.47	1,136,938	25

MATERIAL CH5

Lay-up = $[(\pm 45)_3]_S$, V_F = 0.279, Ave. thickness = 3.05 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

1460	CH5126	-190	*	13	----	----	1	25
1461	CH5123	-190	*	13	----	----	1	25
1462	CH5119	-190	*	13	----	----	1	25
1463	CH5127	-86	10	10	----	----	131,302	25
1464	CH5128	-121	10	2	----	----	1,548	25
1465	CH5129	-121	10	2	----	----	2,777	25
1466	CH5125	-121	10	2	----	----	2,989	25
1467	CH5118	-103	10	4	----	----	12,027	25
1468	CH5120	-103	10	5	----	----	9,130	25
1469	CH5121	-103	10	5	----	----	18,621	25
1470	CH5122	-86	10	15	----	----	329,191	25
1471	CH5124	-86	10	15	----	----	277,202	25
1524	CH5112	147	*	13	9.8	4.12	1	25
1525	CH5103	134	*	13	7.5	----	1	25
1526	CH5105	137	*	13	9.0	----	1	25
1527	CH5115	86	0.1	2	8.3	----	1,140	25
1528	CH5101	86	0.1	2	8.3	----	1,310	25
1529	CH5106	86	0.1	2	8.1	1.69	749	25
1530	CH5102	69	0.1	4	8.1	0.95	11,184	25
1531	CH5113	69	0.1	5	8.8	0.90	17,929	25
1532	CH5104	69	0.1	4	9.0	0.90	14,588	25
1533	CH5114	52	0.1	15	8.7	0.63	113,426	25
1534	CH5107	52	0.1	12	8.5	0.63	282,007	25
1535	CH5111	52	0.1	10	8.3	0.65	181,712	25

Tests 3557 - 3583 involved a gage length of 13 mm (strain rate effect tests).

3557	CH5121	-194	*	0.025	----	----	1	25 tab
3558	CH5144	-202	*	0.025	----	----	1	25 tab
3559	CH5142	-189	*	0.025	----	----	1	25 tab
3560	CH5122	-214	*	0.254	----	----	1	25 tab
3561	CH5123	-207	*	0.254	----	----	1	25 tab
3562	CH5135	-213	*	0.254	----	----	1	25 tab
3563	CH5145	-213	*	2.54	----	----	1	25 tab
3564	CH5147	-206	*	2.54	----	----	1	25 tab
3565	CH5146	-219	*	2.54	----	----	1	25 tab
3566	CH5148	-230	*	6.35	----	----	1	25 tab
3567	CH5124	-225	*	6.35	----	----	1	25 tab
3568	CH5133	-216	*	6.35	----	----	1	25 tab
3569	CH5140	-223	*	12.7	----	----	1	25 tab
3570	CH5141	-225	*	12.7	----	----	1	25 tab
3571	CH5143	-243	*	12.7	----	----	1	25 tab
3572	CH5118	-227	*	19.1	----	----	1	25 tab
3573	CH5125	-224	*	19.1	----	----	1	25 tab
3574	CH5132	-207	*	19.1	----	----	1	25 tab
3575	CH5120	-242	*	25.4	----	----	1	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3576	CH5136	-242	*	25.4	----	----	1	25 tab
3577	CH5137	-211	*	25.4	----	----	1	25 tab
3578	CH5138	-223	*	63.5	----	----	1	25 tab
3579	CH5139	-238	*	63.5	----	----	1	25 tab
3580	CH5116	-215	*	63.5	----	----	1	25 tab
3581	CH5136	-241	*	127	----	----	1	25 tab
3582	CH5126	-239	*	127	----	----	1	25 tab
3583	CH5127	-228	*	127	----	----	1	25 tab
Tests 3557 - 3583 involved a gage length of 100 mm (strain rate effect tests).								
3584	CH5105	120	*	0.025	----	----	1	25 tab
3585	CH5114	120	*	0.025	----	----	1	25 tab
3586	CH5111	120	*	0.025	----	----	1	25 tab
3587	CH5112	125	*	0.254	----	----	1	25 tab
3588	CH5110	126	*	0.254	----	----	1	25 tab
3589	CH5109	126	*	0.254	----	----	1	25 tab
3590	CH5107	126	*	2.54	----	----	1	25 tab
3591	CH5108	137	*	2.54	----	----	1	25 tab
3592	CH5102	131	*	2.54	----	----	1	25 tab
3593	CH5103	137	*	12.7	----	----	1	25 tab
3594	CH5113	135	*	12.7	----	----	1	25 tab
3595	CH5106	136	*	12.7	----	----	1	25 tab
3596	CH5101	137	*	63.5	----	----	1	25 tab
3597	CH5104	142	*	63.5	----	----	1	25 tab
3598	CH5114	131	*	63.5	----	----	1	25 tab

MATERIAL CH6

Lay-up = [±45/0/±45]s, V_F = 0.441, Ave. thickness = 2.26 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

1416	CH6106	-413	*	13	----	----	1	25
1417	CH6114	-381	*	13	----	----	1	25
1418	CH6105	-428	*	13	----	----	1	25
1419	CH6103	-207	10	5	----	----	15,707	25
1420	CH6117	-207	10	10	----	----	20,605	25
1421	CH6107	-207	10	5	----	----	38,711	25
1422	CH6101	-241	10	4	----	----	10,088	25
1423	CH6112	-241	10	4	----	----	11,950	25
1424	CH6102	-241	10	4	----	----	8,842	25
1425	CH6109	-276	10	2	----	----	2,727	25
1426	CH6110	-276	10	2	----	----	1,373	25
1427	CH6119	-276	10	2	----	----	840	25
1428	CH6104	-172	10	20	----	----	880,742	25
1429	CH6118	-172	10	20	----	----	1,628,900	25
1487	CH6123	510	*	13	22.5	3.34	1	25
1488	CH6128	500	*	13	21.6	2.98	1	25
1489	CH6133	495	*	13	22.9	3.24	1	25
1490	CH6140	345	0.1	2	20.9	2.11	284	25
1491	CH6127	345	0.1	2	20.0	2.24	189	25
1492	CH6134	345	0.1	2	21.2	2.04	246	25
1493	CH6139	310	0.1	2	20.3	1.81	561	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1494	CH6124	310	0.1	2	20.9	1.76	758	25
1495	CH6138	310	0.1	2	20.5	1.78	619	25
1496	CH6130	276	0.1	4	20.3	1.64	2,224	25
1497	CH6131	276	0.1	4	21.1	1.60	1,490	25
1498	CH6125	276	0.1	4	22.4	1.41	2,153	25
1499	CH6126	241	0.1	5	21.8	1.30	4,278	25
1500	CH6129	241	0.1	10	21.0	1.29	6,877	25
1501	CH6135	207	0.1	10	23.0	1.04	13,309	25
1502	CH6132	207	0.1	5	22.1	1.04	15,150	25
1503	CH6141	207	0.1	5	22.4	1.06	11,807	25
1504	CH6122	172	0.1	5	21.7	0.87	44,634	25
1505	CH6136	172	0.1	10	22.1	0.86	37,335	25
1506	CH6137	138	0.1	10	22.5	0.67	224,743	25
1507	CH6142	138	0.1	10	21.1	0.69	138,170	25
1508	CH6148	121	0.1	20	20.5	0.59	419,563	25

MATERIAL CH7

Lay-up = [(±45)$_2$]s, V_F = 0.546, Ave. thickness = 3.86 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

1401	CH7110	-174	*	13	----	----	1	25
1402	CH7114	-164	*	13	----	----	1	25
1403	CH7109	-165	*	13	----	----	1	25
1404	CH7107	-103	10	2	----	----	1,918	25
1405	CH7102	-103	10	2	----	----	1,763	25
1406	CH7106	-103	10	2	----	----	3,055	25
1407	CH7108	-86	10	5	----	----	16,492	25
1408	CH7104	-86	10	5	----	----	20,747	25
1409	CH7111	-86	10	5	----	----	15,719	25
1410	CH7150	-69	10	20	----	----	96,260	25
1411	CH7112	-69	10	20	----	----	278,521	25
1412	CH7101	-69	10	15	----	----	167,393	25
1413	CH7122	112	*	13	13.8	1.75	1	25
1414	CH7126	107	*	13	15.4	----	1	25
1415	CH7128	113	*	13	15.4	----	1	25
1536	CH7115	115	*	13	15.7	4.80	1	25
1537	CH7117	116	*	13	17.9	----	1	25
1538	CH7127	112	*	13	18.6	----	1	25
1539	CH7125	69	0.1	5	16.3	0.55	4,943	25
1540	CH7120	69	0.1	5	17.2	0.49	3,145	25
1541	CH7119	69	0.1	5	17.5	0.49	3,797	25
1542	CH7121	52	0.1	10	17.8	0.32	92,285	25
1543	CH7116	52	0.1	10	16.5	0.34	62,832	25
1544	CH7123	52	0.1	10	15.2	0.34	116,214	25
1545	CH7130	83	0.1	2	19.0	0.70	418	25
1546	CH7118	83	0.1	2	18.2	0.57	521	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL CH8

Lay-up = [(±45)$_2$]s, V_F = 0.366, Ave. thickness = 5.89 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester

1430	CH8141	-145	*	13	----	----	1	25
1431	CH8128	-145	*	13	----	----	1	25
1432	CH8122	-148	*	13	----	----	1	25
1433	CH8136	-103	10	4	----	----	191	25
1434	CH8126	-103	10	2	----	----	99	25
1435	CH8125	-103	10	2	----	----	215	25
1436	CH8129	-86	10	2	----	----	1,242	25
1437	CH8121	-86	10	2	----	----	862	25
1438	CH8127	-86	10	2	----	----	719	25
1439	CH8130	-69	10	4	----	----	2,509	25
1440	CH8139	-69	10	4	----	----	3,894	25
1441	CH8135	-69	10	4	----	----	1,784	25
1442	CH8124	-52	10	5	----	----	11,312	25
1443	CH8123	-52	10	5	----	----	8,752	25
1444	CH8132	-52	10	5	----	----	36,219	25
1547	CH8107	91	*	13	9.4	5.86	1	25
1548	CH8104	97	*	13	9.8	6.70	1	25
1549	CH8118	90	*	13	11.9	7.43	1	25
1550	CH8116	52	0.1	4	9.0	0.61	8,968	25
1551	CH8102	52	0.1	4	10.0	0.60	9,804	25
1552	CH8106	52	0.1	5	8.6	0.65	10,105	25
1553	CH8105	62	0.1	2	12.4	0.60	1,756	25
1554	CH8113	62	0.1	2	9.5	0.90	1,333	25
1555	CH8119	62	0.1	2	9.2	0.82	1,691	25
1556	CH8115	41	0.1	10	10.7	0.42	59,831	25
1557	CH8114	41	0.1	10	11.1	0.40	50,912	25
1558	CH8103	41	0.1	10	9.4	0.43	70,962	25
1559	CH8101	34	0.1	15	9.3	0.37	1,480,988	25

MATERIAL CH9

Lay-up = [(±45)$_3$]s, V_F = 0.400, Ave. thickness = 2.13 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

1560	CH9106	157	*	13	10.4	7.70	1	25
1561	CH9113	144	*	13	10.1	5.17	1	25
1562	CH9105	151	*	13	10.6	9.15	1	25
1563	CH9110	103	0.1	2	10.0	1.80	250	25
1564	CH9101	103	0.1	2	10.6	1.70	285	25
1565	CH9114	103	0.1	2	10.8	2.00	294	25
1566	CH9108	86	0.1	2	10.1	1.30	1,503	25
1567	CH9112	86	0.1	2	10.8	1.17	1,901	25
1568	CH9103	86	0.1	2	10.4	1.32	2,357	25
1569	CH9107	69	0.1	5	9.7	0.97	11,702	25
1570	CH9109	52	0.1	20	11.5	0.46	868,713	25
1571	CH9102	69	0.1	5	8.1	0.90	8,369	25
1572	CH9115	69	0.1	5	10.3	0.83	13,987	25
1573	CH9116	52	0.1	15	10.1	0.54	937,400	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1643	CH9144	-172	*	13	----	----	1	25
1644	CH9136	-176	*	13	----	----	1	25
1645	CH9133	-175	*	13	----	----	1	25
1646	CH9132	-121	10	2	----	----	299	25
1647	CH9137	-121	10	4	----	----	738	25
1648	CH9145	-121	10	2	----	----	352	25
1649	CH9143	-103	10	4	----	----	5,842	25
1650	CH9140	-103	10	4	----	----	1,801	25
1651	CH9134	-103	10	2	----	----	2,917	25
1652	CH9130	-86	10	10	----	----	68,643	25
1653	CH9138	-86	10	10	----	----	39,626	25
1654	CH9131	-86	10	5	----	----	46,815	25
1655	CH9141	-76	10	10	----	----	522,908	25

MATERIAL CH10

Lay-up = $[(\pm45)_3]s$, V_F = 0.317, Ave. thickness = 5.56 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester

1574	CH10114	124	*	13	7.6	7.17	1	25
1575	CH10105	122	*	13	7.4	6.42	1	25
1576	CH10115	116	*	13	7.7	8.12	1	25
1577	CH10113	69	0.1	4	8.1	1.16	4,432	25
1578	CH10119	69	0.1	4	7.9	1.30	2,609	25
1579	CH10110	69	0.1	2	8.3	1.05	5,331	25
1580	CH10109	86	0.1	1	8.2	1.81	201	25
1581	CH10104	86	0.1	1	7.3	2.00	114	25
1582	CH10118	86	0.1	1	7.8	1.89	187	25
1583	CH10117	52	0.1	5	8.5	0.67	506,181	25
1584	CH10103	59	0.1	5	9.2	0.76	72,644	25
1585	CH10108	59	0.1	5	9.1	0.75	63,552	25
1586	CH10121	59	0.1	4	8.0	0.85	32,735	25

The compression gage length for the CH10 coupons was 19 mm instead of the standard 13 mm due to hydraulic grip space restrictions (grip heads would impact with a 13 mm gage length).

1668	CH10153	-167	*	13	----	----	1	25
1669	CH10132	-158	*	13	----	----	1	25
1670	CH10142	-164	*	13	----	----	1	25
1671	CH10130	-121	10	1	----	----	93	25
1672	CH10149	-121	10	1	----	----	48	25
1673	CH10151	-121	10	1	----	----	62	25
1674	CH10139	-103	10	1	----	----	510	25
1675	CH10146	-103	10	1	----	----	843	25
1676	CH10133	-103	10	1	----	----	709	25
1677	CH10138	-86	10	2	----	----	2,914	25
1678	CH10131	-86	10	2	----	----	3,996	25
1679	CH10155	-86	10	2	----	----	1,948	25
1680	CH10135	-69	10	5	----	----	25,535	25
1681	CH10144	-69	10	5	----	----	15,850	25
1682	CH10134	-69	10	5	----	----	20,095	25
1683	CH10145	-52	10	15	----	----	948,262	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL CH11

Lay-up = $[(\pm 45)_2]s$, V_F = 0.495, Ave. thickness = 2.41 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

1587	CH11114	128	*	13	13.0	6.78	1	25
1588	CH11111	143	*	13	13.0	6.00	1	25
1589	CH11105	132	*	13	13.0	----	1	25
1590	CH11113	86	0.1	4	14.0	0.98	861	25
1591	CH11109	86	0.1	4	13.8	1.00	1,207	25
1592	CH11101	86	0.1	4	13.1	0.97	1,310	25
1593	CH11102	69	0.1	4	15.2	0.58	13,430	25
1594	CH11107	69	0.1	4	14.0	0.60	18,411	25
1595	CH11106	69	0.1	4	12.0	0.73	11,934	25
1596	CH11103	59	0.1	12	14.0	0.49	85,334	25
1597	CH11104	59	0.1	15	13.6	0.48	120,347	25
1598	CH11110	59	0.1	15	12.8	0.51	68,035	25
1599	CH11112	52	0.1	15	13.0	0.42	356,380	25
1656	CH11120	-190	*	13	----	----	1	25
1657	CH11129	-188	*	13	----	----	1	25
1658	CH11125	-188	*	13	----	----	1	25
1659	CH11116	-121	10	2	----	----	1,285	25
1660	CH11115	-121	10	2	----	----	1,821	25
1661	CH11118	-121	10	2	----	----	1,122	25
1662	CH11124	-103	10	5	----	----	16,602	25
1663	CH11123	-103	10	5	----	----	12,602	25
1664	CH11121	-103	10	5	----	----	21,683	25
1665	CH11117	-86	10	10	----	----	71,004	25
1666	CH11128	-86	10	12	----	----	168,236	25
1667	CH11126	-86	10	10	----	----	302,383	25

MATERIAL CH12

Lay-up = $[\pm 45/0/\pm 45]s$, V_F = 0.328, Ave. thickness = 3.00 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

1600	CH12114	391	*	13	15.8	5.49	1	25
1601	CH12109	412	*	13	18.0	6.82	1	25
1602	CH12116	393	*	13	16.0	5.92	1	25
1603	CH12121	276	0.1	2	11.4	1.94	2,415	25
1604	CH12108	276	0.1	2	17.7	1.99	1,325	25
1605	CH12118	276	0.1	2	17.9	1.85	2,803	25
1606	CH12102	207	0.1	10	18.6	1.20	108,802	25
1607	CH12101	207	0.1	10	18.6	1.29	65,123	25
1608	CH12117	207	0.1	10	18.2	1.29	82,951	25
1609	CH12107	190	0.1	10	18.8	1.13	244,866	25
1610	CH12119	172	0.1	15	16.3	1.19	476,154	25
1611	CH12106	241	0.1	4	17.9	1.49	9,523	25
1612	CH12105	241	0.1	4	17.5	1.60	4,914	25
1613	CH12120	172	0.1	10	18.7	1.00	389,771	25
1684	CH12143	-442	*	13	----	----	1	25
1685	CH12144	-455	*	13	----	----	1	25
1686	CH12133	-455	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1687	CH12123	-276	10	4	----	----	4,326	25
1688	CH12135	-276	10	2	----	----	7,611	25
1689	CH12124	-276	10	4	----	----	8,723	25
1693	CH12137	-241	10	15	----	----	116,437	25
1694	CH12129	-207	10	15	18.9	-1.09	1,712,433	25
1695	CH12126	-207	10	15	----	----	663,181	25
1696	CH12131	-310	10	2	----	----	4,295	25
1697	CH12140	-310	10	2	----	----	3,815	25
1698	CH12127	-310	10	2	----	----	1,465	25
1699	CH12128	-241	10	10	----	----	64,663	25
1700	CH12146	-345	10	1	----	----	887	25
1701	CH12144	-345	10	1	----	----	266	25
1702	CH12145	-345	10	1	----	----	394	25
Tests 3199 - 3219 involved a gage length of 100 mm (coupon width effect tests).								
3199	CH1225	331	*	13	----	----	1	51
3200	CH1226	317	*	13	----	----	1	51
3201	CH1227	295	*	13	----	----	1	51
3202	CH1231	321	*	13	----	----	1	38
3203	CH1232	316	*	13	----	----	1	38
3204	CH1233	299	*	13	----	----	1	38
3205	CH1234	308	*	13	----	----	1	32
3206	CH1235	304	*	13	----	----	1	32
3207	CH1236	310	*	13	----	----	1	32
3208	CH1237	304	*	13	----	----	1	25
3209	CH1238	304	*	13	----	----	1	25
3210	CH1239	301	*	13	----	----	1	25
3211	CH1240	306	*	13	----	----	1	19
3212	CH1241	297	*	13	----	----	1	19
3213	CH1242	309	*	13	----	----	1	19
3214	CH1243	287	*	13	----	----	1	13
3215	CH1244	273	*	13	----	----	1	13
3216	CH1245	278	*	13	----	----	1	13
3217	CH1246	251	*	13	----	----	1	6
3218	CH1247	255	*	13	----	----	1	6
3219	CH1248	219	*	13	----	----	1	6
Tests 3220 - 3243 involved a gage length of 13 mm (coupon width effect tests).								
3220	CH12121	-312	*	13	----	----	1	51
3221	CH12122	-323	*	13	----	----	1	51
3222	CH12123	-330	*	13	----	----	1	51
3223	CH12124	-333	*	13	----	----	1	44
3224	CH12125	-288	*	13	----	----	1	44
3225	CH12126	-335	*	13	----	----	1	44
3226	CH12127	-336	*	13	----	----	1	38
3227	CH12128	-397	*	13	----	----	1	38
3228	CH12129	-401	*	13	----	----	1	38
3229	CH1210	-384	*	13	----	----	1	32
3230	CH1211	-401	*	13	----	----	1	32
3231	CH1212	-382	*	13	----	----	1	32
2141	CH1213	-359	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2142	CH1214	-358	*	13	----	----	1	25
2143	CH1215	-352	*	13	----	----	1	25
3235	CH1216	-356	*	13	----	----	1	19
3236	CH1217	-351	*	13	----	----	1	19
3237	CH1218	-354	*	13	----	----	1	19
3238	CH1219	-354	*	13	----	----	1	13
3239	CH1220	-328	*	13	----	----	1	13
3240	CH1221	-334	*	13	----	----	1	13
3241	CH1222	-308	*	13	----	----	1	6
3242	CH1223	-352	*	13	----	----	1	6
3243	CH1224	-299	*	13	----	----	1	6
Tests 3301 - 3318 involved a gage length of 100 mm (strain rate effect tests).								
3301	CH12001	366	*	0.025	----	----	1	25
3302	CH12002	328	*	0.025	----	----	1	25
3303	CH12003	345	*	0.025	----	----	1	25
3304	CH12004	387	*	0.25	----	----	1	25
3305	CH12005	388	*	0.25	----	----	1	25
3306	CH12006	379	*	0.25	----	----	1	25
3307	CH12007	430	*	2.54	----	----	1	25
3308	CC12008	413	*	2.54	----	----	1	25
3309	CH12009	419	*	2.54	----	----	1	25
3310	CH12010	440	*	25	----	----	1	25
3311	CH12011	420	*	25	----	----	1	25
3312	CH12012	443	*	25	----	----	1	25
3313	CH12013	455	*	64	----	----	1	25
3314	CH12014	480	*	64	----	----	1	25
3315	CH12015	472	*	64	----	----	1	25
3316	CH12016	437	*	127	----	----	1	25
3317	CH12017	485	*	127	----	----	1	25
3318	CH12018	484	*	127	----	----	1	25
Tests 3319 - 3336 involved a gage length of 13 mm (strain rate effect tests).								
3319	CH12025	-408	*	0.025	----	----	1	25
3320	CH12026	-444	*	0.025	----	----	1	25
3321	CH12027	-377	*	0.025	----	----	1	25
3322	CH12028	-415	*	0.25	----	----	1	25
3323	CH12029	-426	*	0.25	----	----	1	25
3324	CH12030	-443	*	0.25	----	----	1	25
3325	CH12031	-447	*	2.54	----	----	1	25
3326	CH12032	-468	*	2.54	----	----	1	25
3327	CH12033	-424	*	2.54	----	----	1	25
3232	CH12013	-359	*	13	----	----	1	25
3233	CH12014	-358	*	13	----	----	1	25
3234	CH12015	-352	*	13	----	----	1	25
3328	CH12034	-482	*	25	----	----	1	25
3329	CH12035	-500	*	25	----	----	1	25
3330	CH12036	-492	*	25	----	----	1	25
3331	CH12037	-438	*	64	----	----	1	25
3332	CH12038	-402	*	64	----	----	1	25
3333	CH12039	-402	*	64	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3334	CH12040	-455	*	127	----	----	1	25
3335	CH12041	-449	*	127	----	----	1	25
3336	CH12042	-454	*	127	----	----	1	25

MATERIAL CH13

Lay-up = [±45/0/±45]s, V_F = 0.509, Ave. thickness = 3.28 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

1614	CH13113	428	*	13	23.0	----	1	25
1615	CH13108	420	*	13	23.2	----	1	25
1616	CH13107	420	*	13	22.6	2.81	1	25
1617	CH13104	276	0.1	2	22.5	1.68	449	25
1618	CH13114	276	0.1	1	24.4	1.75	301	25
1619	CH13111	276	0.1	1	23.5	1.81	363	25
1620	CH13103	207	0.1	4	23.2	1.24	4,078	25
1621	CH13109	207	0.1	4	23.0	1.24	3,466	25
1622	CH13106	207	0.1	4	23.3	1.24	4,587	25
1623	CH13112	138	0.1	10	23.2	0.70	37,685	25
1624	CH13102	138	0.1	5	23.1	0.74	31,299	25
1625	CH13105	138	0.1	5	23.8	0.70	44,571	25
1626	CH13101	103	0.1	20	23.2	0.50	1,067,315	25
1703	CH13127	-406	*	13	----	----	1	25
1704	CH13128	-378	*	13	----	----	1	25
1705	CH13126	-370	*	13	----	----	1	25
1706	CH13125	-241	10	2	----	----	933	25
1707	CH13121	-241	10	2	----	----	2,759	25
1708	CH13115	-241	10	4	----	----	4,163	25
1709	CH13116	-207	10	10	----	----	8,887	25
1710	CH13123	-138	10	15	----	----	2,000,000	25 R
1711	CH13119	-207	10	10	----	----	10,738	25
1712	CH13120	-207	10	10	----	----	15,164	25
1713	CH13122	-172	10	15	----	----	109,685	25
1714	CH13118	-172	10	10	----	----	61,058	25
1715	CH13124	-172	10	10	----	----	228,268	25
1716	CH13117	-276	10	1	----	----	174	25
1717	CH13110	-276	10	1	----	----	104	25
1718	CH13140	-276	10	1	----	----	212	25

MATERIAL CH14

Lay-up = [±45/0/±45]s, V_F = 0.392, Ave. thickness = 2.49 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

1627	CH14112	548	*	13	23.0	3.06	1	25
1628	CH14106	499	*	13	21.3	3.41	1	25
1629	CH14105	504	*	13	22.5	3.69	1	25
1630	CH14104	345	0.1	1	20.6	2.05	283	25
1631	CH14103	345	0.1	1	22.1	1.87	121	25
1632	CH14116	345	0.1	2	21.0	2.17	266	25
1633	CH14107	276	0.1	4	19.7	1.65	2,344	25
1634	CH14110	276	0.1	4	20.0	1.56	1,280	25
1635	CH14113	276	0.1	4	21.2	1.56	1,709	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1636	CH14118	207	0.1	10	20.1	1.12	11,600	25
1637	CH14119	207	0.1	10	21.6	1.10	17,423	25
1638	CH14102	207	0.1	10	21.4	1.00	22,579	25
1639	CH14115	138	0.1	20	19.8	0.73	2,054,772	25
1640	CH14120	172	0.1	10	17.7	0.90	69,782	25
1641	CH14111	172	0.1	10	21.7	0.89	57,256	25
1642	CH14101	172	0.1	10	22.7	0.84	57,107	25
1719	CH14134	-398	*	13	----	----	1	25
1720	CH14124	-401	*	13	----	----	1	25
1721	CH14123	-437	*	13	----	----	1	25
1722	CH14139	-310	10	2	----	----	903	25
1723	CH14140	-310	10	2	----	----	2,756	25
1724	CH14129	-310	10	2	----	----	1,188	25
1725	CH14133	-276	10	5	----	----	10,716	25
1726	CH14125	-276	10	4	----	----	16,008	25
1727	CH14128	-276	10	5	----	----	11,756	25
1728	CH14131	-241	10	10	----	----	58,134	25
1729	CH14132	-241	10	5	----	----	86,421	25
1730	CH14130	-241	10	10	----	----	78,283	25
1731	CH14126	-207	10	20	----	----	3,000,000	25 R

MATERIAL CH15

Lay-up = [±45/0/±45]s, V_F = 0.324, Ave. thickness = 2.51 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

1732	CH15139	-332	*	13	----	----	1	25
1733	CH15138	-374	*	13	----	----	1	25
1734	CH15128	-331	*	13	----	----	1	25
1735	CH15142	-241	10	2	----	----	996	25
1736	CH15143	-241	10	2	----	----	542	25
1737	CH15147	-241	10	2	----	----	1,345	25
1738	CH15141	-207	10	4	----	----	4,825	25
1739	CH15123	-207	10	4	----	----	9,366	25
1740	CH15122	-207	10	5	----	----	10,507	25
1741	CH15145	-172	10	5	----	----	61,865	25
1742	CH15144	-172	10	10	----	----	54,046	25
1743	CH15137	-172	10	10	----	----	41,806	25
1744	CH15136	-138	10	20	----	----	5,000,000	25 R
1800	CH15105	327	*	13	14.0	3.45	1	25
1801	CH15121	308	*	13	15.3	----	1	25
1802	CH15114	296	*	13	15.2	3.79	1	25
1803	CH15118	207	0.1	2	13.6	2.10	403	25
1804	CH15116	207	0.1	2	15.0	1.87	608	25
1805	CH15113	207	0.1	2	14.3	2.09	270	25
1806	CH15115	172	0.1	4	14.5	1.44	18,054	25
1807	CH15117	172	0.1	4	13.4	1.56	16,456	25
1808	CH15104	172	0.1	4	15.0	1.58	11,511	25
1809	CH15103	138	0.1	10	15.7	1.07	132,279	25
1810	CH15106	138	0.1	10	16.4	0.99	350,007	25
1811	CH15102	138	0.1	10	15.3	1.01	465,775	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1812	CH15101	121	0.1	12	15.4	0.88	1,029,975	25

MATERIAL CH16

Lay-up = $[\pm45/0/\pm45]_S$, V_F = 0.343, Ave. thickness = 2.36 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester

1745	CH16136	-325	*	13	----	----	1	25
1746	CH16122	-295	*	13	----	----	1	25
1747	CH16133	-307	*	13	----	----	1	25
1748	CH16123	-241	10	1	----	----	371	25
1749	CH16129	-241	10	2	----	----	1,216	25
1750	CH16138	-241	10	1	----	----	1,010	25
1751	CH16124	-207	10	4	----	----	7,458	25
1752	CH16130	-207	10	4	----	----	11,541	25
1753	CH16128	-207	10	4	----	----	7,137	25
1754	CH16139	-172	10	5	----	----	162,300	25
1755	CH16132	-172	10	12	----	----	109,008	25
1756	CH16135	-172	10	10	----	----	155,530	25
1757	CH16120	-155	10	15	----	----	596,803	25
1813	CH16102	366	*	13	19.4	3.13	1	25
1814	CH16104	362	*	13	17.1	----	1	25
1815	CH16105	353	*	13	18.3	2.43	1	25
1816	CH16101	241	0.1	1	18.8	1.73	151	25
1817	CH16115	241	0.1	1	18.3	1.89	421	25
1818	CH16118	241	0.1	1	19.9	1.66	580	25
1819	CH16106	207	0.1	2	18.5	1.51	2,805	25
1820	CH16112	207	0.1	2	19.0	1.48	1,746	25
1821	CH16116	207	0.1	2	17.9	1.59	1,203	25
1822	CH16119	172	0.1	4	17.3	1.21	5,928	25
1823	CH16103	172	0.1	4	20.8	1.07	3,595	25
1824	CH16109	172	0.1	4	21.6	1.01	4,508	25
1825	CH16107	138	0.1	5	17.5	0.89	36,647	25
1826	CH16110	138	0.1	5	17.7	0.93	47,119	25
1827	CH16108	138	0.1	5	16.3	0.95	34,528	25
1828	CH16113	121	0.1	10	18.2	0.75	163,247	25
1829	CH16140	103	0.1	15	17.1	0.66	1,247,001	25

MATERIAL CH17

Lay-up = [±45/0/±45]s, V_F = 0.423, Ave. thickness = 1.96 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

1758	CH17130	-303	*	13	----	----	1	25
1759	CH17142	-309	*	13	----	----	1	25
1760	CH17144	-292	*	13	----	----	1	25
1761	CH17154	-241	10	2	----	----	822	25
1762	CH17123	-241	10	2	----	----	1,359	25
1763	CH17125	-241	10	2	----	----	1,847	25
1764	CH17141	-207	10	5	----	----	2,279	25
1765	CH17138	-207	10	4	----	----	1,767	25
1766	CH17140	-207	10	4	----	----	7,278	25
1767	CH17124	-172	10	5	----	----	227,223	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1768	CH17134	-172	10	15	----	----	149,828	25
1769	CH17146	-172	10	10	----	----	83,725	25
1770	CH17137	-155	10	20	----	----	4,030,851	25
1901	CH17201	363	*	13	16.0	4.28	1	25
1902	CH17217	345	*	13	17.7	3.14	1	25
1903	CH17202	369	*	13	18.1	3.32	1	25
1904	CH17205	207	0.1	2	18.0	1.53	1,521	25
1905	CH17209	207	0.1	2	18.6	1.40	841	25
1906	CH17212	207	0.1	2	15.7	1.70	657	25
1907	CH17213	172	0.1	4	18.0	1.20	4,396	25
1908	CH17206	172	0.1	5	18.7	1.17	2,826	25
1909	CH17216	172	0.1	5	17.1	1.26	5,024	25
1910	CH17214	138	0.1	5	17.6	0.89	28,190	25
1911	CH17210	138	0.1	5	16.6	1.02	34,959	25
1912	CH17203	138	0.1	5	17.4	0.98	21,682	25
1913	CH17208	121	0.1	5	18.7	0.74	44,730	25
1914	CH17207	103	0.1	5	18.5	0.61	183,268	25
1915	CH17215	103	0.1	5	17.2	0.65	196,692	25

MATERIAL CH18

Lay-up = [±45/0/±45]s, V_F = 0.451, Ave. thickness = 3.10 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

1771	CH18125	-300	*	13	----	----	1	25
1772	CH18127	-280	*	13	----	----	1	25
1773	CH18129	-313	*	13	----	----	1	25
1774	CH18124	-241	10	1	----	----	120	25
1775	CH18121	-241	10	1	----	----	99	25
1776	CH18120	-241	10	1	----	----	94	25
1777	CH18122	-207	10	2	----	----	1,077	25
1778	CH18123	-207	10	2	----	----	783	25
1779	CH18138	-207	10	2	----	----	1,103	25
1780	CH18118	-172	10	4	----	----	17,383	25
1781	CH18117	-172	10	5	----	----	14,090	25
1782	CH18136	-172	10	10	----	----	18,452	25
1783	CH18128	-138	10	15	----	----	64,880	25
1784	CH18119	-138	10	10	----	----	82,563	25
1785	CH18126	-121	10	15	----	----	1,295,428	25
1872	CH18214	286	*	13	14.0	3.24	1	25
1873	CH18203	302	*	13	17.5	2.98	1	25
1874	CH18212	295	*	13	17.0	3.10	1	25
1875	CH18202	207	0.1	2	17.1	1.87	343	25
1876	CH18208	207	0.1	2	16.1	1.93	187	25
1877	CH18205	207	0.1	2	17.5	1.87	269	25
1878	CH18206	172	0.1	4	17.6	1.45	1,360	25
1879	CH18209	172	0.1	4	18.1	1.44	1,424	25
1880	CH18207	172	0.1	4	17.7	1.40	1,875	25
1881	CH18211	138	0.1	4	15.8	1.12	12,279	25
1882	CH18201	138	0.1	5	20.3	0.94	7,623	25
1883	CH18220	138	0.1	4	17.7	1.10	8,671	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1884	CH18204	103	0.1	5	17.7	0.69	119,853	25
1885	CH18210	103	0.1	5	17.3	0.73	73,139	25
1886	CH18213	86	0.1	10	17.4	0.56	585,178	25

MATERIAL CH19

Lay-up = [±45/0/±45]s, V_F = 0.330, Ave. thickness = 4.60 mm, S.D. = 0.19 mm, CoRezyn 63-AX-051 Polyester

1786	CH19142	-256	*	13	----	----	1	25
1787	CH19128	-253	*	13	----	----	1	25
1788	CH19127	-245	*	13	----	----	1	25
1789	CH19147	-172	10	1	----	----	167	25
1790	CH19134	-176	10	1	----	----	82	25
1791	CH19136	-172	10	1	----	----	56	25
1792	CH19125	-138	10	2	----	----	476	25
1793	CH19141	-138	10	1	----	----	801	25
1794	CH19132	-138	10	1	----	----	1,702	25
1795	CH19143	-103	10	4	----	----	28,708	25
1796	CH19122	-103	10	5	----	----	14,379	25
1797	CH19137	-103	10	10	----	----	51,234	25
1798	CH19130	-86	10	10	----	----	928,343	25
1799	CH19120	-86	10	15	----	----	622,350	25
1887	CH19201	192	*	13	11.7	3.88	1	25
1888	CH19210	196	*	13	10.8	3.85	1	25
1889	CH19207	191	*	13	11.6	3.87	1	25
1890	CH19202	121	0.1	4	12.3	1.21	5,507	25
1891	CH19214	121	0.1	2	12.1	1.35	4,586	25
1892	CH19206	121	0.1	2	11.9	1.13	5,100	25
1893	CH19209	103	0.1	5	12.3	1.05	32,613	25
1894	CH19204	103	0.1	5	12.7	0.99	17,152	25
1895	CH19203	86	0.1	10	11.7	0.78	324,779	25
1896	CH19205	103	0.1	5	11.7	1.05	27,183	25
1897	CH19208	86	0.1	10	11.2	0.83	278,576	25
1898	CH19220	86	0.1	12	12.2	0.82	423,198	25
1899	CH19211	138	0.1	1	12.0	1.43	850	25
1900	CH19212	138	0.1	1	11.7	1.55	1,414	25

MATERIAL CH20

Lay-up = [(±45)$_3$]s, V_F = 0.260, Ave. thickness = 3.76 mm, S.D. = 0.15 mm, CoRezyn 63-AX-051 Polyester

3003	CH20116	136	*	13	10.9	1.60	1	25
3004	CH20121	141	*	13	10.2	1.40	1	25
3005	CH20115	124	*	13	10.6	1.70	1	25
3006	CH20101	51.7	0.1	12	12.0	0.52	136,994	25
3007	CH20107	86	0.1	2	10.5	1.09	1,458	25
3008	CH20105	86	0.1	2	11.9	0.96	1,169	25
3009	CH20106	86	0.1	2	10.0	1.25	1,456	25
3010	CH20119	69.0	0.1	4	11.3	0.76	9,530	25
3011	CH20113	51.7	0.1	4	10.4	0.56	199,855	25
3012	CH20110	69.0	0.1	5	10.6	0.83	10,324	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3013	CH20114	69.0	0.1	4	10.4	0.82	7,214	25
3014	CH20131	-232	*	13	----	----	1	25
3015	CH20130	-233	*	13	----	----	1	25
3016	CH20132	-224	*	13	----	----	1	25

MATERIAL CH23

Lay-up = [±45/0/±45]s, V_F = 0.320, Ave. thickness = 2.95 mm, S.D. = 0.13 mm, CoRezyn 63-AX-051 Polyester

3017	CH23111	410	*	13	20.0	2.15	1	25
3018	CH23112	369	*	13	17.0	2.37	1	25
3019	CH23103	402	*	13	20.6	2.10	1	25
3020	CH23104	276	0.1	2	21.2	1.51	331	25
3021	CH23118	207	0.1	4	17.2	1.35	2,311	25
3022	CH23119	207	0.1	4	17.8	1.29	2,596	25
3023	CH23110	207	0.1	4	18.3	1.24	3,577	25
3024	CH23114	138	0.1	5	19.5	0.76	84,094	25
3025	CH23106	138	0.1	5	18.2	0.79	69,137	25
3026	CH23147	-207	10	5	----	----	147,440	25
3027	CH23141	-207	10	5	----	----	81,067	25
3028	CH23160	-444	*	13	----	----	1	25
3029	CH23148	-464	*	13	----	----	1	25
3030	CH23144	-435	*	13	----	----	1	25
3031	CH23168	-276	10	4	----	----	7,443	25
3032	CH23143	-276	10	4	----	----	1,786	25
3033	CH23161	-276	10	4	----	----	6,288	25
3034	CH23143	-207	10	10	----	----	128,233	25
3035	CH23121	276	0.1	1	21.4	1.66	77	25
3036	CH23109	276	0.1	2	18.4	1.93	403	25
3037	CH23115	138	0.1	10	18.1	0.79	98,304	25

MATERIAL DD

Lay-up = [0/±45/0_3/±45/0], V_F = 0.509, Ave. thickness = 2.67 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

1023	DD101	903	*	13	31.9	2.84	1	22
1024	DD103	893	*	13	29.0	3.07	1	22
1025	DD102	934	*	13	30.6	3.10	1	22
1026	DD112	552	0.1	2	31.4	1.76	1,065	22
1027	DD114	552	0.1	2	32.3	1.70	807	22
1028	DD108	552	0.1	2	28.9	1.90	631	22
1029	DD118	483	0.1	5	30.5	1.58	3,044	22
1030	DD113	483	0.1	5	30.9	1.56	1,937	22
1031	DD117	483	0.1	5	30.5	1.58	2,377	22
1032	DD116	414	0.1	5	31.3	1.32	4,997	22
1033	DD119	414	0.1	5	32.4	1.27	8,143	22
1034	DD115	345	0.1	5	32.4	1.06	25,503	22
1035	DD104	345	0.1	5	30.1	1.14	28,657	22
1036	DD110	276	0.1	15	35.2	0.78	64,373	22
1037	DD111	276	0.1	15	29.7	0.92	87,936	22
1038	DD106	207	0.1	15	32.7	0.63	704,401	22

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1039	DD109	207	0.1	15	30.6	0.68	1,062,397	22
1040	DD107	207	0.1	20	32.6	0.63	947,447	22
1123	DD105	-781	*	13	----	----	1	25
1124	DD201	-795	*	13	----	----	1	25

MATERIAL DD2

Lay-up = $[0/\pm45/0]_S$, V_F = 0.441, Ave. thickness = 2.64 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

1043	DD2106	767	*	13	28.6	2.70	1	22
1044	DD2102	757	*	13	30.0	2.53	1	25
1045	DD2114	731	*	13	25.7	2.90	1	22
1046	DD2105	414	0.1	5	27.2	1.52	9,691	25
1047	DD2113	414	0.1	5	25.9	1.61	6,904	22
1048	DD2107	483	0.1	4	27.9	1.80	883	22
1049	DD2117	483	0.1	4	26.1	1.85	1,055	22
1050	DD2108	276	0.1	15	25.2	1.10	766,525	22
1051	DD2110	345	0.1	15	27.2	1.27	71,702	22
1052	DD2111	345	0.1	20	28.9	1.19	59,123	22
1053	DD2109	345	0.1	15	27.9	1.23	62,149	22
1060	DD2115	276	0.1	15	24.7	1.11	655,028	22
1078	DD2116	276	0.1	20	25.5	1.08	697,390	22
1285	DD2171	-579	*	13	----	----	1	25
1286	DD2164	-609	*	13	----	----	1	25
1287	DD2170	-554	*	13	----	----	1	25
1288	DD2163	-414	10	2	----	----	2,311	25
1289	DD2169	-414	10	5	----	----	3,675	25
1290	DD2168	-379	10	5	----	----	24,450	25
1291	DD2167	-379	10	5	----	----	18,781	25
1292	DD2152	-345	10	15	----	----	82,800	25
1293	DD2153	-372	10	10	----	----	19,205	25
1294	DD2161	-310	10	20	----	----	636,142	25
1295	DD2158	-310	10	20	----	----	868,215	25
1296	DD2173	-345	10	15	----	----	111,458	25
1297	DD2176	-414	10	5	----	----	3,775	25
1298	DD2162	-345	10	10	----	----	147,520	25
1299	DD2165	-310	10	20	----	----	1,054,781	25

MATERIAL DD2A

Lay-up = $[0/\pm45/0]_S$, V_F = 0.447, Ave. thickness = 2.61 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester
Due to variations of ultimate strengths with the D155 fabrics (roll-to-roll), a second batch of coupons were manufactured and tested.

4037	DD2A200	345	0.1	5	28.3	1.29	124,809	22 tab
4038	DD2A201	345	0.1	4	29.1	1.33	126,545	22 tab
4039	DD2A202	345	0.1	4	28.5	1.28	153,886	22 tab
4040	DD2A204	1,015	*	13	31.5	3.2	1	22 tab
4041	DD2A205	944	*	13	26.9	3.5	1	22 tab
4042	DD2A207	998	*	13	29.4	3.4	1	22 tab
4043	DD2A206	276	0.1	10	27.2	1.02	1,490,033	22 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4044	DD2A208	276	0.1	8	28.7	0.99	564,480	22 tab
4864	DD2A212	276	0.1	8	28.6	1.00	1,849,488	25 tab

MATERIAL DD4

Lay-up = $[0/\pm45/0]_S$, V_F = 0.481, Ave. thickness = 2.36 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

1061	DD4108	276	0.1	15	27.7	1.00	106,008	22
1062	DD4103	276	0.1	15	28.6	0.97	74,777	22
1063	DD4102	414	0.1	5	29.3	1.41	6,714	22
1064	DD4113	414	0.1	5	32.2	1.28	8,257	22
1065	DD4109	414	0.1	5	30.7	1.35	8,821	22
1066	DD4117	903	*	13	27.9	3.30	1	22
1067	DD4101	901	*	13	31.0	2.91	1	22
1068	DD4114	880	*	13	29.4	2.99	1	22
1069	DD4110	517	0.1	4	35.5	1.46	1,438	22
1070	DD4120	517	0.1	4	----	----	1,284	22
1071	DD4104	345	0.1	10	33.9	1.02	18,821	22
1072	DD4111	345	0.1	10	34.8	0.99	18,293	22
1073	DD4106	345	0.1	10	----	----	22,542	22
1074	DD4118	276	0.1	15	32.7	0.84	118,241	22
1075	DD4115	207	0.1	15	31.6	0.66	278,835	22
1076	DD4116	207	0.1	20	28.3	0.73	386,766	22
1077	DD4105	193	0.1	20	----	----	2,426,414	22
1304	DD4130	-515	*	13	----	----	1	25
1305	DD4131	-519	*	13	----	----	1	25
3083	DD4163	-590	*	13	----	----	1	25
3084	DD4156	-514	*	13	----	----	1	25
3085	DD4151	-566	*	13	----	----	1	25
3105	DD4191	345	-1	2	----	----	972	25
3106	DD4160	345	-1	2	----	----	793	25
3107	DD4165	345	-1	2	----	----	1,436	25
3108	DD4106	861	*	--	----	----	1	25
3109	DD4158	207	-1	5	----	----	83,385	25
3110	DD4157	276	-1	4	----	----	13,351	25
3111	DD4167	276	-1	4	----	----	17,873	25
3112	DD4159	276	-1	4	----	----	9,178	25
3113	DD4150	172	-1	8	----	----	218,504	25
3114	DD4162	207	-1	5	----	----	47,671	25 tab
3115	DD4152	207	-1	4	----	----	63,270	25 tab
3116	DD4161	138	-1	12	----	----	2,000,000	25 R tab

MATERIAL DD5

Lay-up = $[0/\pm45/0]_S$, V_F = 0.374, Ave. thickness = 2.97 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester

1079	DD5113	703	*	13	26.6	2.78	1	22
1080	DD5108	740	*	13	23.8	3.10	1	22
1081	DD5112	729	*	13	23.7	3.08	1	22
1082	DD5109	207	0.1	20	25.2	0.82	5,000,000	22 R
1083	DD5107	483	0.1	2	24.1	2.00	2,386	22

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1084	DD5116	483	0.1	2	27.9	1.72	2,650	22
1085	DD5106	483	0.1	2	26.8	1.80	1,996	22
1086	DD5119	414	0.1	5	24.7	1.67	20,246	22
1087	DD5117	276	0.1	20	24.1	1.20	1,500,000	22 R
1088	DD5104	414	0.1	15	25.4	1.63	14,980	22
1089	DD5102	414	0.1	15	28.1	1.47	12,469	22
1090	DD5118	276	0.1	20	26.7	1.03	1,103,247	22
1091	DD5114	345	0.1	15	22.9	1.51	127,898	22
1092	DD5103	345	0.1	15	23.0	1.50	145,581	22
1093	DD5105	345	0.1	15	25.2	1.37	169,754	22
1094	DD5115	276	0.1	20	----	----	1,033,583	22
1302	DD5130	-553	*	13	----	----	1	25
1303	DD5131	-514	*	13	----	----	1	25
1835	DD5105	-781	*	13	----	----	1	25
1836	DD5201	-795	*	13	----	----	1	25

MATERIAL DD5E

Lay-up = $[0/\pm45/0]_S$, V_F = 0.362, Ave. thickness = 3.10 mm, S.D. = 0.07 mm, Epon 9410 Epoxy

1859	DD5E406	680	*	13	22.8	2.98	1	22
1860	DD5E403	662	*	13	22.8	2.90	1	22
1861	DD5E408	682	*	13	24.4	2.80	1	22
1940	DD5E419	-528	*	13	27.2	----	1	25
1942	DD5E415	-531	*	13	27.2	----	1	25
1943	DD5E418	-503	*	13	25.3	----	1	25
1962	DD5E424	-345	10	10	----	----	334,460	25
1963	DD5E424	-345	10	5	----	----	1,176,784	25
1964	DD5E420	-379	10	4	----	----	85,056	25
1965	DD5E426	-379	10	4	----	----	59,318	25
1966	DD5E422	-379	10	4	----	----	143,526	25
1967	DD5E416	-414	10	2	----	----	5,232	25
1968	DD5E425	-414	10	2	----	----	7,541	25
1970	DD5E421	-345	10	10	----	----	1,740,718	25 R
1971	DD5E428	-414	10	4	----	----	3,855	25
1982	DD5E411	276	0.1	10	23.3	1.19	348,038	22 tab
1983	DD5E409	276	0.1	10	21.5	1.31	498,494	22 tab
1984	DD5E401	276	0.1	10	23.9	1.24	899,308	22 tab
1985	DD5E412	345	0.1	5	23.4	1.51	34,642	22 tab
1986	DD5E405	345	0.1	5	22.3	1.54	67,480	22 tab
1987	DD5E410	414	0.1	2	22.7	1.83	878	22 tab
1988	DD5E414	414	0.1	2	24.4	1.76	2,429	22
1989	DD5E407	345	0.1	5	22.7	1.54	52,731	22
1990	DD5E402	483	0.1	1	21.8	2.28	69	22 tab
1991	DD5E413	241	0.1	15	21.6	1.19	2,441,330	22
2986	DD5E251	310	-1	2	----	----	1,387	25
2987	DD5E261	310	-1	2	----	----	380	25
2988	DD5E254	310	-1	2	----	----	1,130	25
2989	DD5E252	207	-1	4	----	----	23,990	25
2990	DD5E259	207	-1	4	----	----	31,172	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2991	DD5E252	207	-1	4	----	----	92,394	25
2992	DD5E260	172	-1	5	----	----	191,803	25
2993	DD5E258	276	-1	2	----	----	1,072	25
2994	DD5E256	276	-1	2	----	----	601	25
2995	DD5E257	276	-1	2	----	----	2,665	25
2996	DD5E262	155	-1	10	----	----	1,060,993	25
2997	DD5E263	172	-1	10	----	----	168,947	25
2998	DD5E250	172	-1	10	----	----	305,106	25
2999	DD5E270	155	-1	12	----	----	1,463,729	25
3000	DD5E286T	76	*	13	7.31	1.04	1	25
3001	DD5E281T	73	*	13	8.76	0.84	1	25
3002	DD5E280T	64	*	13	7.24	0.89	1	25

MATERIAL DD5E3

Lay-up = $[0/\pm45/0]_S$, V_F = 0.358, Ave. thickness = 3.14 mm, S.D. = 0.08 mm, Prime 20 Epoxy

8686	DD5E3-110	-558	*	13	----	----	1	25
8732	DD5E3-109	-628	*	13	----	----	1	25
8733	DD5E3-108	-579	*	13	----	----	1	25
8734	DD5E3-106	-568	*	13	----	----	1	25
8735	DD5E3-107	-345	10	4	----	----	238,243	25
8655	DD5E3-112	-345	10	4	----	----	506,692	25
8656	DD5E3-111	-345	10	4	----	----	148,535	25
8657	DD5E3-113	-310	10	6	----	----	1,698,851	25
8666	DD5E3-117	-414	10	2	----	----	14,696	25
8667	DD5E3-127	-414	10	2	----	----	6,857	25
8668	DD5E3-148	-414	10	2	----	----	4,644	25
8706	DD5E3-139	-310	10	6	----	----	5,286,161	25
8707	DD5E3-140	-310	10	6	----	----	3,370,820	25
8694	DD5E3-124	-483	10	1	----	----	165	25
8695	DD5E3-126	-483	10	1	----	----	48	25
8696	DD5E3-128	-483	10	1	----	----	21	25
8658	DD5E3-102	310	-1	1	----	----	2,760	25
8659	DD5E3-104	207	-1	3	----	----	318,717	25
8660	DD5E3-103	207	-1	3	----	----	363,610	25
8661	DD5E3-119	207	-1	2	----	----	280,106	25
8662	DD5E3-120	310	-1	1	----	----	3,397	25
8663	DD5E3-123	310	-1	1	----	----	8,244	25
8664	DD5E3-130	172	-1	4	----	----	1,948,998	25
8665	DD5E3-133	172	-1	5	----	----	3,170,897	25
8697	DD5E3-122	414	-1	1	----	----	93	25
8698	DD5E3-105	414	-1	1	----	----	22	25
8699	DD5E3-116	414	-1	1	----	----	35	25
6793	DD5E3-152	758	*	13	23.5	3.23	1	25
6794	DD5E3-151	779	*	13	23.8	3.27	1	25
6795	DD5E3-150	791	*	13	24.2	3.26	1	25
8963	DD5E3-330	-414	10	3	----	----	3,331	25
8964	DD5E3-331	-379	10	4	----	----	17,797	25
8965	DD5E3-339	-345	10	3	----	----	157,762	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
8966	DD5E3-332	-345	10	3	----	----	465,515	25
8967	DD5E3-334	-345	10	4	----	----	286,557	25
8968	DD5E3-337	-379	10	2	----	----	50,604	25
8969	DD5E3-338	-379	10	2	----	----	54,304	25

MATERIAL DD5E4

Lay-up = $[0/\pm45/0]_S$, V_F = 0.35, Ave. thickness = 3.20 mm, S.D. = 0.08 mm, Jeffco 1401-12 epoxy

Tests 6796 - 6898 used 1401-17 hardener and were room temperature cure materials only.

6796	DD5E4-106	752	*	13	24.8	3.03	1	25
6797	DD5E4-105	725	*	13	22.7	3.2	1	25
6798	DD5E4-104	793	*	13	24.0	3.0	1	25

Tests 6799 - 6802 used 1401-17 hardener and were room temperature cure materials only.

6799	DD5E4-100	-533	*	13	23.5	-2.0	1	25
6800	DD5E4-101	-421	*	13	----	----	1	25
6801	DD5E4-102	-531	*	13	----	----	1	25
6802	DD5E4-103	-456	*	13	----	----	1	25

Tests 7093 - 7097 used Jeffco 4101-18 hardener and were post cured for 14 hours at 50C and 2 hours at 85C

7093	DD5E4-210	-580	*	13	23.8	-2.4	1	25
7094	DD5E4-211	-578	*	13	----	----	1	25
7095	DD5E4-212	-575	*	13	----	----	1	25
7096	DD5E4-214	-572	*	13	----	----	1	25
7097	DD5E4-215	-595	*	13	----	----	1	25

Tests 8801 - 8805 used Jeffco 4102 hardener and were post cured for 14 hours at 60C and 2 hours at 85C

8801	DD5E4-221	-595	*	13	22.9	-2.6	1	25
8802	DD5E4-222	-604	*	13	----	----	1	25
8803	DD5E4-223	-601	*	13	----	----	1	25
8804	DD5E4-224	-585	*	13	----	----	1	25
8805	DD5E4-225	-607	*	13	----	----	1	25

Tests 8811 - 8815 used 1401-17 hardener and were post cured for 14 hours at 60C and 2 hours at 85C.

8811	DD5E4-231	-594	*	13	24.4	-2.4	1	25
8812	DD5E4-232	-567	*	13	----	----	1	25
8813	DD5E4-233	-568	*	13	----	----	1	25
8814	DD5E4-234	-583	*	13	----	----	1	25
8815	DD5E4-235	-562	*	13	----	----	1	25

Tests 7084 - 7087, 8970 - 8976 used 1401-17 hardener and were post cured for 14 hours at 60C and 2 hours at 85C

7084	DD5E4-201	-533	*	13	24.4	-2.4	1	25
7085	DD5E4-202	-535	*	13	----	----	1	25
7086	DD5E4-203	-562	*	13	----	----	1	25
7087	DD5E4-204	-569	*	13	----	----	1	25
8970	DD5E4-310	-379	10	3	----	----	86,481	25
8971	DD5E4-311	-379	10	3	----	----	20,718	25
8972	DD5E4-314	-379	10	3	----	----	20,000	25 R
8973	DD5E4-317	-362	10	4	----	----	192,134	25
8974	DD5E4-318	-362	10	4	----	----	320,026	25
8975	DD5E4-313	-632	10	4	----	----	253,637	25
8976	DD5E4-316	-379	10	2	----	----	25,520	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL DD5P

Lay-up = $[0/\pm45/0]_S$, V_F = 0.372, Ave. thickness = 3.02 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester

1853	DD5P206	683	*	13	23.6	2.94	1	22
1854	DD5P209	682	*	13	24.7	2.76	1	22
1855	DD5P214	617	*	13	22.3	2.78	1	22
1871	DD5P201	241	0.1	15	25.7	0.95	8,000,000	22 R
1937	DD5P221	-581	*	13	26.3	----	1	25
1938	DD5P228	-557	*	13	25.0	----	1	25
1939	DD5P219	-586	*	13	25.2	----	1	25
1953	DD5P215	-414	10	2	----	----	5,041	25
1954	DD5P224	-414	10	2	----	----	9,422	25
1955	DD5P218	-414	10	2	----	----	8,491	25
1956	DD5P223	-379	10	5	----	----	178,704	25
1957	DD5P225	-379	10	5	----	----	63,853	25
1958	DD5P216	-379	10	4	----	----	72,641	25
1959	DD5P217	-345	10	10	----	----	344,570	25
1960	DD5P226	-345	10	10	----	----	424,220	25
1961	DD5P227	-345	10	15	----	----	661,103	25
1973	DD5P207	483	0.1	1	24.3	2.20	86	22 tab
1974	DD5P205	414	0.1	2	23.5	1.85	2,102	22 tab
1975	DD5P208	414	0.1	2	24.3	1.74	1,045	22 tab
1976	DD5P212	345	0.1	4	23.9	1.48	36,290	22 tab
1977	DD5P204	345	0.1	5	23.5	1.67	43,703	22 tab
1978	DD5P203	345	0.1	5	24.4	1.43	28,269	22
1979	DD5P210	276	0.1	10	22.7	1.24	857,025	22
1980	DD5P211	276	0.1	10	23.0	1.22	357,553	22 tab
1981	DD5P213	276	0.1	10	21.3	1.18	481,129	22 tab
2965	DD5P255	414	-1	2	----	----	21	25
2966	DD5P259	345	-1	2	----	----	634	25
2967	DD5P260	345	-1	1	----	----	121	25
2968	DD5P251	345	-1	2	----	----	810	25
2969	DD5P250	310	-1	2	----	----	1,360	25
2970	DD5P254	310	-1	1	----	----	163	25
2971	DD5P252	276	-1	2	----	----	5,179	25
2972	DD5P253	276	-1	2	----	----	2,038	25
2973	DD5P257	276	-1	2	----	----	2,131	25
2974	DD5P256	207	-1	4	----	----	16,718	25
2975	DD5P261	207	-1	4	----	----	26,796	25
2976	DD5P258	155	-1	10	----	----	986,000	25 R
2977	DD5P262	172	-1	5	----	----	106,267	25
2978	DD5P257	172	-1	4	----	----	79,563	25
2979	DD5P162	155	-1	10	----	----	561,486	25

Tests 2980 - 2985 were transverse tests tested in the $[90/\pm45/90]_S$ direction

2980	DD5P263T	53	*	13	8.96	0.59	1	25
2981	DD5P264T	54	*	13	8.83	0.61	1	25
2982	DD5P265T	56	*	13	8.89	0.63	1	25
2983	DD5P269T	-170	*	13	----	----	1	25
2984	DD5P267T	-153	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2985	DD5P266T	-163	*	13	----	----	1	25
Tests 3150 - 3180 involved a gage length of 13 mm (width effect tests).								
3150	DD5P001	-591	*	13	----	----	1	51
3151	DD5P002	-662	*	13	----	----	1	51
3152	DD5P003	-674	*	13	----	----	1	51
3153	DD5P004	-622	*	13	----	----	1	51
3154	DD5P005	-624	*	13	----	----	1	44
3155	DD5P006	-616	*	13	----	----	1	44
3156	DD5P007	-671	*	13	----	----	1	44
3157	DD5P008	-649	*	13	----	----	1	44
3158	DD5P009	-597	*	13	----	----	1	38
3159	DD5P010	-604	*	13	----	----	1	38
3160	DD5P011	-638	*	13	----	----	1	38
3161	DD5P012	-695	*	13	----	----	1	38
3162	DD5P013	-649	*	13	----	----	1	32
3163	DD5P014	-648	*	13	----	----	1	32
3164	DD5P015	-666	*	13	----	----	1	32
3165	DD5P016	-650	*	13	----	----	1	32
3166	DD5P061	-687	*	13	----	----	1	25
3167	DD5P062	-634	*	13	----	----	1	25
3168	DD5P063	-671	*	13	----	----	1	25
3169	DD5P021	-588	*	13	----	----	1	19
3170	DD5P022	-580	*	13	----	----	1	19
3171	DD5P023	-630	*	13	----	----	1	19
3172	DD5P024	-610	*	13	----	----	1	19
3173	DD5P025	-614	*	13	----	----	1	13
3174	DD5P026	-550	*	13	----	----	1	13
3175	DD5P027	-581	*	13	----	----	1	13
3176	DD5P028	-607	*	13	----	----	1	13
3177	DD5P029	-495	*	13	----	----	1	6
3178	DD5P030	-549	*	13	----	----	1	6
3179	DD5P031	-539	*	13	----	----	1	6
3180	DD5P032	-519	*	13	----	----	1	6
Tests 3181 - 3198 involved a gage length of 100 mm (width effect tests).								
3181	DD5P28	853	*	13	----	----	1	38
3182	DD5P29	861	*	13	----	----	1	38
3183	DD5P30	825	*	13	----	----	1	38
3184	DD5P31	824	*	13	----	----	1	32
3185	DD5P32	843	*	13	----	----	1	32
3186	DD5P33	840	*	13	----	----	1	32
3187	DD5P13	852	*	13	----	----	1	25
3188	DD5P14	774	*	13	----	----	1	25
3189	DD5P15	825	*	13	----	----	1	25
3190	DD5P037	787	*	13	----	----	1	19
3191	DD5P038	814	*	13	----	----	1	19
3192	DD5P039	792	*	13	----	----	1	19
3193	DD5P040	737	*	13	----	----	1	13
3194	DD5P041	792	*	13	----	----	1	13
3195	DD5P042	683	*	13	----	----	1	13

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3196	DD5P043	536	*	13	----	----	1	6
3197	DD5P044	526	*	13	----	----	1	6
3198	DD5P045	537	*	13	----	----	1	6
Tests 3244 - 3276 involved a gage length of 13 mm (strain rate effect tests).								
3244	DD5P17	-502	*	0.0025	----	----	1	25
3245	DD5P18	-492	*	0.0025	----	----	1	25
3246	DD5P19	-497	*	0.0025	----	----	1	25
3247	DD5P40	-582	*	0.025	----	----	1	25
3248	DD5P41	-591	*	0.025	----	----	1	25
3249	DD5P42	-528	*	0.025	----	----	1	25
3250	DD5P43	-626	*	0.25	----	----	1	25
3251	DD5P44	-592	*	0.25	----	----	1	25
3252	DD5P45	-547	*	0.25	----	----	1	25
3253	DD5P46	-585	*	1.27	----	----	1	25
3254	DD5P47	-578	*	1.27	----	----	1	25
3255	DD5P48	-577	*	1.27	----	----	1	25
3256	DD5P49	-588	*	2.54	----	----	1	25
3257	DD5P50	-628	*	2.54	----	----	1	25
3258	DD5P51	-581	*	2.54	----	----	1	25
3259	DD5P52	-653	*	6.35	----	----	1	25
3260	DD5P53	-624	*	6.35	----	----	1	25
3261	DD5P54	-674	*	6.35	----	----	1	25
3262	DD5P55	-671	*	13	----	----	1	25
3263	DD5P56	-662	*	13	----	----	1	25
3264	DD5P57	-656	*	13	----	----	1	25
3265	DD5P58	-697	*	19	----	----	1	25
3266	DD5P59	-689	*	19	----	----	1	25
3267	DD5P60	-676	*	19	----	----	1	25
3268	DD5P61	-678	*	25	----	----	1	25
3269	DD5P62	-692	*	25	----	----	1	25
3270	DD5P63	-675	*	25	----	----	1	25
3271	DD5P64	-692	*	64	----	----	1	25
3272	DD5P65	-671	*	64	----	----	1	25
3273	DD5P66	-709	*	64	----	----	1	25
3274	DD5P67	-697	*	127	----	----	1	25
3275	DD5P68	-704	*	127	----	----	1	25
3276	DD5P69	-665	*	127	----	----	1	25
Tests 3277 - 3300 involved a gage length of 100 mm (strain rate effect tests).								
3277	DD5P1	552	*	0.0025	----	----	1	25
3278	DD5P2	592	*	0.0025	----	----	1	25
3279	DD5P3	585	*	0.0025	----	----	1	25
3280	DD5P4	624	*	0.025	----	----	1	25
3281	DD5P5	614	*	0.025	----	----	1	25
3282	DD5P6	610	*	0.025	----	----	1	25
3283	DD5P7	730	*	0.25	----	----	1	25
3284	DD5P8	722	*	0.25	----	----	1	25
3285	DD5P9	705	*	0.25	----	----	1	25
3286	DD5P10	748	*	2.54	----	----	1	25
3287	DD5P11	736	*	2.54	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3288	DD5P12	757	*	2.54	----	----	1	25
3289	DD5P13	852	*	13	----	----	1	25
3290	DD5P14	834	*	13	----	----	1	25
3291	DD5P15	825	*	13	----	----	1	25
3292	DD5P16	763	*	25	----	----	1	25
3293	DD5P17	778	*	25	----	----	1	25
3294	DD5P18	841	*	25	----	----	1	25
3295	DD5P19	810	*	64	----	----	1	25
3296	DD5P20	919	*	64	----	----	1	25
3297	DD5P21	876	*	64	----	----	1	25
3298	DD5P22	916	*	127	----	----	1	25
3299	DD5P23	903	*	127	----	----	1	25
3300	DD5P24	895	*	127	----	----	1	25
Tests 3455 - 3533 involved different coupon geometries (standard and mini-coupon) and frequencies.								
3455	DD5P550	414	0.1	2	26.7	1.58	8,157	22
3456	DD5P520	414	0.1	2	26.6	1.64	12,185	22
3457	DD5P524	414	0.1	2	23.6	1.70	11,533	22
3458	DD5P511	414	0.1	2	23.6	1.71	6,716	22
3459	DD5P555	414	0.1	2	24.2	1.72	12,041	22
3460	DD5P510	414	0.1	2	26.0	1.61	7,640	22
3461	DD5P501	414	0.1	2	23.5	1.67	11,085	22
3462	DD5P551	414	0.1	2	25.3	1.65	9,930	22
3463	DD5P533	414	0.1	2	25.3	1.66	9,191	22
3464	DD5P517	414	0.1	2	24.2	1.73	9,067	22
3465	DD5P542	310	0.1	10	25.9	1.26	514,201	22
3466	DD5P508	310	0.1	10	23.1	1.28	285,386	22
3467	DD5P521	310	0.1	10	23.6	1.22	351,717	22
3468	DD5P560	310	0.1	10	24.0	1.31	345,652	22
3469	DD5P519	310	0.1	10	24.3	1.34	749,084	22
3470	DD5P544	310	0.1	10	24.3	1.28	579,002	22 tab
3471	DD5P504	414	0.1	2	23.5	1.69	9,912	22 tab
3472	DD5P564	414	0.1	2	----	----	16,271	22 tab
3473	DD5P503	414	0.1	2	----	----	5,305	22 tab
3474	DD5P515	414	0.1	2	----	----	10,499	22 tab
3475	DD5P525	310	0.1	10	----	----	342,738	22 tab
3476	DD5P540	310	0.1	10	----	----	228,420	22 tab
3477	DD5P506	310	0.1	10	----	----	376,933	22 tab
3478	DD5P541	414	0.1	2	----	----	8,883	22 tab
3479	DD5P502	310	0.1	10	24.6	1.30	403,000	22 tab
3498	DD5P605	241	0.1	30	----	----	2,820,426	8 tab
3499	DD5P601	207	0.1	40	----	0.89	10,027,337	8 tab
3500	DD5P602	241	0.1	20	----	----	1,548,025	8 tab
3501	DD5P601	241	0.1	25	----	----	348,666	8 tab
3502	DD5P606	241	0.1	20	----	----	1,016,251	8 tab
3530	DD5P614	241	0.1	25	23.6	1.04	2,312,896	8 tab
3531	DD5P612	207	0.1	40	----	0.91	22,002,386	8 tab
3525	DD5P603	193	0.1	45	23.6	0.82	39,082,107	8 tab
3526	DD5P610	414	0.1	2	----	----	8,123	8 tab
3527	DD5P604	414	0.1	2	----	----	18,264	8 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3528	DD5P613	414	0.1	2	----	----	8,358	8 tab
3529	DD5P643	241	0.1	10	----	----	2,668,144	8 tab
3532	DD5P628	241	0.1	10	----	----	2,823,516	8 tab
3533	DD5P599	241	0.1	10	----	----	3,554,421	8 tab
Tests 3534 - 3556 were run at different frequencies to study thermal and mechanical effects.								
3534	DD5P635	310	0.1	10	----	----	594,298	8 tab
3535	DD5P634	310	0.1	10	----	----	537,593	8 tab
3536	DD5P631	310	0.1	10	----	----	252,317	8 tab
3537	DD5P637	310	0.1	10	----	----	296,456	8 tab
3538	DD5P636	310	0.1	10	----	----	275,551	8 tab
3539	DD5P627	310	0.1	10	----	----	261,531	8 tab
3540	DD5P638	310	0.1	5	----	----	379,674	8 tab
3541	DD5P629	310	0.1	5	----	----	240,098	8 tab
3542	DD5P642	310	0.1	5	----	----	458,684	8 tab
3543	DD5P570	310	0.1	2	----	----	304,764	8 tab
3544	DD5P571	310	0.1	2	----	----	227,372	8 tab
3545	DD5P563	310	0.1	2	----	----	247,249	8 tab
3546	DD5P633	310	0.1	20	----	----	404,285	8 tab
3547	DD5P622	310	0.1	20	----	----	432,281	8 tab
3548	DD5P630	310	0.1	20	----	----	731,478	8 tab
3549	DD5P620	310	0.1	2	----	----	196,929	8 tab
3550	DD5P623	310	0.1	30	----	----	59,971	8 tab
3554	DD5P509	310	0.1	1	25.6	1.21	284,133	22 tab
3555	DD5P580	310	0.1	1	----	----	213,190	22 tab
3556	DD5P581	310	0.1	1	----	----	198,210	22 tab
Tests 3850 - 3869 were transverse tests tested in the $[90/\pm45/90]_S$ direction								
3850	DD5P624T	-145	*	13	----	----	1	25
3851	DD5P633T	-142	*	13	----	----	1	25
3852	DD5P625T	-158	*	13	----	----	1	25
3853	DD5P601T	67	*	13	9.21	1.33	1	25
3854	DD5P602T	65	*	13	8.84	1.28	1	25
3855	DD5P603T	66	*	13	9.31	1.35	1	25
3856	DD5P604T	24	0.1	10	8.46	0.29	3,846,149	25
3857	DD5P605T	31	0.1	5	8.62	0.45	160,829	25
3858	DD5P606T	31	0.1	5	8.33	0.48	84,821	25
3859	DD5P607T	35	0.1	5	9.20	0.57	39,239	25
3860	DD5P608T	31	0.1	5	8.61	0.50	105,856	25
3861	DD5P609T	28	0.1	5	8.33	0.33	329,077	25
3862	DD5P610T	35	0.1	5	8.67	0.54	25,383	25
3863	DD5P611T	35	0.1	5	8.63	0.65	39,867	25
3864	DD5P617T	38	0.1	2	8.73	1.10	4,765	25
3865	DD5P612T	38	0.1	2	9.05	1.09	10,816	25
3866	DD5P615T	41	0.1	2	8.93	1.25	7,778	25
3867	DD5P614T	28	0.1	5	9.37	0.32	4,025,994	25
3868	DD5P616T	28	0.1	7	8.84	0.34	930,682	25
3869	DD5P613T	38	0.1	4	8.40	----	9,712	25
3982	DD5P661	207	0.1	25	----	----	8,672,644	8 tab
3983	DD5P632	207	0.1	25	----	----	9,754,976	8 tab
3984	DD5P660	207	0.1	25	----	----	11,452,158	8 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3985	DD5P664	172	0.1	60	----	----	112,139,744	8 R tab
3986	DD5P641	172	0.1	60	----	----	78,244,896	8 tab
3987	DD5P639	172	0.1	60	----	----	110,000,000	8 R tab
3988	DD5P674	138	-1	15	----	----	6,276,710	8 tab
3989	DD5P670	138	-1	15	----	----	3,601,668	8 tab
3990	DD5P671	138	-1	15	----	----	6,071,355	8 tab
4016	DD5P662	103	-1	30	----	----	100,000,000	8 R tab
4017	DD5P677	121	-1	15	----	----	18,077,742	8 tab
4018	DD5P690	121	-1	15	----	----	32,308,210	8 tab
4120	DD5P666	241	0.5	40	----	----	100,000,000	8 R tab
4121	DD5P675	379	0.5	10	----	----	438,618	8 tab
4122	DD5P672	379	0.5	10	----	----	610,270	8 tab
4123	DD5P667	379	0.5	10	----	----	297,323	8 tab
4124	DD5P673	310	0.5	30	----	----	13,320,248	8 tab
4125	DD5P669	310	0.5	40	----	----	3,809,795	8 tab
4126	DD5P640	310	0.5	40	----	----	8,730,709	8 tab
4127	DD5P665	276	0.5	40	----	----	30,480,698	8 tab
4128	DD5P676	276	0.5	40	----	----	26,841,282	8 tab
4129	DD5P700	276	0.5	50	----	----	47,918,327	8 tab
4222	DD5P751	-470	*	13	----	----	1	8
4223	DD5P752	-481	*	13	----	----	1	8
4224	DD5P750	-556	*	13	----	----	1	8
4225	DD5P753	-533	*	13	----	----	1	8
4230	DD5P712	742	*	13	----	----	1	8
4231	DD5P754	770	*	13	----	----	1	8
4232	DD5P756	750	*	13	----	----	1	8
4233	DD5P757	752	*	13	----	----	1	8
4859	DD59801	-310	10	10	----	----	2,747,477	25
4860	DD5P802	-310	10	10	----	----	1,143,005	25
4861	DD5P803	-310	10	10	----	----	531,709	25

MATERIAL DD5V

Lay-up = $[0/\pm45/0]_S$, V_F = 0.368, Ave. thickness = 3.05 mm, S.D. = 0.09 mm, Derakane 411-C-50 Vinyl ester

1856	DD5V311	688	*	13	23.4	3.00	1	22
1857	DD5V308	672	*	13	22.5	3.39	1	22
1858	DD5V303	664	*	13	21.7	3.10	1	22
1862	DD5V309	483	0.1	2	22.5	2.30	283	22
1863	DD5V306	414	0.1	4	22.1	1.89	5,751	22
1864	DD5V301	414	0.1	2	28.3	1.66	8,529	22
1865	DD5V302	276	0.1	10	25.8	1.08	392,541	22
1866	DD5V312	345	0.1	5	22.9	1.56	54,570	22
1867	DD5V313	345	0.1	5	24.3	1.46	68,513	22
1868	DD5V314	345	0.1	5	24.2	1.52	58,782	22
1869	DD5V310	241	0.1	15	23.4	1.02	3,673,144	22
1870	DD5V350	276	0.1	5	23.0	1.30	618,125	22
1934	DD5V315	-519	*	13	----	----	1	25
1935	DD5V318	-533	*	13	----	----	1	25
1936	DD5V316	-538	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1944	DD5V329	-414	10	5	----	----	9,981	25
1945	DD5V317	-414	10	4	----	----	18,310	25
1946	DD5V327	-414	10	5	----	----	11,920	25
1947	DD5V325	-345	10	10	----	----	1,462,167	25
1948	DD5V325	-345	10	20	----	----	943,258	25
1949	DD5V319	-379	10	5	----	----	179,421	25
1950	DD5V324	-379	10	5	----	----	84,516	25
1951	DD5V322	-379	10	5	----	----	73,591	25
1952	DD5V321	-379	10	5	----	----	107,610	25
1972	DD5V304	345	0.1	5	23.9	1.44	42,916	22 tab

MATERIAL DD5V2

Lay-up = $[0/\pm45/0]_S$, V_F = 0.352, Ave. thickness = 3.18 mm, S.D. = 0.09 mm, Derakane 8084 Epoxy Vinyl ester

4367	DD5V2101	276	0.1	10	----	----	3,326,186	22 tab
4368	DD5V2102	414	0.1	4	21.4	1.94	20,070	22 tab
4369	DD5V2103	414	0.1	3	22.9	1.89	35,015	22 tab
4370	DD5V2114	345	0.1	5	21.6	1.61	454,290	22 tab
4371	DD5V2110	345	0.1	5	23.2	1.53	228,519	22 tab
4372	DD5V2112	345	0.1	5	22.2	1.62	375,206	22 tab
4373	DD5V2113	414	0.1	4	----	----	18,445	22 tab
4374	DD5V2109	798	*	13	22.2	3.4	1	22 tab
4375	DD5V2108	757	*	13	21.0	3.3	1	22 tab
4376	DD5V2111	807	*	13	24.1	3.3	1	22 tab
4377	DD5V2115	276	0.1	7	22.5	1.25	3,738,875	22 tab
4378	DD5V2150	-629	*	13	----	----	1	25
4379	DD5V2153	-597	*	13	----	----	1	25
4380	DD5V2156	-588	*	13	----	----	1	25
4381	DD5V2157	-414	10	6	----	----	366,453	25
4382	DD5V2151	-414	10	6	----	----	122,340	25
4383	DD5V2158	-414	10	5	----	----	63,740	25
4384	DD5V2155	-448	10	2	----	----	4,337	25
4385	DD5V2152	-448	10	3	----	----	11,119	25
4386	DD5V2154	-448	10	3	----	----	12,549	25
4387	DD5V2170	-379	10	5	----	----	783,925	25
4388	DD5V2160	-379	10	6	----	----	91,821	25
4389	DD5V2161	345	-1	1	----	----	765	25
4390	DD5V2162	345	-1	1	----	----	549	25
4391	DD5V2168	345	-1	1	----	----	984	25
4392	DD5V2167	310	-1	2	----	----	1,675	25
4393	DD5V2166	310	-1	1	----	----	1,463	25
4394	DD5V2165	310	-1	2	----	----	3,443	25
4395	DD5V2164	207	-1	5	----	----	46,477	25
4396	DD5V2164	172	-1	5	----	----	471,449	25
4397	DD5V2172	172	-1	5	----	----	342,089	25
4398	DD5V2174	172	-1	6	----	----	941,295	25

Tests 5955 - 5972 involved a gage length of 100 mm (strain rate effect tests).

5955	DD5V200	619	*	0.0025	----	----	1	25
5956	DD5V201	542	*	0.0025	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5957	DD5V202	578	*	0.0025	----	----	1	25
5958	DD5V203	622	*	0.025	----	----	1	25
5959	DD5V204	611	*	0.025	----	----	1	25
5960	DD5V205	594	*	0.025	----	----	1	25
5961	DD5V206	736	*	0.25	----	----	1	25
5962	DD5V207	614	*	0.25	----	----	1	25
5963	DD5V208	678	*	0.25	----	----	1	25
5964	DD5V209	733	*	2.54	----	----	1	25
5965	DD5V210	786	*	2.54	----	----	1	25
5966	DD5V211	755	*	2.54	----	----	1	25
5967	DD5V212	802	*	13	----	----	1	25
5968	DD5V213	731	*	13	----	----	1	25
5969	DD5V214	772	*	13	----	----	1	25
5970	DD5V215	795	*	64	----	----	1	25
5971	DD5V216	805	*	64	----	----	1	25
5972	DD5V217	836	*	64	----	----	1	25
Tests 5973 - 5999 involved a gage length of 13 mm (strain rate effect tests).								
5973	DD5V220	-453	*	0.0025	----	----	1	25
5974	DD5V221	-467	*	0.0025	----	----	1	25
5975	DD5V222	-434	*	0.0025	----	----	1	25
5976	DD5V223	-484	*	0.025	----	----	1	25
5977	DD5V224	-498	*	0.025	----	----	1	25
5978	DD5V225	-497	*	0.025	----	----	1	25
5979	DD5V226	-473	*	0.25	----	----	1	25
5980	DD5V227	-501	*	0.25	----	----	1	25
5981	DD5V228	-511	*	0.25	----	----	1	25
5982	DD5V229	-542	*	2.54	----	----	1	25
5983	DD5V230	-531	*	2.54	----	----	1	25
5984	DD5V231	-527	*	2.54	----	----	1	25
5985	DD5V232	-531	*	6.35	----	----	1	25
5986	DD5V233	-546	*	6.35	----	----	1	25
5987	DD5V234	-521	*	6.35	----	----	1	25
5988	DD5V235	-536	*	13	----	----	1	25
5989	DD5V236	-554	*	13	----	----	1	25
5990	DD5V237	-545	*	13	----	----	1	25
5991	DD5V238	-545	*	25	----	----	1	25
5992	DD5V239	-561	*	25	----	----	1	25
5993	DD5V240	-581	*	25	----	----	1	25
5994	DD5V241	-583	*	64	----	----	1	25
5995	DD5V242	-572	*	64	----	----	1	25
5996	DD5V243	-586	*	64	----	----	1	25
5997	DD5V244	-614	*	127	----	----	1	25
5998	DD5V245	-573	*	127	----	----	1	25
5999	DD5V246	-575	*	127	----	----	1	25
Tests 6602-6604 were preformed at the same time as carbon compression coupons were tested for comparison								
6602	DD5V21100	-568	*	13	----	----	1	25
6603	DD5V21101	-567	*	13	----	----	1	25
6604	DD5V21102	-592	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL DD5V3

Lay-up = $[0/\pm45/0]_S$, V_F = 0.363, Ave. thickness = 3.08 mm, S.D. = 0.09 mm, Reichhold Dion 9800 Special Urethane-modified Vinyl Ester

6803	DD5V3-166	810	*	13	26.6	3.0	1	25
6804	DD5V3-164	786	*	13	24.4	3.1	1	25
6805	DD5V3-165	793	*	13	23.8	3.0	1	25
6806	DD5V3-160	-579	*	13	----	----	1	25
6807	DD5V3-161	-633	*	13	----	----	1	25
6808	DD5V3-162	-576	*	13	----	----	1	25
6809	DD5V3-163	-616	*	13	----	----	1	25
8955	DD5V3-310	-379	10	4	----	----	1,897,586	25
8956	DD5V3-311	-414	10	3	----	----	14,143	25
8957	DD5V3-312	-414	10	3	----	----	?	25XX
8958	DD5V3-313	-396	10	3	----	----	78,206	25
8959	DD5V3-314	-396	10	3	----	----	1,765	25
8960	DD5V3-315	-396	10	3	----	----	54,781	25
8961	DD5V3-317	-379	10	4	----	----	282,291	25
8962	DD5V3-318	-379	10	4	----	----	306,492	25

MATERIAL DD6

Lay-up = $[0/\pm45/0]_S$, V_F = 0.318, Ave. thickness = 3.53 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

1095	DD6116	602	*	13	20.9	2.88	1	22
1096	DD6104	609	*	13	22.6	2.69	1	22
1097	DD6106	603	*	13	23.8	2.53	1	22
1098	DD6101	414	0.1	5	22.3	1.85	928	22
1099	DD6108	414	0.1	2	21.4	1.94	841	22
1100	DD6111	414	0.1	2	19.8	2.09	1,302	22
1101	DD6113	345	0.1	5	19.3	1.79	17,421	22
1102	DD6103	345	0.1	10	19.5	1.76	26,109	22
1103	DD6112	345	0.1	10	19.2	1.79	18,696	22
1104	DD6102	276	0.1	15	21.5	1.28	193,637	22
1105	DD6110	276	0.1	10	20.4	1.35	406,267	22
1106	DD6107	276	0.1	15	22.7	1.22	300,000	22 R
1121	DD6121	-447	*	13	----	----	1	25
1122	DD6150	-448	*	13	----	----	1	25
1126	DD6126	-447	*	13	----	----	1	25
1127	DD6143	-448	*	13	----	----	1	25
1128	DD6130	-449	*	13	----	----	1	25
1129	DD6128	-460	*	13	----	----	1	25
1140	DD6118	-276	10	15	----	----	1,918,022	25
1142	DD6125	-276	10	20	----	----	1,223,779	25
1145	DD6124	-345	10	10	----	----	54,759	25
1146	DD6123	-345	10	15	----	----	35,062	25
1150	DD6109	-379	10	10	----	----	15,355	25
1151	DD6114	-379	10	10	----	----	10,750	25
1158	DD6133	-345	10	10	----	----	42,786	25
1159	DD6132	-310	10	15	----	----	423,811	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1160	DD6105	-379	10	5	----	----	9,779	25
1161	DD6131	-310	10	15	----	----	324,531	25
1166	DD6141	-475	*	13	----	----	1	25
1167	DD6139	-310	10	20	----	----	284,644	25
1170	DD6115	-276	10	20	----	----	2,012,851	25
1171	DD6130	-414	10	4	----	----	1,883	25
1172	DD6148	-414	10	4	----	----	2,341	25
1300	DD6143	-510	*	13	----	----	1	25
1301	DD6145	-529	*	13	----	----	1	25

MATERIAL DD7

Lay-up = $[0/\pm45/0]_S$, V_F = 0.543, Ave. thickness = 2.11 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester

1107	DD7105	837	*	13	36.5	2.80	1	22
1108	DD7113	824	*	13	30.7	2.69	1	22
1109	DD7107	826	*	13	30.3	2.73	1	22
1110	DD7112	839	*	13	32.4	2.59	1	22
1111	DD7108	483	0.1	2	32.5	1.48	978	22
1112	DD7103	483	0.1	2	32.4	1.52	784	22
1113	DD7111	414	0.1	5	28.9	1.43	3,379	22
1114	DD7110	414	0.1	5	----	----	2,916	22
1115	DD7106	345	0.1	10	----	----	9,304	22
1116	DD7109	345	0.1	10	----	----	14,481	22
1117	DD7104	276	0.1	10	----	----	29,331	22
1118	DD7114	276	0.1	10	----	----	25,746	22
1119	DD7102	207	0.1	20	----	----	127,887	22
1120	DD7115	207	0.1	20	----	----	94,292	22
1143	DD7131	-276	10	20	----	----	2,761,322	25
1144	DD7129	-310	10	20	----	----	4,919,032	25
1147	DD7124	-577	*	13	----	----	1	25
1148	DD7133	-605	*	13	----	----	1	25
1149	DD7118	-562	*	13	----	----	1	25
1155	DD7101	-379	10	10	----	----	45,445	25
1156	DD7131	-379	10	10	----	----	66,177	25
1157	DD7132	-379	10	10	----	----	52,848	25
1163	DD7122	-345	10	10	----	----	928,436	25
1164	DD7128	-345	10	15	----	----	511,438	25
1165	DD7133	-448	10	4	----	----	843	25
1168	DD7140	-345	10	20	----	----	781,113	25
1169	DD7130	-448	10	4	----	----	1,307	25
1173	DD7117	-414	10	5	----	----	10,902	25
1174	DD7119	-414	10	5	----	----	8,454	25
1175	DD7137	-310	10	20	----	----	5,322,151	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL DD8

Lay-up = $[0/\pm45/0]_S$, V_F = 0.436, Ave. thickness = 2.67 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester
Material is the same as DD2 except that all the fabric stitching (D155 and DB120) was removed.

1204	DD8105	483	0.1	4	----	----	12,460	22
1206	DD8106	483	0.1	4	----	----	7,139	22
1207	DD8109	414	0.1	10	22.0	1.88	63,076	22
1209	DD8102	414	0.1	10	----	----	46,816	22
1210	DD8101	345	0.1	10	----	----	298,339	22
1211	DD8111	345	0.1	15	----	----	567,522	22
1212	DD8103	483	0.1	4	22.9	1.31	5,846	22
1213	DD8104	276	0.1	15	----	----	33,425	22 R
1214	DD8121	345	0.1	10	----	----	462,481	22
1215	DD8108	741	*	13	30.3	2.44	1	22
1216	DD8115	698	*	13	30.8	2.27	1	22
1217	DD8120	818	*	13	28.3	2.33	1	22
1218	DD8117	856	*	13	28.1	2.44	1	22
1833	DD8112	-587	*	13	----	----	1	25
1834	DD8143	-576	*	13	----	----	1	25

MATERIAL DD8A

Lay-up = $[0/\pm45/0]_S$, V_F = 0.447, Ave. thickness = 2.61 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester
Stitching was removed from the D155 fabric. The DB120 fabric was not altered

4031	DD8A103	345	0.1	5	31.3	1.15	475,424	22 tab
4032	DD8A105	345	0.1	5	29.4	1.22	385,518	22 tab
4033	DD8A104	345	0.1	5	28.7	1.27	321,056	22 tab

MATERIAL DD8B

Lay-up = $[0/\pm45/0]_S$, V_F = 0.441, Ave. thickness = 2.64 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester
Stitching was removed from the D155 fabric. The DB120 stitch which stitches the +45 to the -45 ply was removed. Each +45 and -45 ply still had their individual ply stitch intact.

4034	DD8B102	345	0.1	5	26.0	1.29	366,371	22 tab
4035	DD8B105	345	0.1	5	24.7	1.37	244,659	22 tab
4036	DD8B104	345	0.1	5	27.8	1.22	199,990	22 tab

MATERIAL DD9

Lay-up = $[0/\pm45/0]_S$, V_F = 0.560, Ave. thickness = 2.03 mm, S.D. = 0.04 mm, CoRezyn 63-AX-051 Polyester
Material is the same as DD7 except that all the fabric stitching (D155 and DB120) was removed.

1219	DD9101	414	0.1	10	34.5	1.20	8,603	22
1220	DD9109	483	0.1	5	33.9	1.42	2,695	22
1221	DD9116	414	0.1	5	33.8	1.23	6,359	22
1223	DD9103	345	0.1	10	33.2	1.04	29,276	22
1224	DD9104	207	0.1	15	34.6	0.60	432,809	22
1226	DD9107	944	*	13	----	----	1	22
1227	DD9109	903	*	13	----	----	1	22

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1228	DD9110	873	*	13	----	----	1	22
1229	DD9114	483	0.1	4	35.6	1.36	3,294	22
1230	DD9113	345	0.1	10	36.8	0.93	38,377	22
1231	DD9106	276	0.1	10	----	----	94,262	22
1232	DD9113	207	0.1	10	----	----	432,480	22
1830	DD9200	-513	*	13	----	----	1	25
1831	DD9202	-603	*	13	----	----	1	25
1832	DD9201	-552	*	13	----	----	1	25

MATERIAL DD10

Lay-up = $[0/\pm45/0]_S$, V_F = 0.622, Ave. thickness = 1.73 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester
Material had all the fabric stitching (D155 and DB120) removed.

2820	DD10110	1,045	*	13	42.8	2.45	1	22
2821	DD10109	888	*	13	42.6	2.08	1	22
2822	DD10108	935	*	13	39.1	2.40	1	22
2823	DD10107	483	0.1	4	43.0	1.12	3,132	22
2824	DD10105	483	0.1	4	40.0	1.20	2,128	22
2825	DD10102	414	0.1	5	42.6	1.18	7,291	22
2826	DD10101	414	0.1	5	43.7	1.11	11,251	22
2827	DD10103	276	0.1	10	43.7	0.59	72,116	22
2828	DD10104	276	0.1	10	43.2	0.66	94,297	22
2829	DD10106	276	0.1	10	44.6	0.64	152,411	22
2866	DD10127	-525	*	13	----	----	1	25
2867	DD10121	-557	*	13	----	----	1	25
2868	DD10125	-607	*	13	----	----	1	25
2869	DD10124	-362	10	20	----	----	10,000,000	25 R
2870	DD10122	-414	10	2	----	----	266	25
2871	DD10123	-379	10	12	----	----	798,311	25
2872	DD10128	-379	10	12	----	----	576,424	25
2873	DD10126	-379	10	12	----	----	1,678,467	25
2874	DD10130	-518	*	13	----	----	1	25 Z
2875	DD10131	-553	*	13	----	----	1	25 Z
2963	DD10401	-379	10	12	----	----	844,707	has stitch
2964	DD10402	-379	10	12	----	----	553,651	has stitch

MATERIAL DD11

Lay-up = $[0/\pm45/0]_S$, V_F = 0.304, Ave. thickness = 3.19 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

2853	DD11101	543	*	13	20.1	2.70	1	22
2854	DD11110	642	*	13	19.3	3.20	1	22
2855	DD11102	589	*	13	18.8	3.13	1	22
2856	DD11103	276	0.1	5	21.7	1.28	328,394	22
2857	DD11104	276	0.1	5	20.0	1.45	144,473	22
2858	DD11105	414	0.1	1	19.9	2.08	602	22
2859	DD11107	414	0.1	1	17.4	2.40	859	22
2860	DD11108	414	0.1	1	21.0	2.00	359	22
2861	DD11109	345	0.1	2	19.0	1.90	5,733	22
2862	DD11106	345	0.1	2	20.3	1.78	4,560	22

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2863	DD11114	241	0.1	12	20.7	1.20	3,880,803	22
2864	DD11111	276	0.1	5	20.1	1.38	109,080	22
2865	DD11118	345	0.1	2	20.8	1.75	3,741	22
2876	DD11128	-331	*	13	----	----	1	25
2877	DD11129	-314	*	13	----	----	1	25
2878	DD11120	-310	*	13	----	----	1	25
2879	DD11125	-241	10	1	----	----	189	25
2880	DD11127	-207	10	2	----	----	2,411	25
2881	DD11122	-207	10	2	----	----	1,882	25
2882	DD11121	-207	10	2	----	----	1,530	25
2883	DD11124	-172	10	10	----	----	137,454	25
2884	DD11126	-172	10	10	----	----	87,211	25
2885	DD11123	-172	10	10	----	----	123,600	25
2886	DD11131	-155	10	12	----	----	356,114	25
Tests 3992 - 4002 were transverse tests tested in the $[90/\pm45/90]_S$ direction								
3992	DD11T309	35	0.1	1	7.84	1.47	21	25
3993	DD11T308	21	0.1	4	----	----	69,027	25
3994	DD11T310	21	0.1	5	8.00	0.25	112,343	25
3995	DD11T315	21	0.1	5	7.94	0.26	104,931	25
3996	DD11T313	17	0.1	10	7.62	0.22	4,000,000	25 R
3997	DD11T312	24	0.1	5	8.19	0.30	24,784	25
3998	DD11T301	24	0.1	4	7.41	0.31	10,054	25
3999	DD11T305	24	0.1	4	7.65	0.31	8,202	25
4000	DD11T311	42	*	13	7.43	0.68	1	25
4001	DD11T307	43	*	13	8.32	0.53	1	25
4002	DD11T306	34	*	13	7.64	0.46	1	25
4325	DD11224	103	-1	5	----	----	1,695,591	25
4322	DD11227	138	-1	5	----	----	79,076	25
4323	DD11221	103	-1	5	----	----	1,767,448	25
4328	DD11213	138	-1	5	----	----	40,380	25
4329	DD11219	138	-1	5	----	----	118,395	25
4330	DD11210	138	-1	5	----	----	32,677	25
4331	DD11212	121	-1	5	----	----	269,627	25
4332	DD11215	121	-1	5	----	----	406,842	25
4333	DD11214	121	-1	5	----	----	464,001	25
4334	DD11223	103	-1	5	----	----	2,148,180	25
4336	DD11225	172	-1	5	----	----	9,734	25
4337	DD11220	172	-1	5	----	----	11,680	25
4338	DD11217	172	-1	3	----	----	6,888	25
4339	DD11218	207	-1	1	----	----	1,144	25
4340	DD11211	207	-1	1	----	----	987	25
4341	DD11216	207	-1	1	----	----	2,953	25
4365	DD11244	138	-1	10	----	----	1,023,726	25
4366	DD11240	138	-1	10	----	----	8,000,000	25 R

MATERIAL DD11A

Lay-up = $(\pm45/0_4/\mp45)$, V_F = 0.289, Ave. thickness = 3.38 mm, S.D. = 0.14 mm, CoRezyn 63-AX-051 Polyester

2942	DD11A102	-309	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2954	DD11A101	-413	*	13	----	----	1	25
2955	DD11A106	-327	*	13	----	----	1	25
3551	DD11A112	629	*	13	18.3	3.40	1	25
3552	DD11A110	595	*	13	20.4	2.93	1	25
3553	DD11A111	589	*	13	19.9	3.03	1	25

MATERIAL DD11E3

Lay-up = $[0/\pm45/0]_S$, V_F = 0.315, Ave. thickness = 3.07 mm, S.D. = 0.08 mm, Prime 20 Epoxy

8669	DD11E3-112	-247	*	13	----	----	1	25
8670	DD11E3-137	-172	10	2	----	----	3,171	25
8671	DD11E3-127	-103	10	6	----	----	3,316,245	25
8672	DD11E3-111	-138	10	4	----	----	628,028	25
8673	DD11E3-125	-138	10	4	----	----	142,149	25
8674	DD11E3-116	-138	10	4	----	----	73,148	25
8675	DD11E3-134	-172	10	1	----	----	4,063	25
8676	DD11E3-124	-172	10	1	----	----	7,803	25
8677	DD11E3-133	-224	*	13	----	----	1	25
8678	DD11E3-135	-276	*	13	----	----	1	25
8679	DD11E3-110	-311	*	13	----	----	1	25
8680	DD11E3-147	-103	10	6	----	----	6,853,926	25
8700	DD11E3-118	-207	10	1	----	----	68	25
8701	DD11E3-139	-207	10	1	----	----	81	25
8702	DD11E3-132	-207	10	1	----	----	53	25
8681	DD11E3-128	103	-1	3	----	----	4,879,300	25
8682	DD11E3-131	138	-1	2	----	----	17,757	25
8683	DD11E3-115	138	-1	2	----	----	35,759	25
8684	DD11E3-130	138	-1	2	----	----	64,341	25
8685	DD11E3-148	103	-1	4	----	----	1,850,142	25
8703	DD11E3-114	172	-1	1	----	----	646	25
8704	DD11E3-122	172	-1	1	----	----	3,778	25
8705	DD11E3-123	172	-1	1	----	----	1,680	25
6810	DD11E3-151	655	*	13	20.5	3.19	1	25
6811	DD11E3-150	589	*	13	20.4	2.89	1	25
6812	DD11E3-152	629	*	13	20.2	3.1	1	25
8977	DD11E3-330	-241	10	1	----	----	9	25
8978	DD11E3-331	-172	10	2	----	----	14,155	25
8979	DD11E3-332	-138	10	4	----	----	100,092	25

MATERIAL DD11E4

Lay-up = $[0/\pm45/0]_S$, V_F = 0.34, Ave. thickness = 2.84 mm, S.D. = 0.05 mm, Jeffco 1401-12 epoxy

Tests 7088 - 7092 used 1401-17 hardener and were post cured for 14 hours at 50C and 2 hours at 85C

7088	DD11E4-205	-319	*	13	24.1	-1.3	1	25
7089	DD11E4-206	-313	*	13	----	----	1	25
7090	DD11E4-207	-287	*	13	----	----	1	25
7091	DD11E4-207	-305	*	13	----	----	1	25
7092	DD11E4-209	-288	*	13	----	----	1	25

Tests 8796 - 8800 used Jeffco 4102 hardener and were post cured for 14 hours at 60C and 2 hours at 85C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
8796	DD11E4-216	-342	*	13	24.3	-1.4	1	25
8797	DD11E4-217	-328	*	13	----	----	1	25
8798	DD11E4-218	-361	*	13	----	----	1	25
8799	DD11E4-219	-357	*	13	----	----	1	25
8800	DD11E4-220	-312	*	13	----	----	1	25

Tests 8806 - 8810 used 1401-17 hardener and were post cured for 14 hours at 60C and 2 hours at 85C.

8806	DD11E4-226	-311	*	13	23.1	-1.3	1	25
8807	DD11E4-227	-336	*	13	----	----	1	25
8808	DD11E4-228	-328	*	13	----	----	1	25
8809	DD11E4-229	-271	*	13	----	----	1	25
8810	DD11E4-230	-318	*	13	----	----	1	25

MATERIAL DD12

Lay-up = $[0/\pm45/0]_S$, V_F = 0.407, Ave. thickness = 2.40 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

2842	DD12108	708	*	13	26.0	2.71	1	22
2843	DD12110	731	*	13	26.7	2.73	1	22
2844	DD12112	729	*	13	26.7	2.74	1	22
2845	DD12103	414	0.1	2	26.4	1.53	4,967	22
2846	DD12107	276	0.1	12	29.3	0.94	272,993	22
2847	DD12109	276	0.1	12	24.6	1.12	252,590	22
2848	DD12104	241	0.1	12	26.3	0.90	721,943	22
2849	DD12111	345	0.1	5	24.7	1.46	27,280	22
2850	DD12106	345	0.1	5	25.8	1.42	55,126	22
2851	DD12105	345	0.1	5	26.6	1.49	50,100	22
2852	DD12101	276	0.1	5	27.0	1.05	199,436	22
2897	DD12132	-339	*	13	----	----	1	25
2898	DD12131	-273	*	13	----	----	1	25
2899	DD12130	-293	*	13	----	----	1	25

MATERIAL DD13

Lay-up = $[0/\pm45/0]_S$, V_F = 0.460, Ave. thickness = 2.13 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester

2830	DD13111	855	*	13	29.6	2.89	1	22
2831	DD13110	799	*	13	30.4	2.63	1	22
2832	DD13113	809	*	13	32.9	2.56	1	22
2833	DD13101	414	0.1	4	26.2	1.60	5,769	22
2834	DD13102	414	0.1	4	29.0	1.39	7,805	22
2835	DD13107	345	0.1	5	29.3	1.26	17,253	22
2836	DD13108	207	0.1	12	27.6	0.77	1,397,049	22
2837	DD13106	345	0.1	5	31.2	1.15	28,437	22
2838	DD13105	345	0.1	5	26.9	1.49	19,323	22
2839	DD13113	276	0.1	10	28.9	0.97	145,120	22
2840	DD13114	276	0.1	10	30.2	0.91	85,412	22
2841	DD13115	276	0.1	10	31.7	0.89	124,822	22
2887	DD13129	-319	*	13	----	----	1	25
2888	DD13122	-311	*	13	----	----	1	25
2889	DD13124	-312	*	13	----	----	1	25
2890	DD13130	-207	10	2	----	----	1,870	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2891	DD13123	-207	10	2	----	----	9,529	25
2892	DD13127	-207	10	2	----	----	4,017	25
2893	DD13120	-172	10	10	----	----	59,117	25
2894	DD13131	-172	10	10	----	----	35,801	25
2895	DD13128	-172	10	12	----	----	45,057	25
2896	DD13126	-155	10	10	----	----	443,122	25

MATERIAL DD14

Lay-up = $[0/\pm45/0]_S$, V_F = 0.425, Ave. thickness = 2.71 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

2956	DD14301	-452	*	13	----	----	1	25
2957	DD14303	-385	*	13	----	----	1	25
2958	DD14302	-447	*	13	----	----	1	25
4064	DD14112	794	*	13	25.7	3.11	1	22 tab
4065	DD14106	754	*	13	25.5	3.05	1	22 tab
4066	DD14105	637	*	13	23.3	2.80	1	22 tab
4067	DD14111	345	0.1	2	25.4	1.48	5,851	22 tab
4068	DD14107	345	0.1	2	26.0	1.38	8,812	22 tab
4069	DD14109	345	0.1	2	24.1	1.56	6,090	22 tab
4070	DD14104	276	0.1	6	23.9	1.09	26,391	22 tab
4071	DD14103	276	0.1	5	25.7	1.13	25,357	22 tab
4072	DD14102	207	0.1	10	25.4	0.78	432,261	22 tab
4073	DD14101	276	0.1	5	25.5	1.20	47,275	22 tab
4074	DD14110	207	0.1	10	25.1	0.85	513,840	22 tab
4075	DD14108	207	0.1	10	26.0	0.80	210,479	22 tab

MATERIAL DD15

Lay-up = $[0/\pm45/0]_S$, V_F = 0.368, Ave. thickness = 3.13 mm, S.D. = 0.18 mm, CoRezyn 63-AX-051 Polyester

2959	DD15302	-435	*	13	----	----	1	25
2960	DD15301	-411	*	13	----	----	1	25
2961	DD15303	-471	*	13	----	----	1	25

MATERIAL DD16

Lay-up = $[90/0/\pm45/0]_S$, V_F = 0.333, Ave. thickness = 4.62 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester. See the residual strength section of this database for additional tests.

3650	DD16102	284	0.1	2	17.1	1.83	32,965	25
3654	DD16108	204	0.1	10	18.1	1.26	844,744	25
3655	DD16101	206	0.1	10	18.9	1.24	274,618	25
3656	DD16103	204	0.1	10	18.2	1.27	658,704	25
3657	DD16106	214	0.1	10	18.6	1.30	523,116	25
3651	DD16105	284	0.1	2	19.0	1.68	29,313	25

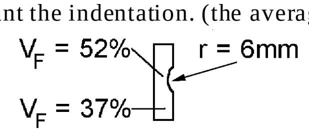
Test 3690 and 3691 had four additional 90 plies on the outside over a 25 mm length.

3690	DD16200	310	0.1	10	----	----	560,000	25 R
3691	DD16202	310	0.1	10	----	----	396,989	25 R
3832	DD16150	-394	*	13	----	----	1	25
3833	DD16151	-406	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3834	DD16152	-454	*	13	----	----	1	25
6068	DD16205	-414	*	13	----	----	1	25
6069	DD16216	-388	*	13	----	----	1	25
6070	DD16221	-394	*	13	----	----	1	25
6071	DD16215	-446	*	13	----	----	1	25
6072	DD16222	-276	10	2	----	----	41,771	25
6073	DD16217	-241	10	5	----	----	174,382	25
6074	DD16208	-276	10	2	----	----	20,148	25
6075	DD16204	-276	10	2	----	----	13,173	25
6076	DD16209	-276	10	4	----	----	8,358	25
6077	DD16201	-241	10	8	----	----	464,269	25
6078	DD16206	-241	10	6	----	----	670,467	25
6079	DD16220	-207	10	12	----	----	12,328,786	25

MATERIAL DD17

lay-up = $[0/\pm45/0]_S$, V_F = 0.37, 0.52 , Ave. thickness = 2.90 mm, 2.09 mm (indentation) S.D. = 0.05 mm, 0.07 mm (indentation), CoRezyn 63-AX-051 Polyester. This material had a surface indentation to locally raise the V_F. The listed stress does NOT take into account the indentation. (the average stress increase due to this indentation = 1.39)



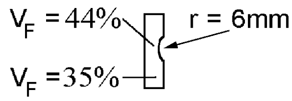
Side View

3694	DD17104	445	0.1	2	----	----	1,317	25 tab
3696	DD17106	448	0.1	2	----	----	1,210	25 tab
3697	DD17107	333	0.1	2	----	----	8,591	25 tab
3698	DD17108	328	0.1	2	----	----	7,151	25 tab
3699	DD17109	165	0.1	10	----	----	198,817	25 tab
3700	DD17110	111	0.1	12	----	----	889,958	25 tab
3701	DD17111	108	0.1	12	----	----	2,048,532	25 tab
3702	DD17112	165	0.1	12	----	----	218,200	25 tab
3703	DD17101	787	*	13	----	----	1	25 tab
3704	DD17102	784	*	13	----	----	1	25 tab
3705	DD17103	775	*	13	----	----	1	25 tab
3706	DD17118	166	0.1	10	----	----	225,558	25 tab
3707	DD17118	334	0.1	2	----	----	5,342	25 tab
3950	DD17211	-394	*	13	----	----	1	25 Z
3951	DD17213	-427	*	13	----	----	1	25 Z
3952	DD17210	-440	*	13	----	----	1	25 Z
3953	DD17206	-276	10	4	----	----	8,751	25 Z
3954	DD17202	-276	10	4	----	----	21,582	25 Z
3955	DD17208	-276	10	3	----	----	4,910	25 Z
3956	DD17207	-207	10	20	----	----	1,184,170	25 Z
3957	DD17214	-207	10	20	----	----	5,357,313	25 Z
3958	DD17209	-207	10	20	----	----	890,895	25 Z

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL DD17A

Lay-up = $[0/\pm45/0]_S$, V_F = 0.350, 0.440, Ave. thickness = 2.83 mm, 2.29 mm (indentation) S.D. = 0.15 mm, 0.06 mm (indentation), CoRezyn 63-AX-051 Polyester. This material has a surface indentation to raise the V_F. The listed stress does NOT take into account the indentation. (the average stress increase due to this indentation = 1.24)



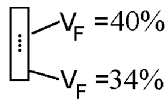
Side View

3875	DD17A127	414	0.1	2	24.3	1.87	870	25
3876	DD17A106	414	0.1	2	24.5	1.88	993	25
3877	DD17A116	414	0.1	2	22.5	2.10	440	25 R
3878	DD17A112	345	0.1	4	23.1	1.65	1,637	25
3879	DD17A103	345	0.1	4	26.1	1.52	7,677	25
3880	DD17A113	345	0.1	4	23.2	1.60	3,156	25
3881	DD17A102	345	0.1	4	23.8	1.52	2,866	25
3882	DD17A109	276	0.1	5	22.4	1.30	23,820	25
3883	DD17A101	276	0.1	4	22.1	1.33	52,327	25
3884	DD17A107	276	0.1	4	22.1	1.29	15,558	25
3885	DD17A111	207	0.1	5	23.2	0.97	385,099	25
3886	DD17A128	207	0.1	5	24.3	0.92	186,232	25
3887	DD17A110	207	0.1	5	22.6	0.96	119,502	25
3888	DD17A122	207	0.1	5	25.5	0.97	170,000	25 R
3889	DD17A125	681	*	13	23.2	3.05	1	25
3890	DD17A121	621	*	13	22.5	3.01	1	25
3891	DD17A120	636	*	13	24.3	2.92	1	25
3892	DD17A123	207	0.1	5	23.0	0.96	584,702	25 tab
3893	DD17A104	276	0.1	2	25.2	1.18	65,356	25 tab
3894	DD17A108	190	0.1	8	22.6	0.86	843,279	25 tab
3895	DD17A119	190	0.1	8	21.1	0.94	510,998	25 tab
3896	DD17A117	172	0.1	8	22.9	0.80	6,125,824	25 tab
3897	DD17A115	345	0.1	2	24.3	1.64	2,414	25 tab
3898	DD17A126	345	0.1	3	22.5	1.70	12,349	25 tab
3899	DD17A114	276	0.1	4	23.6	1.20	43,591	25 tab
3959	DD17A209	-207	10	2	----	----	118	25 Z
3960	DD17A214	-207	10	4	----	----	584	25 Z
3961	DD17A215	-207	10	2	----	----	506	25 Z
3962	DD17A210	-138	10	10	----	----	1,496,838	25 Z
3963	DD17A208	-138	10	25	----	----	20,000,000	25 Z R
3964	DD17A221	-138	10	15	----	----	499,160	25 Z
3965	DD17A213	-297	*	13	----	----	1	25 Z
3966	DD17A216	-243	*	13	----	----	1	25 Z
3967	DD17A217	-255	*	13	----	----	1	25 Z
3968	DD17A218	-138	10	10	----	----	1,296,088	25 Z

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL DD18

Lay-up = $[0/\pm45/0]_S$, V_F = 0.34, 0.40, Ave. thickness = 3.35 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester. This material has a mid-laminate 90 degree D155 ply, 4 mm long and across the width of the coupon, to locally raise the V_F.

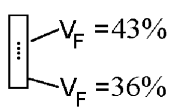


Side View

3722	DD18107	241	0.1	10	21.2	1.12	268,555	25
3723	DD18112	241	0.1	10	22.5	1.15	328,011	25
3724	DD18111	241	0.1	10	21.5	1.24	463,110	25
3725	DD18110	414	0.1	2	24.6	1.91	12,899	25
3726	DD18109	414	0.1	2	22.8	1.99	10,402	25
3727	DD18108	414	0.1	2	22.9	2.05	8,310	25
3728	DD18105	345	0.1	5	23.0	1.66	49,566	25
3729	DD18104	345	0.1	5	23.7	1.47	25,373	25
3730	DD18106	345	0.1	5	22.1	1.48	45,228	25
3731	DD18103	754	*	13	22.3	3.40	1	25
3732	DD18102	708	*	13	21.8	3.30	1	25
3733	DD18101	727	*	13	22.2	----	1	25
3734	DD18140	207	0.1	12	23.3	0.90	2,661,881	25
3835	DD18150	-575	*	13	----	----	1	25
3836	DD18151	-466	*	13	----	----	1	25
3837	DD18152	-484	*	13	----	----	1	25

MATERIAL DD18A

Lay-up = $[0/\pm45/0]_S$, V_F = 0.36, 0.43, Ave. thickness = 2.78 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester. This material has a mid-laminate 90 degree D155 ply, 4 mm long and across the width of the coupon, to locally raise the V_F.



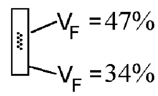
Side View

3900	DD18A115	190	0.1	10	21.0	0.95	1,750,000	25 R tab
3901	DD18A112	414	0.1	2	22.2	2.13	913	25 tab
3902	DD18A101	345	0.1	4	21.5	1.79	5,846	25 tab
3903	DD18A108	276	0.1	5	23.1	1.18	78,800	25 tab
3904	DD18A104	414	0.1	2	22.6	1.96	1,508	25 tab
3905	DD18A113	414	0.1	2	21.7	2.00	815	25 tab
3906	DD18A106	207	0.1	8	22.0	1.15	654,689	25 tab
3907	DD18A110	345	0.1	4	22.3	1.67	3,418	25 tab
3908	DD18A114	345	0.1	3	24.3	1.55	8,292	25 tab
3909	DD18A105	276	0.1	5	24.4	1.22	65,338	25 tab
3910	DD18A103	276	0.1	5	22.5	1.29	67,612	25 tab
3911	DD18A102	207	0.1	8	23.2	0.99	3,000,000	25 R tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3913	DD18A150	716	*	13	23.1	3.20	1	25 tab
3914	DD18A151	716	*	13	23.3	3.07	1	25 tab
3915	DD18A152	667	*	13	23.3	3.06	1	25 tab
3941	DD18A140	-320	*	13	----	----	1	25
3942	DD18A111	-338	*	13	----	----	1	25
3943	DD18A141	-318	*	13	----	----	1	25

MATERIAL DD19

Lay-up = $[0/\pm45/0]_S$, V_F = 0.34, 0.47, Ave. thickness = 3.39 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester. This material has two mid-laminate 90 degree plies, 4 mm long and across the width of the coupon, to locally raise the V_F.

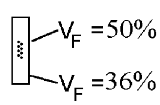


Side View

3710	DD19107	414	0.1	2	22.0	2.17	2,235	25
3711	DD19106	241	0.1	8	21.8	1.23	57,266	25
3712	DD19109	241	0.1	5	21.4	1.24	92,441	25
3713	DD19108	241	0.1	5	21.8	1.20	77,008	25
3714	DD19111	155	0.1	12	22.6	0.75	1,354,001	25
3715	DD19110	155	0.1	12	24.3	0.68	955,238	25
3716	DD19101	155	0.1	12	20.5	0.83	3,104,534	25
3717	DD19112	345	0.1	2	----	----	9,055	25
3718	DD19119	345	0.1	1	----	----	8,722	25
3719	DD19105	716	*	13	21.2	3.4	1	25
3720	DD19104	706	*	13	21.5	3.3	1	25
3721	DD19103	707	*	13	22.4	3.2	1	25
3838	DD19120	-400	*	13	----	----	1	25
3839	DD19121	-332	*	13	----	----	1	25
3840	DD19126	-392	*	13	----	----	1	25
3944	DD19124	-207	10	10	----	----	93,523	25
3945	DD19125	-207	10	15	----	----	3,000,000	25
3946	DD19127	-276	10	10	----	----	27,769	25
3947	DD19122	-276	10	5	----	----	1,397	25
3948	DD19123	-276	10	5	----	----	18,564	25
3949	DD19131	-241	10	5	----	----	5,710	25

MATERIAL DD19A

Lay-up = $[0/\pm45/0]_S$, V_F = 0.346, 0.50, Ave. thickness = 2.78 mm, S.D. = 0.03 mm, CoRezyn 63-AX-051 Polyester. This material has two mid-laminate 90 degree plies, 4 mm wide, to locally raise the V_F.



Side View

3916	DD19A140	207	0.1	7	23.7	0.88	31,090	25 tab
3917	DD19A117	138	0.1	6	23.9	0.58	1,250,000	25 R tab

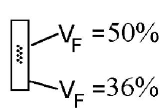
TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3918	DD19A118	345	0.1	2	24.0	1.50	877	25 tab
3919	DD19A106	345	0.1	2	24.6	1.61	1,088	25 tab
3920	DD19A128	345	0.1	2	21.9	1.69	1,590	25 tab
3921	DD19A127	276	0.1	4	22.4	1.34	8,594	25 tab
3922	DD19A121	276	0.1	4	22.8	1.35	31,283	25 tab
3923	DD19A122	276	0.1	5	23.5	1.36	11,012	25 tab
3924	DD19A111	207	0.1	7	23.4	0.96	108,773	25 tab
3925	DD19A116	207	0.1	7	22.2	1.11	72,092	25 tab
3926	DD19A119	172	0.1	8	23.9	0.83	143,171	25 tab
3927	DD19A110	646	*	13	23.3	3.01	1	25 tab
3928	DD19A114	647	*	13	21.8	3.18	1	25 tab
3929	DD19A115	661	*	13	22.6	3.0	1	25 tab
3930	DD19A126	172	0.1	5	----	----	95,294	25 tab
3931	DD19A113	-328	*	13	----	----	1	25
3932	DD19A124	-299	*	13	----	----	1	25
3933	DD19A123	-252	*	13	----	----	1	25
3934	DD19A109	-172	10	10	----	----	88,437	25
3935	DD19A102	-138	10	10	----	----	4,312,570	25
3936	DD19A103	-138	10	20	----	----	12,000,000	25 R
3937	DD19A104	-172	10	10	----	----	62,730	25
3940	DD19A101	-172	10	10	----	----	124,618	25

Tests 3972 - 3981 were transverse tests tested in the $[90/\pm45/90]_S$ direction

3972	DD19AT107	69	*	13	11.1	0.64	1	25
3973	DD19AT102	68	*	13	9.74	0.71	1	25
3974	DD19AT101	68	*	13	9.60	0.74	1	25
3975	DD19AT106	17	0.1	20	11.2	0.16	4,000,000	25 R
3976	DD19AT104	38	0.1	2	10.5	0.37	13,061	25
3977	DD19AT103	35	0.1	4	10.7	0.34	39,706	25
3978	DD19AT110	35	0.1	4	10.1	0.34	85,033	25
3979	DD19AT109	28	0.1	12	10.5	0.26	930,960	25
3980	DD19AT108	28	0.1	12	10.8	0.26	2,571,689	25
3981	DD19AT105	28	0.1	15	11.8	0.24	2,461,981	25

MATERIAL DD19B

Lay-up = $[0/\pm45/0]_S$, V_F = 0.35, 0.44, Ave. thickness = 2.78 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester, This material had two 8 mm x 19 mm internal (between center 0° plies and centered side-to-side) D155 fabric patches to raise the V_F without any test coupon edge effects.



Side View

4003	DD19B117	276	0.1	4	24.1	1.09	27,705	25 tab
4004	DD19B113	276	0.1	4	22.7	1.25	50,000	25 R tab
4005	DD19B109	276	0.1	4	22.2	1.20	18,014	25 tab
4006	DD19B110	276	0.1	4	26.2	1.13	10,666	25 tab
4007	DD19B105	241	0.1	4	25.8	1.03	46,870	25 tab
4008	DD19B115	207	0.1	5	25.3	0.88	123,726	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4009	DD19B112	207	0.1	7	26.4	0.78	711,185	25 tab
4010	DD19B114	241	0.1	4	23.8	1.07	17,022	25 tab
4011	DD19B111	241	0.1	4	22.5	1.15	62,757	25 tab
4012	DD19B101	697	*	13	26.1	2.94	1	25 tab
4013	DD19B106	693	*	13	25.3	2.87	1	25 tab
4014	DD19B107	691	*	13	23.8	3.02	1	25 tab
4015	DD19B119	207	0.1	6	24.4	0.80	377,162	25 tab

MATERIAL DD20

Lay-up = $[0_2/\pm45/0]_S$, V_F = 0.342, Ave. thickness = 2.89 mm, S.D. = 0.04 mm, CoRezyn 63-AX-051 Polyester.

4019	DD20101	584	*	13	22.6	2.8	1	22 tab
4020	DD20105	582	*	13	23.1	2.6	1	22 tab
4021	DD20108	594	*	13	23.2	2.8	1	22 tab
4022	DD20103	310	0.1	2	22.6	1.55	8,408	22 tab
4023	DD20102	310	0.1	4	22.0	1.58	4,899	22 tab
4024	DD20109	310	0.1	4	22.9	1.46	5,860	22 tab
4025	DD20104	207	0.1	5	23.3	0.96	27,916	22 tab
4026	DD20106	172	0.1	10	21.7	0.83	87,234	22 tab
4027	DD20112	172	0.1	5	20.0	0.89	65,250	22 tab
4028	DD20111	138	0.1	7	22.8	0.63	484,310	22 tab
4029	DD20110	138	0.1	7	21.2	0.69	459,000	22 tab
4030	DD20107	138	0.1	7	20.9	0.70	362,971	22 tab
4206	DD20143	-337	*	13	----	----	1	25
4207	DD20142	-313	*	13	----	----	1	25
4208	DD20141	-294	*	13	----	----	1	25
4209	DD20140	-308	*	13	----	----	1	25

MATERIAL DD20A

Lay-up = $[0_2/\pm45/0]_S$, V_F = 0.377, Ave. thickness = 2.66 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester.

4054	DD20A112	653	*	13	25.7	2.69	1	22 tab
4055	DD20A110	645	*	13	24.5	2.76	1	22 tab
4056	DD20A108	619	*	13	24.3	2.64	1	22 tab
4057	DD20A104	310	0.1	3	26.7	1.35	5,006	22 tab
4058	DD20A102	310	0.1	3	25.4	1.35	6,014	22 tab
4059	DD20A109	310	0.1	3	25.6	1.41	5,207	22 tab
4060	DD20A106	207	0.1	8	25.0	0.83	38,386	22 tab
4061	DD20A111	207	0.1	8	26.4	0.80	24,080	22 tab
4062	DD20A107	207	0.1	8	25.2	0.88	44,850	22 tab
4063	DD20A101	138	0.1	12	24.1	0.60	1,209,687	22 tab
4076	DD20A103	172	0.1	10	----	----	46,058	22 tab

MATERIAL DD22

Lay-up = $[0_2/\pm45/0]_S$, V_F = 0.307, Ave. thickness = 2.86 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester.

4045	DD22112	564	*	13	21.0	2.8	1	22 tab
4046	DD22103	551	*	13	19.5	2.86	1	22 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4047	DD22109	533	*	13	21.1	2.61	1	22 tab
4048	DD22110	207	0.1	5	20.3	1.06	1,873,215	22 tab
4049	DD22104	276	0.1	4	18.2	1.67	62,055	22 tab
4050	DD22106	276	0.1	3	19.2	1.61	88,185	22 tab
4051	DD22102	276	0.1	3	19.5	1.54	58,843	22 tab
4052	DD22105	241	0.1	4	18.4	1.27	384,914	22 tab
4053	DD22111	241	0.1	10	19.3	1.25	960,823	22 tab
4210	DD22140	-372	*	13	----	----	1	25
4211	DD22141	-416	*	13	----	----	1	25
4212	DD22142	-398	*	13	----	----	1	25
4213	DD22143	-370	*	13	----	----	1	25

MATERIAL DD24

Lay-up = [0/±45/0_3/±45/0], V_F = 0.389 , Ave. thickness = 2.59 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester

4130	DD24124	345	0.1	8	----	----	40,767	22 tab
4131	DD24131	345	0.1	8	22.5	1.53	17,433	22 tab
4132	DD24129	345	0.1	8	24.7	1.50	20,925	22 tab
4133	DD24125	276	0.1	8	21.8	1.31	190,571	22 tab
4134	DD24130	241	0.1	12	22.9	1.08	696,493	22 tab
4135	DD24128	241	0.1	12	23.3	1.12	314,716	22 tab
4136	DD24115	746	*	13	25.9	3.0	1	22 tab
4137	DD24117	704	*	13	----	----	1	22 tab
4138	DD24114	739	*	13	26.8	3.0	1	22 tab
4139	DD24127	207	0.1	12	23.6	0.88	5,000,000	22 R tab
4164	DD24106	-528	*	13	----	----	1	25
4165	DD24105	-537	*	13	----	----	1	25
4166	DD24104	-500	*	13	----	----	1	25
4167	DD24107	-477	*	13	----	----	1	25

MATERIAL DD25

Lay-up = $[0/\pm45/0]_S$, V_F = 0.455, Ave. thickness = 2.89 mm, S.D. = 0.14 mm, Glass Veil, CoRezyn 63-AX-051 Polyester

4140	DD25102	814	*	13	28.4	3.0	1	22 tab
4141	DD25105	682	*	13	28.0	3.1	1	22 tab
4142	DD25108	733	*	13	27.2	2.7	1	22 tab
4143	DD25109	345	0.1	7	27.7	1.42	1,621	22 tab
4144	DD25106	207	0.1	10	29.2	0.73	205,450	22 tab
4145	DD25107	172	0.1	12	26.0	0.67	5,000,000	22 R tab
4146	DD25101	276	0.1	5	25.7	1.10	37,442	22 tab
4147	DD25110	276	0.1	5	29.3	0.99	50,003	22 tab
4148	DD25111	276	0.1	5	29.7	1.01	48,799	22 tab
4149	DD25114	207	0.1	12	30.4	0.68	778,703	22 tab
4150	DD25104	345	0.1	2	27.0	1.37	8,578	22 tab
4151	DD25113	345	0.1	2	28.8	1.22	17,706	22 tab
4152	DD25103	207	0.1	8	27.7	0.78	982,766	22 tab
4160	DD25130	-498	*	13	----	----	1	25
4161	DD25131	-505	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4162	DD25132	-464	*	13	----	----	1	25
4163	DD25133	-465	*	13	----	----	1	25
4173	DD25132	-241	10	15	----	----	1,322,357	25
4174	DD25136	-241	10	15	----	----	524,658	25

MATERIAL DD25A

Lay-up = $[0/\pm45/0]_S$, V_F = 0.493, Ave. thickness = 2.67 mm, S.D. = 0.08 mm, Polyester Veil, CoRezyn 63-AX-051 Polyester

4153	DD25A113	790	*	13	27.6	3.0	1	22 tab
4154	DD25A112	780	*	13	28.8	2.8	1	22 tab
4155	DD25A111	778	*	13	27.3	2.9	1	22 tab
4183	DD25A101	207	0.1	10	28.0	0.74	1,015,979	22 tab
4184	DD25A108	241	0.1	10	27.7	0.86	503,924	22 tab
4185	DD25A104	241	0.1	10	27.7	0.91	740,566	22 tab
4186	DD25A109	241	0.1	12	----	----	1,178,054	22 tab
4187	DD25A106	276	0.1	10	28.6	1.01	135,192	22 tab
4188	DD25A110	276	0.1	4	29.5	0.97	146,154	22 tab
4189	DD25A102	276	0.1	4	29.5	0.99	253,259	22 tab
4190	DD25A103	345	0.1	4	29.5	1.23	20,249	22 tab
4191	DD25A107	345	0.1	4	28.5	1.24	44,823	22 tab
4192	DD25A105	345	0.1	4	29.3	1.20	44,578	22 tab
4218	DD25A160	-679	*	13	----	----	1	25
4219	DD25A161	-657	*	13	----	----	1	25
4220	DD25A163	-608	*	13	----	----	1	25
4221	DD25A162	-570	*	13	----	----	1	25

MATERIAL DD25B

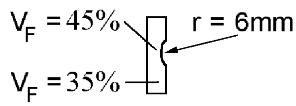
Lay-up = $[0/\pm45/0]_S$, V_F = 0.308, Ave. thickness = 4.27 mm, S.D. = 0.06 mm, Polyester Veil, CoRezyn 63-AX-051 Polyester

4156	DD25B104	486	*	13	18.2	2.7	1	22 tab
4157	DD25B103	540	*	13	19.7	2.9	1	22 tab
4158	DD25B111	516	*	13	19.0	2.8	1	22 tab
4159	DD25B102	207	0.1	10	20.2	1.07	1,200,000	22 R tab
4168	DD25B130	-437	*	13	----	----	1	25
4169	DD25B131	-363	*	13	----	----	1	25
4170	DD25B132	-453	*	13	----	----	1	25
4171	DD25B133	-422	*	13	----	----	1	25
4175	DD25B110	241	0.1	5	----	----	118,550	22 tab
4176	DD25B108	241	0.1	10	18.5	1.38	178,659	22 tab
4177	DD25B112	241	0.1	10	17.5	1.46	70,464	22 tab
4178	DD25B107	276	0.1	4	20.1	1.41	49,497	22 tab
4179	DD25B106	276	0.1	4	19.1	1.48	17,956	22 tab
4180	DD25B105	276	0.1	4	19.3	1.52	41,266	22 tab
4182	DD25B109	310	0.1	2	21.2	1.54	5,663	22 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL DD25D

Lay-up = $[0/\pm45/0]_S$, V_F = 0.35, 0.45, Ave. thickness = 3.96 mm, 2.55 mm (indentation) S.D. = 0.09 mm, 0.06 mm (indentation), Polyester veil, CoRezyn 63-AX-051 Polyester. This material has a surface indentation to raise the V_F. The listed stress does NOT take into account the indentation. (the average stress increase due to this indentation = 1.55)



4234	DD25D102	516	*	13	25.5	2.15	1	25
4235	DD25D101	179	0.1	5	23.1	1.17	110,424	25
4236	DD25D110	181	0.1	4	25.0	0.94	180,832	25
4237	DD25D112	155	0.1	7	22.0	0.83	584,489	25
4238	DD25D111	155	0.1	8	----	----	252,968	25
4239	DD25D108	176	0.1	4	----	----	66,875	25
4240	DD25D105	153	0.1	8	----	----	182,727	25
4241	DD25D104	156	0.1	5	----	----	347,113	25
4242	DD25D107	180	0.1	5	----	----	159,308	25
4243	DD25D117	451	*	13	----	----	1	25
4244	DD25D118	467	*	13	----	----	1	25

MATERIAL DD26

Lay-up = $[0/\pm45/0]_S$, V_F = 0.473, Ave. thickness = 2.61 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester. Same fabric as DD25, but with a different binder used for general purpose polyester resins.

4245	DD26116	849	*	13	32.0	2.65	1	22 tab
4246	DD26101	808	*	13	30.4	2.70	1	22 tab
4247	DD26110	902	*	13	29.6	3.05	1	22 tab
4248	DD26115	414	0.1	4	32.4	1.45	10,628	22 tab
4249	DD26114	414	0.1	4	28.8	1.53	13,112	22 tab
4250	DD26111	414	0.1	4	29.0	1.45	9,883	22 tab
4251	DD26112	345	0.1	8	28.8	1.25	39,204	22 tab
4252	DD26113	345	0.1	8	30.1	1.20	44,872	22 tab
4253	DD26104	241	0.1	12	30.1	0.80	780,507	22 tab
4254	DD26103	345	0.1	5	30.7	1.24	92,698	22 tab
4255	DD26107	241	0.1	12	28.1	0.90	609,415	22 tab
4256	DD26105	241	0.1	10	29.6	0.83	2,019,100	22 tab
4257	DD26106	241	0.1	10	30.5	0.83	1,568,929	22 tab
4258	DD26126	-563	*	13	----	----	1	25
4259	DD26127	-593	*	13	----	----	1	25
4260	DD26125	-519	*	13	----	----	1	25
4261	DD26129	-594	*	13	----	----	1	25
4262	DD26124	-310	10	10	----	----	103,105	25
4263	DD26120	-241	10	12	----	----	20,000,000	25 R
4268	DD26130	-276	10	12	----	----	2,851,058	25
4264	DD26121	-276	10	12	----	----	2,185,867	25
4265	DD26122	-276	10	12	----	----	1,343,877	25
4172	DD26132	-276	10	12	----	----	363,720	25 R

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL DD27A

Lay-up = $[0/\pm45]_S$, V_F = 0.320, Ave. thickness = 4.08 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

5933	DD27A112	555	*	13	21.3	2.99	1	22 tab
5934	DD27A103	574	*	13	21.5	2.91	1	22 tab
5935	DD27A107	207	0.1	3	19.1	1.22	11,981	22 tab
5936	DD27A109	570	*	13	22.1	3.07	1	22 tab
5937	DD27A101	207	0.1	3	20.4	1.09	16,202	22 tab
5938	DD27A110	138	0.1	4	21.9	0.63	381,380	22 tab
5939	DD27A108	207	0.1	3	20.1	1.17	17,327	22 tab
5940	DD27A114	138	0.1	6	20.7	0.67	468,496	22 tab
5941	DD27A111	138	0.1	6	19.5	0.75	256,311	22 tab
5942	DD27A104	276	0.1	1	21.4	1.35	2,115	22 tab
5943	DD27A106	276	0.1	1	18.2	1.62	1,585	22 tab
5944	DD27A130	-383	*	13	----	----	1	25
5945	DD27A127	-394	*	13	----	----	1	25
5946	DD27A122	-365	*	13	----	----	1	25
5950	DD27A102	103	0.1	8	20.3	0.53	2,780,943	22 tab
5951	DD27A105	103	0.1	8	19.7	0.54	1,889,675	22 tab
5901	DD27A131	103	0.1	8	20.1	0.52	1,299,207	22 tab

MATERIAL DD27B

Lay-up = $[0/\pm45]_S$, V_F = 0.420, Ave. thickness = 3.16 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

5920	DD27B101	658	*	13	25.5	3.1	1	22 tab
5921	DD27B107	679	*	13	24.4	2.9	1	22 tab
5922	DD27B102	665	*	13	26.4	2.8	1	22 tab
5923	DD27B106	345	0.1	1	26.3	1.43	1,918	22 tab
5924	DD27B112	345	0.1	1	24.9	1.56	2,312	22 tab
5925	DD27B110	345	0.1	1	25.8	1.64	3,316	22 tab
5926	DD27B104	276	0.1	2	26.1	1.10	13,355	22 tab
5927	DD27B109	276	0.1	2	25.6	1.13	10,804	22 tab
5928	DD27B108	172	0.1	5	27.9	0.65	633,513	22 tab
5929	DD27B103	276	0.1	2	24.7	1.17	11,011	22 tab
5930	DD27B105	207	0.1	4	25.0	0.87	105,010	22 tab
5931	DD27B111	207	0.1	4	26.3	0.89	127,727	22 tab
5932	DD27B113	207	0.1	4	26.4	0.84	122,565	22 tab
5947	DD27B120	-329	*	13	----	----	1	25
5948	DD27B127	-324	*	13	----	----	1	25
5949	DD27B131	-311	*	13	----	----	1	25
5952	DD27B133	138	0.1	8	26.3	0.54	1,432,060	22 tab
5953	DD27B134	172	0.1	5	25.6	0.68	497,241	22 tab
5954	DD27B135	138	0.1	8	26.8	0.50	2,067,242	22 tab

MATERIAL DD27C

Lay-up = $[0/\pm45]_S$, V_F = 0.431, Ave. thickness = 3.08 mm, S.D. = 0.09 mm, Derakane 8084 vinyl ester

6581	DD27C101	809	*	13	27.5	3	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6582	DD27C102	722	*	13	26.0	2.9	1	25
6583	DD27C103	721	*	13	26.0	2.8	1	25
6584	DD27C108	-393	*	13	----	----	1	25
6585	DD27C107	-436	*	13	----	----	1	25
6586	DD27C106	-420	*	13	----	----	1	25
6587	DD27C105	-441	*	13	----	----	1	25

MATERIAL FFA

Lay-up = $[\pm45/0/0/\pm45]_S$, V_F =0.364, Ave. thickness = 3.78 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester. The FFA, FFB, FFC, FFD and FFF materials involved the same fabrics with the lay-up orientation changed to investigate ply sequence fatigue differences.

3337	FFA104	721	*	13	24.3	3.00	1	25
3338	FFA112	717	*	13	23.6	3.03	1	25
3339	FFA106	710	*	13	24.8	2.90	1	25
3340	FFA109	414	0.1	2	23.6	1.98	1,832	25
3341	FFA102	414	0.1	2	23.8	2.14	757	25
3342	FFA114	414	0.1	2	25.0	2.05	926	25
3343	FFA111	345	0.1	4	24.9	1.63	4,233	25
3344	FFA118	276	0.1	4	25.9	1.21	30,201	25
3345	FFA115	345	0.1	2	24.8	1.63	4,642	25
3346	FFA107	276	0.1	4	24.3	1.29	37,675	25
3347	FFA113	345	0.1	2	24.9	1.63	2,420	25
3348	FFA105	276	0.1	4	23.6	1.28	18,064	25
3349	FFA103	172	0.1	10	23.9	0.78	10,000,000	25 R
3350	FFA110	207	0.1	10	23.7	0.93	1,123,713	25
3351	FFA116	207	0.1	12	23.7	0.99	372,007	25
3352	FFA117	207	0.1	12	22.8	1.02	612,692	25
3370	FFA153	207	0.1	12	----	----	926,563	25
3371	FFA108	345	0.1	2	----	----	2,039	25
Tests 3373 - 3377 were run at 20 Hz to observe thermal failures								
3373	FFA160	207	0.1	20	----	----	42,809	25
3374	FFA155	345	0.1	20	----	----	820	25
3375	FFA152	276	0.1	20	----	----	5,899	25
3376	FFA151	172	0.1	20	----	----	157,623	25
3377	FFA154	138	0.1	20	----	----	5,000,000	25
3424	FFA150	-557	*	13	----	----	1	25
3425	FFA152	-558	*	13	----	----	1	25
3426	FFA151	-544	*	13	----	----	1	25

MATERIAL FFB

Lay-up = $[0/\pm45/0/\pm45/0]_S$, V_F =0.361, Ave. thickness = 3.81 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester. The FFA, FFB, FFC, FFD and FFF materials involved the same fabrics with the lay-up orientation changed to investigate ply orientation fatigue differences.

3353	FFB136	599	*	13	24.1	3	1	25
3354	FFB132	607	*	13	23.4	2.9	1	25
3355	FFB138	657	*	13	24.9	2.8	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3356	FFB128	414	0.1	2	23.6	1.97	803	25
3357	FFB141	414	0.1	2	23.9	2.04	1,391	25
3358	FFB134	345	0.1	2	23.4	1.68	2,293	25
3359	FFB130	345	0.1	2	23.4	1.68	1.909	25
3360	FFB142	276	0.1	4	22.3	1.41	16,986	25
3361	FFB140	276	0.1	2	24.4	1.23	22,313	25
3362	FFB131	207	0.1	12	23.3	0.98	486,273	25
3363	FFB127	207	0.1	12	21.0	1.03	393,660	25
3364	FFB139	207	0.1	12	23.6	0.95	540,700	25
Tests 3365 - 3368 were notched on the edges to reduce the stress concentration at the grips.								
3365	FFB137	276	0.1	4	----	----	54,111	15
3366	FFB133	207	0.1	12	----	----	849,853	15
3367	FFB129	414	0.1	1	----	----	925	15
3368	FFB125	345	0.1	2	----	----	5,420	15
3369	FFB135	635	*	13	----	----	1	25
3427	FFB114	-517	*	13	----	----	1	25
3428	FFB109	-507	*	13	----	----	1	25
3429	FFB115	-495	*	13	----	----	1	25

MATERIAL FFC

Lay-up = $[0/\pm45/\pm45/0]_S$, V_F =0.361, Ave. thickness = 3.81 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester. The FFA, FFB, FFC, FFD and FFF materials involved the same fabrics with the lay-up orientation changed to investigate ply orientation fatigue differences.

3378	FFC117	648	*	13	23.6	2.90	1	25
3379	FFC111	620	*	13	----	----	1	6
3380	FFC104	604	*	13	----	----	1	6
3381	FFC114	414	0.1	1	23.1	2.00	508	25
3382	FFC110	414	0.1	1	----	----	692	25
3383	FFC107	345	0.1	2	22.6	1.71	1,621	25
3384	FFC108	345	0.1	2	----	----	3,371	25
3385	FFC109	276	0.1	4	----	----	31,551	25
3386	FFC118	276	0.1	4	----	----	24,762	25
3387	FFC103	414	0.1	1	----	----	788	25
3388	FFC115	345	0.1	2	----	----	2,895	25
3389	FFC105	276	0.1	4	----	----	27,395	25
3390	FFC101	207	0.1	12	----	----	417,819	25
3391	FFC112	207	0.1	12	----	----	414,180	25
3392	FFC113	207	0.1	21	22.4	0.93	649,406	25
3430	FFC134	-517	*	13	----	----	1	25
3431	FFC128	-476	*	13	----	----	1	25
3432	FFC136	-505	*	13	----	----	1	25

MATERIAL FFD

Lay-up = $[0/0/\pm45/\pm45]_S$, V_F =0.359, Ave. thickness = 3.83 mm, S.D. = 0.04 mm, CoRezyn 63-AX-051 Polyester. The FFA, FFB, FFC, FFD and FFF materials involved the same fabrics with the lay-up orientation changed to investigate ply orientation fatigue differences.

3393	FFD112	676	*	13	24.0	2.90	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3394	FFD106	630	*	13	----	----	1	25
3395	FFD107	602	*	13	----	----	1	25
3396	FFD110	414	0.1	2	22.2	2.18	533	25
3397	FFD111	414	0.1	2	----	----	793	6
3398	FFD104	414	0.1	2	----	----	912	6
3399	FFD102	345	0.1	2	----	----	3,683	6
3400	FFD105	345	0.1	2	----	----	2,923	6
3401	FFD114	345	0.1	2	----	----	3,993	6
3402	FFD115	276	0.1	4	----	----	24,441	6
3403	FFD116	276	0.1	4	----	----	32,380	6
3404	FFD101	276	0.1	4	----	----	21,567	6
3405	FFD103	207	0.1	12	----	----	1,099,442	6
3406	FFD117	207	0.1	12	----	----	466,758	6
3407	FFD104	207	0.1	12	----	----	650,603	6
3433	FFD133	-547	*	13	----	----	1	25
3434	FFD141	-549	*	13	----	----	1	25
3435	FFD138	-530	*	13	----	----	1	25

MATERIAL FFF

Lay-up = $[\pm45/\pm45/0/0]_S$, V_F =0.365, Ave. thickness = 3.77 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester. The FFA, FFB, FFC, FFD and FFF materials involved the same fabrics with the lay-up orientation changed to investigate ply orientation fatigue differences.

3408	FFF110	640	*	13	----	----	1	6
3409	FFF106	643	*	13	----	----	1	6
3410	FFF122	708	*	13	23.9	2.9	1	25
3411	FFF108	414	0.1	1	----	----	683	6
3412	FFF107	414	0.1	1	----	----	810	6
3413	FFF114	414	0.1	2	----	----	1,587	6
3415	FFF112	345	0.1	2	----	----	7,694	6
3416	FFF117	345	0.1	2	----	----	5,602	6
3417	FFF113	345	0.1	2	----	----	8,381	6
3418	FFF115	276	0.1	4	----	----	30,596	6
3419	FFF109	276	0.1	5	----	----	30,569	6
3420	FFF132	276	0.1	5	----	----	26,561	6
3421	FFF116	207	0.1	12	----	----	374,533	6
3422	FFF111	207	0.1	12	----	----	665,573	6
3423	FFF143	207	0.1	20	----	----	684,496	6
3436	FFF125	-605	*	13	----	----	1	25
3437	FFF134	-627	*	13	----	----	1	25
3438	FFF129	-555	*	13	----	----	1	25

MATERIAL GG

Lay-up = $[0_2/\pm45/0_2]$, V_F =0.401, Ave. thickness = 2.46 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester.

3439	GG110	1087	*	13	----	----	1	22
3440	GG104	933	*	13	27.8	3.4	1	22
3441	GG102	891	*	13	27.3	3.3	1	22
3442	GG107	483	0.1	2	28.3	2.00	16,881	22
3443	GG106	483	0.1	2	29.0	2.01	7,897	22

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3444	GG101	414	0.1	2	27.6	1.68	47,335	22
3445	GG105	414	0.1	4	27.3	1.73	62,970	22
3446	GG108	345	0.1	5	27.1	1.35	390,948	22
3447	GG109	345	0.1	5	28.4	1.26	680,831	22
3448	GG103	345	0.1	5	28.5	1.31	814,868	22
3449	GG116	483	0.1	2	28.4	1.97	13,403	22
3450	GG117	414	0.1	2	28.3	1.66	42,910	22
3451	GG130	-623	*	13	----	----	1	25
3452	GG131	-644	*	13	----	----	1	25
3453	GG132	-617	*	13	----	----	1	25
3454	GG118	980	*	13	28.5	3.44	1	22

TEST & SAMPLE ID # MAX. STRESS MPa R Q Hz E GPa e % CYCLES TO FAIL WIDTH (mm) and Notes

0^{O} UNIDIRECTIONAL TESTS

Materials A130, D092A, D155A, DB120A and DB240A were tested in the longitudinal (0°), transverse (90°) and (±45°) fiber directions for material properties. Fabrics DB120A and DB240A were unstitched into +45° and -45° plies, rotated to the 0°direction and tested as a unidirectional fabric. In the notes column, ZERO indicates a unidirectional 0° test, 90 indicates a transverse test and ±45 indicates a simulated shear test (ASTM D3518). These tests are summarized in Table 17.

MATERIAL A060

Lay-up = $[0]_{10}$, V_F = 0.463, Ave. thickness = 1.76 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3038	A060104	-317	*	13	----	----	1	25
3039	A060106	-278	*	13	----	----	1	25
3040	A060101	-219	*	13	----	----	1	25
3041	A060119	-440	*	13	----	----	1	25 Z
3042	A060120	-322	*	13	----	----	1	25 Z
3068	A060117	624	*	13	31.4	2.00	1	25
3069	A060113	586	*	13	29.4	2.05	1	25
3070	A060114	529	*	13	32.0	1.70	1	25
3071	A060116	345	0.1	5	27.6	1.21	13,952	25
3072	A060118	345	0.1	5	33.9	1.04	7,687	25
3073	A060110	241	0.1	12	31.8	0.72	1,900,000	25 R
3074	A060118	241	0.1	12	32.5	0.74	1,284,494	25
3075	A060111	345	0.1	5	32.5	1.14	36,913	25
3076	A060115	310	0.1	10	31.4	0.99	84,367	25

MATERIAL A130

Lay-up = $[0]_8$, V_F = 0.534, Ave. thickness = 2.62 mm, S.D. = 0.04 mm, CoRezyn 63-AX-051 Polyester
Tests 2036 - 2054 in this section were done for Table 17.Compression tests involved a 13 mm gage length. Tests with a ZERO comment were tested in the longitudinal 0° direction. A ±45 comment indicates that a ±45° laminate was tested and a 90 indicates a transverse or 90° fiber direction test

2036	A13001	840	*	0.25	38.8	2.20	1	ZERO
2037	A13002	852	*	0.25	38.4	2.80	1	ZERO
2038	A13003	881	*	0.25	37.5	2.60	1	ZERO
2039	A13004	81	*	0.25	11.2	----	1	±45
2040	A13005	87	*	0.25	11.4	----	1	±45
2041	A13006	88	*	0.25	11.4	----	1	±45
2042	A13007	-300	*	0.25	29.1	----	1	ZERO
2043	A13008	-337	*	0.25	28.4	----	1	ZERO
2044	A13009	-364	*	0.25	32.1	----	1	ZERO
2045	A13010	-91	*	0.25	11.9	----	1	±45
2046	A13011	-85	*	0.25	11.9	----	1	±45
2047	A13012	-90	*	0.25	10.6	----	1	±45
2048	A13013	-98	*	0.25	7.79	----	1	90
2049	A13014	-89	*	0.25	6.69	----	1	90
2050	A13015	-93	*	0.25	8.27	----	1	90
2051	A13016	34	*	0.25	8.48	0.37	1	90
2052	A13017	34	*	0.25	9.03	0.36	1	90

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2053	A13050	900	*	0.25	35.3	2.71	1	ZERO
2054	A13051	92	*	0.25	11.0	----	1	±45

MATERIAL A130C

Lay-up = $[0]_6$, V_F = 0.356, Ave. thickness = 2.97 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester,

2415	A130C110	682	*	13	29.9	2.30	1	25
2416	A130C112	756	*	13	30.2	2.50	1	25
2417	A130C113	745	*	13	29.9	2.50	1	25
2418	A130C104	414	0.1	5	31.0	1.33	15,268	25
2419	A130C109	414	0.1	5	33.1	1.25	17,020	25
2420	A130C106	483	0.1	2	34.1	1.42	2,781	25
2421	A130C108	483	0.1	2	32.0	1.51	1,986	25
2422	A130C102	345	0.1	8	29.8	1.16	425,772	25
2423	A130C103	483	0.1	2	32.5	1.49	3,521	25
2424	A130C111	414	0.1	5	31.5	1.31	37,072	25
2425	A130C101	345	0.1	10	33.9	1.12	854,215	25
2426	A130C118	310	0.1	10	31.6	0.98	4,377,528	25
2427	A130C119	345	0.1	10	31.6	1.09	841,256	25
2631	A130C301	-356	*	3	----	----	1	25
2632	A130C302	-347	*	3	----	----	1	25
2633	A130C303	-394	*	3	----	----	1	25
2634	A130C304	-324	*	3	----	----	1	25
2900	A130C144	-207	10	12	----	----	484,312	25
2901	A130C141	-207	10	12	----	----	4,000,000	25 R
2902	A130C148	-276	10	5	----	----	161,152	25
2903	A130C145	-442	*	13	----	----	1	25
2904	A130C146	-345	10	1	----	----	94	25
2905	A130C143	-310	10	2	----	----	2,799	25
2906	A130C149	-310	10	2	----	----	916	25
2907	A130C147	-310	10	2	----	----	452	25
2908	A130C142	-276	10	10	----	----	71,475	25
2909	A130C149	-345	10	1	----	----	71	25
2910	A130C151	-276	10	10	----	----	62,465	25

Tests 3077 - 3079 were manufactured with epoxy to see if this matrix increased the compressive strength

3077	A130C103E	-287	*	13	----	----	1	25 Epoxy
3078	A130C102E	-262	*	13	----	----	1	25 Epoxy
3079	A130C301E	-296	*	13	----	----	1	25 Epoxy

Tests 5727 - 5738 involved removing the weaving stitch prior to RTM to improve the compressive strength properties by reducing the out-of-plane fiber angles. The weft was a number of glass fibers with a thermoplastic bead, which was heated and impregnated part of the A130 strands.

Tests 5727 were the control coupons

5727	A130C401	-349	*	13	----	----	1	25
5728	A130C402	-385	*	13	----	----	1	25
5729	A130C403	-371	*	13	----	----	1	25
5730	A130C404	-330	*	13	----	----	1	25

Tests 5731 - 5734 had the thermoplastic bead burned off, but the glass stitching thread remained

5731	A130C405	-395	*	13	----	----	1	25
5732	A130C406	-466	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5733	A130C407	-545	*	13	----	----	1	25
5734	A130C408	-509	*	13	----	----	1	25
Tests 5735 - 5738 had the thermoplastic bead burned off and the glass stitching thread removed								
5735	A130C409	-515	*	13	----	----	1	25
5736	A130C410	-483	*	13	----	----	1	25
5737	A130C411	-477	*	13	----	----	1	25
5738	A130C412	-509	*	13	----	----	1	25

MATERIAL A130G

Lay-up = $[0]_{14}$, V_F = 0.55, Ave. thickness = 4.38 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester

2401	A130G113	1186	*	13	45.3	2.61	1	25
2402	A130G103	1150	*	13	43.7	2.60	1	25
2403	A130G109	1272	*	13	47.6	2.67	1	25
2404	A130G114	690	0.1	2	48.0	1.43	938	25
2405	A130G108	690	0.1	2	45.2	1.52	507	25
2406	A130G112	690	0.1	2	48.3	1.44	1,546	25
2407	A130G107	552	0.1	4	45.0	1.22	5,452	25
2408	A130G110	552	0.1	4	43.2	1.28	2,952	25
2409	A130G105	552	0.1	4	40.0	1.37	4,864	25
2410	A130G101	414	0.1	5	42.4	0.97	45,710	25
2411	A130G102	414	0.1	5	40.0	1.03	32,282	25
2412	A130G115	276	0.1	15	46.9	0.57	4,847,670	25 R
2413	A130G104	414	0.1	4	45.5	0.91	28,621	25
2114	A130G106	345	0.1	8	40.5	0.85	413,627	25
2635	A130G301	-488	*	3	----	----	1	25
2636	A130G302	-414	*	3	----	----	1	25
2637	A130G303	-369	*	3	----	----	1	25
2638	A130G304	-422	*	3	----	----	1	25

MATERIAL A260

Lay-up = $[0]_{4}$, V_F = 0.368, Ave. thickness = 3.71 mm, S.D. = 0.13 mm, CoRezyn 63-AX-051 Polyester

3086	A260109	-396	*	13	----	----	1	25
3087	A260118	-357	*	13	----	----	1	25
3088	A260105	-540	*	13	----	----	1	25
3089	A260102	-422	*	13	----	----	1	25
3090	A260108	-460	*	13	----	----	1	25
3091	A260120	-470	*	13	----	----	1	25
3092	A260124	833	*	13	31.2	2.70	1	25
3093	A260122	690	*	13	23.4	2.90	1	25
3094	A260126	805	*	13	27.3	2.90	1	25
3095	A260127	345	0.1	5	29.9	0.99	3,000,000	25 R
3096	A260123	448	0.1	5	29.0	1.35	51,850	25
3097	A260125	448	0.1	8	32.1	1.42	27,702	25
3098	A260128	448	0.1	5	28.5	1.40	17,163	25
3099	A260121	379	0.1	10	31.9	1.14	191,959	25
3100	A260133	552	0.1	2	35.9	1.36	4,207	25
3101	A260120	552	0.1	2	32.5	1.79	1,448	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3102	A260130	552	0.1	2	36.4	1.52	3,348	25
3103	A260132	379	0.1	10	32.1	1.21	640,153	25
3104	A260134	379	0.1	10	34.3	1.20	455,258	25

MATERIAL CM1701A

Lay-up = $[0]_5$, V_F = 0.38, Ave. thickness = 3.20 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

2911	CMA101	-604	*	13	----	----	1	25
2912	CMA102	-573	*	13	----	----	1	25
2913	CMA103	-542	*	13	----	----	1	25
2935	CMA116	874	*	13	32.4	2.70	1	25
2936	CMA113	784	*	13	28.6	2.75	1	25
2937	CMA107	730	*	13	29.2	2.50	1	25
2938	CMA112	483	0.1	2	29.8	1.63	784	25
2939	CMA106	483	0.1	2	38.3	1.29	1,940	25
2940	CMA105	483	0.1	2	33.2	1.46	1,574	25
2941	CMA111	414	0.1	5	29.3	1.54	17,955	25
2943	CMA110	414	0.1	4	26.8	1.60	6,418	25
2945	CMA117	345	0.1	5	28.0	1.19	26,217	25
2946	CMA108	345	0.1	5	32.3	1.00	38,086	25
2947	CMA114	276	0.1	10	28.8	0.89	81,998	25
2948	CMA119	276	0.1	10	29.1	0.92	117,831	25
2615	CMA101	-604	*	13	----	----	1	25
2616	CMA102	-573	*	13	----	----	1	25
2617	CMA103	-542	*	13	----	----	1	25
2949	CMA121	-345	10	4	----	----	42,588	25
2950	CMA125	-345	10	4	----	----	13,272	25
2951	CMA127	-345	10	4	----	----	80,669	25
2952	CMA123	-310	10	10	----	----	105,995	25
2953	CMA132	-310	10	12	----	----	532,367	25
2962	CMA134	-310	10	10	----	----	460,941	25

MATERIAL D072A

Lay-up = $[0]_{10}$, V_F = 0.330, Ave. thickness = 3.30 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

3043	D072A118	-608	*	13	----	----	1	25
3044	D072A123	-562	*	13	----	----	1	25
3045	D072A122	-508	*	13	----	----	1	25
3046	D072A120	-345	10	5	----	----	87,741	25
3047	D072A119	-414	10	3	----	----	9,757	25
3048	D072A117	-414	10	4	----	----	2,192	25
3049	D072A116	-345	10	5	----	----	79,404	25
3050	D072A121	-414	10	4	----	----	6,097	25
3051	D072A115	-345	10	5	----	----	136,908	25
3055	D072A110	812	*	13	28.3	2.87	1	25
3056	D072A109	789	*	13	29.3	2.70	1	25
3057	D072A108	796	*	13	27.8	2.90	1	25
3058	D072A107	483	0.1	4	26.8	1.83	9,586	25
3059	D072A106	483	0.1	4	26.7	1.91	8,838	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3060	D072A105	310	0.1	10	28.2	0.96	929,460	25
3061	D072A101	483	0.1	4	31.7	1.63	5,993	25
3062	D072A102	345	0.1	5	27.7	1.14	195,791	25
3063	D072A111	414	0.1	5	31.3	1.32	28,168	25
3064	D072A112	414	0.1	5	26.9	1.47	34,247	25
3065	D072A121	414	0.1	5	28.4	1.40	23,522	25
3066	D072A118	345	0.1	10	26.3	1.30	162,352	25
3067	D072A123	345	0.1	10	27.7	1.29	237,010	25

MATERIAL D092

Lay-up = $[0]_{10}$, V_F = 0.385, Ave. thickness = 3.10 mm, S.D. = 0.07 mm, CoRezyn 63-AX-051 Polyester
Tests 1992 - 2013 in this section were done for Table 17.Compression tests involved a 13 mm gage length.

1992	D09201	929	*	0.25	35.1	2.82	1	ZERO
1993	D09202	926	*	0.25	36.8	2.87	1	ZERO
1994	D09203	911	*	0.25	34.3	3.14	1	ZERO
1995	D09204	134	*	0.25	12.2	----	1	±45
1996	D09205	37	*	0.25	10.1	0.35	1	90
1997	D09208	-761	*	0.25	28.4	-2.6	1	ZERO
1998	D09209	-745	*	0.25	30.6	-2.4	1	ZERO
1999	D09210	-783	*	0.25	31.8	-2.5	1	ZERO
2000	D09211	-130	*	0.25	12.3	----	1	±45
2001	D09212	-129	*	0.25	10.9	----	1	±45
2002	D09213	-130	*	0.25	11.1	----	1	±45
2003	D09214	-141	*	0.25	7.38	-1.91	1	90
2004	D09215	40	*	0.25	7.10	0.56	1	90
2005	D09216	-130	*	0.25	7.65	-1.91	1	90
2006	D09217	150	*	0.25	9.44	----	1	±45
2007	D09250	-816	*	0.25	32.5	-1.63	1	ZERO
2008	D09251	-758	*	0.25	31.4	-1.47	1	ZERO
2009	D09252	-127	*	0.25	6.62	-1.92	1	90
2010	D09253	-129	*	0.25	14.2	----	1	±45
2011	D09254	1041	*	0.25	34.9	3.09	1	ZERO
2012	D09255	140	*	0.25	12.5	----	1	±45
2013	D09256	38	*	0.25	9.79	0.37	1	90

MATERIAL D092B

Lay-up = $[0]_9$, V_F = 0.388, Ave. thickness = 2.76 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester

2144	D092B105	994	*	13	35.6	2.80	1	25 tab
2145	D092B104	907	*	13	32.9	2.86	1	25 tab
2146	D092B106	959	*	13	34.7	2.80	1	25 tab
2147	D092B107	552	0.1	4	36.1	1.60	8,610	25 tab
2148	D092B109	552	0.1	4	32.9	1.70	12,301	25 tab
2149	D092B110	414	0.1	15	36.8	1.13	302,338	25
2150	D092B103	414	0.1	15	32.6	1.21	259,952	25
2151	D092B111	414	0.1	15	31.9	1.30	236,479	25
2152	D092B108	345	0.1	15	33.9	1.04	1,557,555	25
2153	D092B101	345	0.1	15	32.0	1.09	957,554	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2154	D092B102	345	0.1	15	35.7	0.98	1,847,878	25
2380	D092B230	878	*	13	33.4	2.62	1	25
2381	D092B208	875	*	13	34.3	2.55	1	25
2382	D092B204	834	*	13	34.1	2.45	1	25
2383	D092B216	552	0.1	4	34.0	1.62	2,914	25
2384	D092B210	552	0.1	4	32.2	1.71	3,142	25
2385	D092B201	552	0.1	4	33.9	1.63	3,756	25
2386	D092B213	414	0.1	10	32.9	1.26	126,113	25
2387	D092B203	414	0.1	5	33.9	1.22	165,310	25
2388	D092B205	345	0.1	12	33.7	1.02	892,557	25
2389	D092B209	345	0.1	12	32.4	1.06	1,112,027	25
2390	D092B211	414	0.1	10	33.2	1.25	171,967	25
2639	D092B301	-684	*	13	----	----	1	25
2640	D092B302	-710	*	13	----	----	1	25
2641	D092B303	-708	*	13	----	----	1	25
2642	D092B305	-630	*	3	----	----	1	25
2643	D092B306	-610	*	3	----	----	1	25
2644	D092B308	-705	*	3	----	----	1	25

MATERIAL D092D

Lay-up = $[0]_7$, V_F = 0.333, Ave. thickness = 2.64 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

2391	D092D105	736	*	13	25.4	2.89	1	25
2392	D092D107	722	*	13	25.6	2.81	1	25
2393	D092D111	734	*	13	25.8	2.84	1	25
2394	D092D108	482	0.1	2	24.4	1.98	3,342	25
2395	D092D110	482	0.1	4	23.6	2.04	2,650	25
2396	D092D103	414	0.1	8	25.4	1.63	113,301	25
2397	D092D109	345	0.1	10	25.6	1.35	813,359	25
2398	D092D104	414	0.1	8	27.4	1.51	75,856	25
2399	D092D102	345	0.1	12	24.3	1.42	291,147	25
2400	D092D106	345	0.1	15	26.1	1.30	948,810	25
2645	D092D301	-574	*	3	----	----	1	25
2646	D092D302	-515	*	3	----	----	1	25
2647	D092D303	-532	*	3	----	----	1	25
2648	D092D304	-538	*	3	----	----	1	25

MATERIAL D092F

Lay-up = $[0]_{12}$, V_F = 0.492, Ave. thickness = 3.00 mm, S.D. = 0.04 mm, CoRezyn 63-AX-051 Polyester

2178	D092F110	1090	*	13	35.9	3.04	1	25
2179	D092F112	1105	*	13	40.5	2.85	1	25 tab
2180	D092F103	1141	*	13	41.8	2.85	1	25
2181	D092F111	1203	*	13	42.2	2.86	1	25 tab
2182	D092F107	414	0.1	15	44.1	0.97	221,920	25
2183	D092F109	414	0.1	15	39.9	1.03	92,864	25
2184	D092F105	414	0.1	15	37.2	1.12	138,489	25
2185	D092F106	345	0.1	15	42.6	0.81	864,540	25
2186	D092F101	345	0.1	15	38.3	0.90	387,503	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2187	D092F102	552	0.1	4	41.8	1.32	15,665	25 tab
2188	D092F124	552	0.1	4	44.6	1.24	31,284	25 tab
2653	D092F123	-615	*	3	----	----	1	25
2654	D092F126	-692	*	3	----	----	1	25
2655	D092F122	-697	*	3	----	----	1	25
2656	D092F121	-712	*	3	----	----	1	25

MATERIAL D092G

Lay-up = $[0]_{14}$, V_F = 0.520, Ave. thickness = 3.25 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

2155	D092G113	1,130	*	13	42.2	2.70	1	25 tab
2156	D092G105	1,206	*	13	43.3	2.80	1	25 tab
2157	D092G103	1,182	*	13	41.8	2.80	1	25 tab
2158	D092G109	690	0.1	2	43.2	1.62	484	25 tab
2159	D092G112	414	0.1	4	44.1	0.94	12,691	25 tab
2160	D092G106	414	0.1	4	45.0	0.90	15,436	25 tab
2161	D092G101	552	0.1	1	46.0	1.31	2,113	25 tab
2162	D092G104	552	0.1	2	45.4	1.22	2,942	25 tab
2163	D092G102	414	0.1	2	43.4	0.97	11,735	25 tab
2164	D092G110	552	0.1	2	47.2	1.20	2,700	25 tab
2165	D092G108	276	0.1	10	44.5	0.62	261,247	25 tab
2166	D092G111	207	0.1	10	44.0	0.47	3,000,000	25 R tab
2167	D092G114	276	0.1	10	47.7	0.58	159,725	25 tab
2168	D092G107	276	0.1	10	50.0	0.55	95,939	25 tab
2169	D092G205	276	0.1	15	50.7	0.55	472,372	25 tab
2170	D092G207	276	0.1	10	51.1	0.56	494,104	25 tab
2171	D092G206	276	0.1	10	50.7	0.53	368,039	25 tab
2173	D092G201	414	0.1	10	46.8	0.90	36,932	25 tab
2174	D092G202	414	0.1	4	49.2	0.90	29,096	25 tab
2175	D092G204	276	0.1	10	49.1	0.56	700,000	25 R tab
2177	D092G105	345	0.1	12	46.1	0.81	478,382	25 tab
2354	D092G205	1196	*	13	44.5	2.89	1	25 tab
2355	D092G209	1133	*	13	43.4	2.61	1	25 tab
2356	D092G201	1161	*	13	45.0	2.60	1	25 tab
2357	D092G212	276	0.1	12	47.8	0.58	874,379	25 tab
2358	D092G207	552	0.1	5	47.5	1.16	12,811	25 tab
2359	D092G202	552	0.1	5	41.5	1.33	9,807	25 tab
2360	D092G211	552	0.1	5	45.2	1.22	9,091	25 tab
2361	D092G216	690	0.1	2	42.1	1.64	1,360	25 tab
2362	D092G215	690	0.1	2	45.9	1.50	2,083	25 tab
2363	D092G214	414	0.1	10	41.9	0.99	113,852	25 tab
2364	D092G210	414	0.1	10	43.0	0.96	92,451	25 tab
2365	D092G213	276	0.1	15	45.6	0.60	6,654,291	25 tab
2366	D092G203	414	0.1	10	44.5	0.93	135,121	25 tab
2649	D092G301	-658	*	3	----	----	1	25
2650	D092G302	-645	*	3	----	----	1	25
2651	D092G303	-629	*	3	----	----	1	25
2652	D092G304	-837	*	3	----	----	1	25
2786	D092G130	-621	10	4	----	----	13,859	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2787	D092G120	-621	10	5	----	----	7,978	25
2789	D092G126	-621	10	5	----	----	6,124	25
2790	D092G131	-552	10	12	----	----	19,386	25
2791	D092G123	-552	10	12	----	----	27,412	25
2792	D092G124	-552	10	12	----	----	11,391	25
2793	D092G132	-414	10	12	----	----	1,864,286	25
2794	D092G128	-483	10	10	----	----	481,468	25
2795	D092G121	-483	10	10	----	----	298,071	25
2796	D092G127	-483	10	10	----	----	331,041	25

MATERIAL D155

Lay-up = $[0]_6$, V_F = 0.45, Ave. thickness = 2.74 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester
Tests 2014 - 2035 in this section were done for Table 17.Compression tests involved a 13 mm gage length.

2014	D15501	984	*	0.25	39.0	2.90	1	ZERO
2015	D15502	898	*	0.25	36.3	2.69	1	ZERO
2016	D15503	976	*	0.25	38.9	2.87	1	ZERO
2017	D15504	93	*	0.25	12.8	----	1	±45
2018	D15505	25	*	0.25	9.12	0.43	1	90
2019	D15506	30	*	0.25	9.24	0.37	1	90
2022	D15509	-109	*	0.25	14.0	-3.2	1	±45
2023	D15510	-106	*	0.25	15.1	-3.72	1	±45
2024	D15511	-122	*	0.25	8.31	-1.62	1	90
2025	D15512	-118	*	0.25	7.65	-1.43	1	90
2026	D15513	-727	*	0.25	32.1	-2.48	1	ZERO
2027	D15514	-710	*	0.25	31.8	-1.77	1	ZERO
2028	D15515	-756	*	0.25	29.6	-1.34	1	ZERO
2029	D15516	104	*	0.25	12.3	----	1	±45
2030	D15517	103	*	0.25	10.8	----	1	±45
2031	D15550	-730	*	0.25	32.3	-2.18	1	ZERO
2032	D15551	-807	*	0.25	33.0	-2.14	1	ZERO
2033	D15552	-147	*	0.25	7.72	-1.96	1	90
2034	D15553	1088	*	0.25	39.0	2.85	1	ZERO
2035	D15554	86	*	0.25	13.2	----	1	±45

MATERIAL D155B

Lay-up = $[0]_5$, V_F = 0.399, Ave. thickness = 2.70 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

2110	D155B65	935	*	13	34.8	2.80	1	25 tab
2111	D155B71	961	*	13	29.6	3.25	1	25 tab
2112	D155B61	911	*	13	33.8	2.80	1	25
2113	D155B60	552	0.1	2	31.9	1.86	1,831	25
2114	D155B72	552	0.1	2	29.8	1.92	3,911	25
2115	D155B63	414	0.1	5	31.9	1.44	85,156	25
2116	D155B70	414	0.1	10	28.6	1.49	108,103	25
2117	D155B69	276	0.1	20	28.5	1.08	8,000,000	25
2118	D155B68	552	0.1	4	30.9	1.83	6,582	25 tab
2119	D155B66	690	0.1	1	32.2	2.32	139	25
2120	D155B62	345	0.1	10	33.0	1.10	1,230,231	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2121	D155B64	414	0.1	10	33.0	1.28	75,774	25 tab
2122	D155B67	345	0.1	12	29.5	1.19	721,864	25 tab
2123	D155B81	345	0.1	10	32.5	1.15	572,173	25
2203	D155B200	755	*	13	31.1	2.43	1	25
2204	D155B209	779	*	13	28.2	2.76	1	25
2205	D155B215	785	*	13	28.5	2.75	1	25
2206	D155B201	483	0.1	4	32.6	1.48	6,979	25
2207	D155B207	483	0.1	4	33.1	1.46	16,497	25
2208	D155B205	414	0.1	7	32.2	1.28	82,605	25
2209	D155B203	414	0.1	8	36.8	1.13	68,483	25
2236	D155B212	345	0.1	15	33.6	1.02	967,901	25
2237	D155B210	345	0.1	15	30.1	1.15	1,104,634	25
2338	D155B202	483	0.1	5	30.4	1.59	19,814	25
2339	D155B213	552	0.1	3	32.2	1.71	2,141	25
2340	D155B208	552	0.1	4	30.3	1.82	2,305	25
2341	D155B211	552	0.1	4	31.8	1.73	1,733	25
2342	D155B214	414	0.1	10	30.8	1.34	48,181	25
2657	D155B301	-620	*	3	----	----	1	25
2658	D155B302	-666	*	3	----	----	1	25
2659	D155B303	-642	*	3	----	----	1	25
2660	D155B304	-656	*	3	----	----	1	25
2776	D155B174	-681	*	3	----	----	1	25
2777	D155B177	-517	10	1	----	----	178	25
2778	D155B175	-414	10	10	----	----	76,348	25
2779	D155B178	-414	10	10	----	----	61,956	25
2780	D155B180	-345	10	12	----	----	954,990	25
2781	D155B176	-345	10	12	----	----	893,962	25
2782	D155B173	-345	10	12	----	----	1,121,768	25
2783	D155B181	-414	10	10	----	----	172,874	25
2784	D155B179	-483	10	2	----	----	886	25
3735	D155B222	831	*	13	32.8	----	1	25
3736	D155B223	845	*	13	----	----	1	25
3737	D155B218	775	*	13	----	----	1	25
3738	D155B218	843	*	13	----	----	1	25

MATERIAL D155C

Lay-up = $[0]_7$, V_F = 0.474, Ave. thickness = 2.99 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

2124	D155C111	1189	*	13	33.6	3.57	1	25
2125	D155C109	1184	*	13	32.3	3.66	1	25
2126	D155C107	1188	*	13	34.6	3.43	1	25
2127	D155C101	827	0.1	2	32.5	2.55	315	25
2128	D155C105	552	0.1	5	34.0	1.59	11,103	25
2129	D155C110	552	0.1	5	33.4	1.62	10,021	25
2130	D155C106	414	0.1	12	33.7	1.24	189,546	25
2131	D155C104	345	0.1	15	35.6	1.01	1,276,914	25
2132	D155C108	414	0.1	10	37.0	1.23	133,885	25
2133	D155C100	414	0.1	10	34.3	1.24	206,447	25
2134	D155C114	552	0.1	4	32.1	1.68	14,762	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2135	D155C102	345	0.1	12	35.1	0.99	854,271	25
2136	D155C103	345	0.1	12	32.2	1.04	644,464	25

The following D155C2 plate was thickness tapered, which raised the fiber volume fraction of the material due to removal of matrix rich layers on the surfaces.

2220	D155C202	1129	*	13	43.0	2.62	1	25
2221	D155C205	1208	*	13	42.6	2.83	1	25
2222	D155C203	1152	*	13	43.8	2.63	1	25
2223	D155C206	552	0.1	5	46.7	1.18	19,546	25
2224	D155C207	552	0.1	5	43.0	1.28	19,611	25
2225	D155C209	552	0.1	5	46.7	1.09	25,014	25
2227	D155C210	345	0.1	10	41.4	0.83	1,369,554	25
2228	D155C213	345	0.1	12	43.4	0.75	1,251,972	25
2229	D155C211	690	0.1	2	42.5	1.65	3,370	25
2230	D155C208	690	0.1	2	42.8	1.61	2,480	25
2231	D155C201	414	0.1	5	45.0	0.92	196,825	25
2232	D155C212	414	0.1	10	43.4	0.95	278,697	25
2233	D155C204	414	0.1	10	41.8	0.99	188,541	25
2234	D155C216	690	0.1	2	40.5	1.70	3,610	25
2235	D155C217	345	0.1	15	42.4	0.81	1,182,710	25
2661	D155C301	-847	*	3	----	----	1	25
2662	D155C302	-734	*	3	----	----	1	25
2663	D155C303	-752	*	3	----	----	1	25
2664	D155C304	-841	*	3	----	----	1	25

MATERIAL D155G

Lay-up = $[0]_8$, V_F = 0.584, Ave. thickness = 2.81 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester

2189	D155G104	1318	*	13	48.4	2.72	1	25 tab
2190	D155G110	1320	*	13	48.2	2.74	1	25 tab
2191	D155G115	1303	*	13	46.7	2.80	1	25 tab
2192	D155G103	690	0.1	4	49.8	1.39	4,546	25 tab
2193	D155G107	690	0.1	2	46.3	1.49	1,839	25 tab
2194	D155G106	552	0.1	5	49.0	1.13	14,842	25 tab
2195	D155G109	552	0.1	5	51.3	1.08	10,796	25 tab
2196	D155G108	345	0.1	12	52.6	0.66	137,665	25 tab
2197	D155G105	345	0.1	12	46.2	0.75	164,363	25 tab
2198	D155G114	276	0.1	12	44.2	0.62	1,154,036	25 tab
2199	D155G102	276	0.1	12	41.4	0.66	817,204	25 tab
2200	D155G101	345	0.1	10	44.5	0.78	169,202	25 tab
2201	D155G112	690	0.1	2	45.2	1.53	2,546	25 tab
2202	D155G113	552	0.1	5	43.7	1.26	11,201	25 tab
2665	D155G301	-729	*	13	----	----	1	25
2666	D155G302	-647	*	13	----	----	1	25
2667	D155G303	-698	*	13	----	----	1	25
2668	D155G354	-783	*	13	----	----	1	25
2766	D155G305	-552	10	12	----	----	38,446	25
2767	D155G306	-552	10	12	----	----	130,068	25
2768	D155G309	-552	10	12	----	----	57,998	25
2770	D155G307	-483	10	12	----	----	161,615	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2771	D155G305	-483	10	12	----	----	74,321	25
2772	D155G304	-730	*	13	----	----	1	25
2773	D155G316	-621	10	1	----	----	90	25
2774	D155G320	-621	10	1	----	----	136	25
2775	D155G310	-621	10	1	----	----	62	25
3117	D155G315	-821	*	13	----	----	1	25
3118	D155G302	-752	*	13	----	----	1	25
3119	D155G310	-722	*	13	----	----	1	25
Tests 3599 - 3613 involved a gage length of 13 mm (strain rate effect tests).								
3599	D155G314	-627	*	0.025	----	----	1	25 tab
3600	D155G321	-660	*	0.025	----	----	1	25 tab
3601	D155G323	-654	*	0.025	----	----	1	25 tab
3602	D155G311	-739	*	2.54	----	----	1	25 tab
3603	D155G322	-723	*	2.54	----	----	1	25 tab
3604	D155G324	-701	*	2.54	----	----	1	25 tab
3605	D155G317	-673	*	12.7	----	----	1	25 tab
3606	D155G313	-762	*	12.7	----	----	1	25 tab
3607	D155G319	-784	*	12.7	----	----	1	25 tab
3608	D155G335	-757	*	25.4	----	----	1	25 tab
3609	D155G330	-776	*	25.4	----	----	1	25 tab
3610	D155G333	-768	*	25.4	----	----	1	25 tab
3611	D155G332	-735	*	127	----	----	1	25 tab
3612	D155G331	-796	*	127	----	----	1	25 tab
3613	D155G336	-755	*	127	----	----	1	25 tab
Tests 3614 - 3625 involved a gage length of 100 mm (strain rate effect tests).								
3614	D155G217	964	*	0.025	----	----	1	25 tab
3615	D155G219	833	*	0.025	----	----	1	25 tab
3616	D155G214	897	*	0.025	----	----	1	25 tab
3617	D155G216	1086	*	2.54	----	----	1	25 tab
3618	D155G221	1143	*	2.54	----	----	1	25 tab
3619	D155G222	1061	*	2.54	----	----	1	25 tab
3620	D155G223	1140	*	12.7	----	----	1	25 tab
3621	D155G226	1222	*	12.7	----	----	1	25 tab
3622	D155G225	1024	*	12.7	----	----	1	25 tab
3623	D155G224	1086	*	63.5	----	----	1	25 tab
3624	D155G218	1100	*	63.5	----	----	1	25 tab
3625	D155G220	1136	*	63.5	----	----	1	25 tab

MATERIAL D155H

Lay-up = $[0]_7$, V_F = 0.515, Ave. thickness = 2.93 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester, No Stitching. Stitching in the D155 fabric was removed to study this effect.

2210	D155H106	961	*	13	34.3	2.80	1	25
2211	D155H111	886	*	13	33.1	2.68	1	25
2212	D155H103	903	*	13	34.7	2.61	1	25
2215	D155H108	552	0.1	5	34.4	1.60	39,227	25
2216	D155H109	552	0.1	5	35.4	1.56	22,154	25
2217	D155H122	1076	*	13	40.1	2.98	1	has stitch
2218	D155H121	1178	*	13	40.7	2.89	1	has stitch

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2219	D155H120	1109	*	13	40.5	2.74	1	has stitch
2226	D155H102	552	0.1	5	33.9	1.62	41,215	25
2344	D155H210	483	0.1	10	37.0	1.30	156,200	25
2346	D155H204	1101	*	13	41.7	2.63	1	25
2347	D155H203	483	0.1	15	38.8	1.24	128,523	25
2348	D155H208	483	0.1	12	39.7	1.21	195,322	25
2349	D155H209	414	0.1	15	40.0	1.04	3,219,571	25
2350	D155H201	414	0.1	15	40.5	1.02	1,211,477	25
2351	D155H212	690	0.1	4	42.0	1.64	2,953	25
2352	D155H206	690	0.1	4	41.4	1.67	2,264	25
2353	D155H207	690	0.1	4	40.7	1.70	1,822	25
2669	D155H301	-718	*	3	----	----	1	25
2670	D155H302	-686	*	3	----	----	1	25
2671	D155H303	-623	*	3	----	----	1	has stitch
2672	D155H304	-864	*	3	----	----	1	has stitch
2673	D155H305	-795	*	3	----	----	1	has stitch
2674	D155H306	-846	*	3	----	----	1	has stitch

MATERIAL D155J

Lay-up = $[0]_9$, V_F = 0.583, Ave. thickness = 3.54 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester, No Stitching. Stitching in the D155 fabric was removed to study this effect.

2428	D155J111	1,098	*	13	49.8	2.65	1	25
2429	D155J114	1,190	*	13	47.5	2.51	1	25
2430	D155J101	1,140	*	13	48.6	2.43	1	25
2431	D155J103	690	0.1	5	44.9	1.54	6,213	25
2432	D155J115	690	0.1	5	50.0	1.38	7,977	25
2433	D155J106	690	0.1	5	46.8	1.47	4,784	25
2434	D155J108	552	0.1	5	50.0	----	20,345	25
2435	D155J105	552	0.1	5	50.0	1.10	73,109	25
2436	D155J109	414	0.1	12	47.0	0.88	684,350	25
2437	D155J113	552	0.1	5	47.8	1.15	35,652	25
2438	D155J116	414	0.1	12	47.8	0.79	912,579	25
2439	D155J107	552	0.1	5	45.2	1.22	89,980	25
2440	D155J104	414	0.1	12	47.3	0.86	485,216	25
2675	D155J301	-826	*	3	----	----	1	25
2676	D155J302	-704	*	3	----	----	1	25
2677	D155J303	-796	*	3	----	----	1	25
2678	D155J304	-777	*	3	----	----	1	25

MATERIAL D155K

Lay-up = $[0]_7$, V_F = 0.328, Ave. thickness = 4.45 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

3673	D155K110	872	*	13	28.5	3.15	1	25
3674	D155K111	881	*	13	29.6	2.98	1	25
3675	D155K109	830	*	13	28.5	2.91	1	25
3676	D155K108	414	0.1	2	27.1	1.58	7,569	25
3677	D155K112	414	0.1	4	28.7	1.54	13,447	25
3678	D155K101	414	0.1	4	26.3	1.59	6,267	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3679	D155K113	276	0.1	12	28.5	0.97	764,138	25
3680	D155K102	276	0.1	12	26.7	1.01	1,305,237	25
3681	D155K103	276	0.1	12	28.6	0.96	1,733,768	25
3682	D155K105	345	0.1	6	30.1	1.18	175,689	25
3683	D155K104	345	0.1	6	27.9	1.26	106,359	25
3684	D155K107	345	0.1	6	26.9	1.29	152,853	25
3685	D155K106	483	0.1	1	28.1	2.12	576	25
3686	D155K120	483	0.1	1	27.3	1.90	2,594	25
3687	D155K121T	23.8	*	13	8.00	0.30	1	25
3688	D155K122T	24.9	*	13	8.36	0.29	1	25
3689	D155K123T	18.9	*	13	8.52	0.22	1	25
3841	D155K125	-500	*	13	----	----	1	25
3842	D155K126	-624	*	13	----	----	1	25
3843	D155K127	-527	*	13	----	----	1	25

MATERIAL DB120

Lay-up = $[0]_{16}$, V_F = 0.44, Ave. thickness = 2.69 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester
Tests 2055 - 2074 in this section were done for Table 17.Compression tests involved a 13 mm gage length.
±45 degree fabric was separated into +45 and -45 degree plies and rotated to 0 degrees.

2055	DB12001	610	*	0.25	26.5	2.65	1	ZERO
2056	DB12002	596	*	0.25	26.8	2.41	1	ZERO
2057	DB12003	83	*	0.25	9.45	----	1	±45
2058	DB12004	85	*	0.25	9.10	----	1	±45
2059	DB12005	85	*	0.25	9.86	----	1	±45
2060	DB12006	87	*	0.25	8.89	----	1	±45
2061	DB12007	26	*	0.25	7.24	0.39	1	90
2062	DB12008	-554	*	0.25	18.9	----	1	ZERO
2063	DB12009	-555	*	0.25	19.7	----	1	ZERO
2064	DB12010	-545	*	0.25	19.4	----	1	ZERO
2065	DB12011	-116	*	0.25	8.83	----	1	±45
2066	DB12012	-120	*	0.25	9.86	----	1	±45
2067	DB12013	-123	*	0.25	9.31	----	1	±45
2068	DB12014	-120	*	0.25	6.96	-2.20	1	90
2069	DB12015	-117	*	0.25	6.41	-1.70	1	90
2070	DB12016	-104	*	0.25	6.55	-2.10	1	90
2071	DB12017	616	*	0.25	24.8	2.60	1	ZERO
2072	DB12018	24	*	0.25	7.72	0.32	1	90
2073	DB12050	619	*	0.25	28.2	2.30	1	ZERO
2074	DB12051	104	*	0.25	9.72	----	1	±45

MATERIAL DB240

Lay-up = $[0]_8$, V_F = 0.46, Ave. thickness = 2.77 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester
Tests 2075 - 2093 in this section were done for Table 17. Compression tests involved a 13 mm gage length.
±45 degree fabric was separated into +45 and -45 degree plies and rotated to 0 degrees.

2075	DB24001	701	*	0.25	30.8	2.60	1	ZERO
2076	DB24002	715	*	0.25	30.1	2.60	1	ZERO
2077	DB24003	669	*	0.25	31.1	2.50	1	ZERO

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2078	DB24004	69	*	0.25	10.9	----	1	±45
2079	DB24005	69	*	0.25	10.1	----	1	±45
2080	DB24006	68	*	0.25	9.90	----	1	±45
2081	DB24007	-551	*	0.25	25.9	-1.60	1	ZERO
2082	DB24008	-507	*	0.25	24.8	-1.70	1	ZERO
2083	DB24009	-557	*	0.25	25.6	-1.60	1	ZERO
2084	DB24010	-122	*	0.25	11.0	----	1	±45
2085	DB24011	-101	*	0.25	10.3	----	1	±45
2086	DB24012	-128	*	0.25	10.3	----	1	±45
2087	DB24013	-125	*	0.25	6.32	-1.80	1	90
2088	DB24014	-118	*	0.25	6.69	-1.65	1	90
2089	DB24015	-122	*	0.25	7.08	-1.62	1	90
2090	DB24016	20	*	0.25	7.58	0.29	1	90
2091	DB24017	19	*	0.25	7.10	0.26	1	90
2092	DB24050	703	*	0.25	32.2	2.85	1	ZERO
2093	DB24051	70	*	0.25	10.1	----	1	±45

BALANCED ANGLE PLY TESTING

The angled materials in this section were constructed using the D155 fabric.

MATERIAL D155B (baseline 0° behavior)

Lay-up = $[0]_5$, V_F = 0.399, Ave. thickness = 2.70 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2203	D155B200	755	*	13	31.1	2.43	1	25
2204	D155B209	779	*	13	28.2	2.76	1	25
2205	D155B215	785	*	13	28.5	2.75	1	25
2206	D155B201	483	0.1	4	32.6	1.48	6,979	25
2207	D155B207	483	0.1	4	33.1	1.46	16,497	25
2208	D155B205	414	0.1	7	32.2	1.28	82,605	25
2209	D155B203	414	0.1	8	36.8	1.13	68,483	25
2236	D155B212	345	0.1	15	33.6	1.02	967,901	25
2237	D155B210	345	0.1	15	30.1	1.15	1,104,634	25
2338	D155B202	483	0.1	5	30.4	1.59	19,814	25
2339	D155B213	552	0.1	3	32.2	1.71	2,141	25
2340	D155B208	552	0.1	4	30.3	1.82	2,305	25
2341	D155B211	552	0.1	4	31.8	1.73	1,733	25
2342	D155B214	414	0.1	10	30.8	1.34	48,181	25

MATERIAL 10D155

Lay-up = $[\pm 10]_3$, V_F = 0.355, Ave. thickness = 3.47 mm, S.D. = 0.17 mm, CoRezyn 63-AX-051 Polyester

2513	10D155122	271	*	13	28.6	0.90	1	25
2514	10D155127	303	*	13	28.5	1.00	1	25
2515	10D155120	249	*	13	25.5	0.95	1	25
2566	10D155128	172	0.1	10	27.9	0.60	167,538	25
2569	10D155213	172	0.1	8	26.1	0.66	178,266	25
2570	10D155208	172	0.1	10	29.2	0.64	207,957	25
2571	10D155205	284	*	13	29.0	0.98	1	25
2572	10D155209	207	0.1	5	29.4	0.71	18,193	25
2573	10D155210	207	0.1	5	32.3	0.64	21,780	25
2574	10D155212	207	0.1	5	29.3	0.72	16,360	25
2575	10D155215	155	0.1	12	29.5	0.53	1,764,883	25
2583	10D155114	-405	*	13	----	----	1	25
2584	10D155106	-343	*	13	----	----	1	25
2585	10D155112	-406	*	13	----	----	1	25
2586	10D155113	-381	*	13	----	----	1	25

MATERIAL 20D155

Lay-up = $[\pm 20]_3$, V_F = 0.384, Ave. thickness = 3.21 mm, S.D. = 0.14 mm, CoRezyn 63-AX-051 Polyester

2510	20D155101	244	*	13	24.3	1.08	1	25
2511	20D155104	269	*	13	23.2	1.20	1	25
2512	20D155107	290	*	13	25.1	1.40	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2558	20D155113	172	0.1	5	26.9	0.71	21,427	25
2559	20D155112	172	0.1	7	25.3	0.69	38,475	25
2560	20D155111	138	0.1	12	24.5	0.58	835,986	25
2561	20D155108	172	0.1	7	24.8	0.76	25,475	25
2562	20D155106	207	0.1	2	27.0	0.83	2,244	25
2563	20D155110	207	0.1	2	23.8	0.90	860	25
2564	20D155116	207	0.1	2	25.8	0.88	2,779	25
2565	20D155102	138	0.1	15	24.1	0.56	742,154	25
2587	20D155301	-284	*	13	----	----	1	25
2588	20D155302	-289	*	13	----	----	1	25
2589	20D155303	-271	*	13	----	----	1	25
2590	20D155304	-303	*	13	----	----	1	25

MATERIAL 30D155

Lay-up = $[\pm 30]_3$, V_F = 0.396, Ave. thickness = 3.11 mm, S.D. = 0.14 mm, CoRezyn 63-AX-051 Polyester

2507	30D155107	183	*	13	17.8	1.40	1	25
2508	30D155104	184	*	13	16.1	1.60	1	25
2509	30D155113	141	*	13	18.1	1.60	1	25
2537	30D155114	103	0.1	5	18.3	0.56	15,975	25
2538	30D155110	103	0.1	8	17.2	0.63	25,545	25
2539	30D155112	69	0.1	15	19.7	0.37	2,525,000	25 R
2540	30D155111	69	0.1	25	17.0	0.37	2,000,000	25 R
2541	30D155109	86	0.1	20	16.4	0.52	84,851	25
2542	30D155108	86	0.1	20	18.8	0.42	214,208	25
2543	30D155115	86	0.1	20	17.4	0.50	168,607	25
2544	30D155116	121	0.1	5	17.1	0.78	9,028	25
2545	30D155101	121	0.1	6	18.0	0.74	12,509	25
2546	30D155102	121	0.1	5	18.6	0.71	11,345	25
2547	30D155103	103	0.1	6	16.8	0.62	42,426	25
2591	30D155301	-195	*	13	----	----	1	25
2592	30D155302	-168	*	13	----	----	1	25
2593	30D155303	-169	*	13	----	----	1	25
2594	30D155304	-173	*	13	----	----	1	25
4445	30D155130	-103	10	4	----	----	28,562	25
4446	30D155130	-103	10	4	----	----	45,437	25
4447	30D155132	-103	10	4	----	----	44,837	25
4448	30D155133	-90	10	7	----	----	150,426	25
4449	30D155134	-90	10	8	----	----	142,051	25
4450	30D155135	-90	10	6	----	----	269,359	25
4451	30D155136	-83	10	10	----	----	530,475	25

MATERIAL 40D155

Lay-up = $[\pm 40]_3$, V_F = 0.389, Ave. thickness = 3.17 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

2504	40D155110	147	*	13	11.5	14	1	25
2505	40D155105	142	*	13	11.2	16	1	25
2506	40D155102	142	*	13	11.4	11	1	25
2516	40D155103	86	0.1	4	10.8	0.89	7,598	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2517	40D155104	86	0.1	4	11.8	0.97	6,950	25
2518	40D155106	86	0.1	4	12.2	0.93	3,054	25
2519	40D155107	69	0.1	5	11.7	0.69	27,264	25
2520	40D155108	55	0.1	12	12.3	0.46	631,703	25
2521	40D155109	55	0.1	15	11.9	0.49	275,777	25
2522	40D155111	69	0.1	5	11.8	0.67	36,776	25
2523	40D155112	69	0.1	8	12.0	0.62	34,920	25
2524	40D155113	55	0.1	20	11.1	0.52	857,164	25
2595	40D155301	-131	*	13	----	----	1	25
2596	40D155302	-135	*	13	----	----	1	25
2597	40D155303	-127	*	13	----	----	1	25
2598	40D155304	-134	*	13	----	----	1	25
4452	40D155137	-103	10	2	----	----	635	25
4453	40D155136	-90	10	4	----	----	5,021	25
4454	40D155135	-90	10	4	----	----	4,073	25
4455	40D155134	-90	10	4	----	----	2,494	25
4456	40D155133	-69	10	6	----	----	60,384	25
4457	40D155132	-69	10	6	----	----	82,612	25
4458	40D155131	-69	10	6	----	----	129,706	25
4459	40D155140	-59	10	10	----	----	460,369	25
4467	40D155141	-59	10	10	----	----	611,713	25

MATERIAL 45D155

Lay-up = $[\pm 45]_3$, V_F = 0.389, Ave. thickness = 3.17 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester

2441	45D155112	106	*	13	9.66	22.0	1	25
2442	45D155105	107	*	13	10.3	24.9	1	25
2443	45D155108	108	*	13	9.97	24.0	1	25
2444	45D155104	55	0.1	12	10.2	0.65	12,908	25
2445	45D155106	55	0.1	10	9.55	0.68	15,899	25
2446	45D155113	41	0.1	15	10.4	0.41	394,632	25
2447	45D155111	55	0.1	10	9.91	0.64	10,671	25
2448	45D155110	41	0.1	20	9.33	0.43	748,125	25
2449	45D155102	34	0.1	20	9.10	0.38	2,167,690	25 R
2450	45D155107	41	0.1	12	10.6	0.42	507,811	25
2451	45D155114	69	0.1	2	9.06	0.92	1,885	25
2452	45D155109	69	0.1	2	9.65	0.97	1,639	25
2453	45D155103	69	0.1	2	9.40	0.99	3,669	25
2599	45D155301	-139	*	13	----	----	1	25
2600	45D155302	-135	*	13	----	----	1	25
2601	45D155303	-135	*	13	----	----	1	25
2602	45D155304	-142	*	13	----	----	1	25
4399	45D155140	-97	10	2	----	----	1,236	25
4400	45D155143	-69	10	5	----	----	523,409	25
4401	45D155141	-69	10	10	----	----	597,040	25
4402	45D155142	-69	10	10	----	----	362,225	25
4403	45D155149	-69	10	10	----	----	367,979	25
4404	45D155145	34	-1	5	----	----	153,354	25
4405	45D155148	34	-1	5	----	----	64,588	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4406	45D155144	34	-1	5	----	----	114,603	25
4407	45D155146	-83	10	8	----	----	19,588	25
4408	45D155147	-83	10	5	----	----	34,052	25
4409	45D155120	-83	10	5	----	----	28,684	25
4410	45D155119	-97	10	2	----	----	3,655	25
4411	45D155115	-97	10	2	----	----	4,822	25
4412	45D155121	28	-1	10	----	----	705,984	25
4413	45D155116	28	-1	10	----	----	791,693	25
4414	45D155164	41	-1	2	----	----	12,406	25
4415	45D155160	41	-1	2	----	----	10,061	25
4416	45D155161	41	-1	2	----	----	19,692	25

MATERIAL 45D155V2

Lay-up = $[\pm45]_3$, V_F = 0.397, Ave. thickness = 3.10 mm, S.D. = 0.10 mm, Derakane 8084 Epoxy Vinyl ester

4417	45D155V349	-69	10	12	----	----	2,569,227	25
4418	45D155V322	-83	10	5	----	----	148,697	25
4419	45D155V326	-83	10	5	----	----	82,143	25
4420	45D155V344	-83	10	5	----	----	267,226	25
4421	45D155V320	-69	10	10	----	----	1,700,116	25
4422	45D155V325	-69	10	12	----	----	1,154,414	25
4423	45D155V330	-151	*	13	----	----	1	25
4424	45D155V329	-148	*	13	----	----	1	25
4425	45D155V331	-149	*	13	----	----	1	25
4426	45D155V314	136	*	13	9.9	----	1	25
4427	45D155V313	129	*	13	10.6	----	1	25
4428	45D155V316	141	*	13	11.0	----	1	25
4429	45D155V315	48	0.1	5	10.1	0.53	137,932	25
4430	45D155V311	48	0.1	5	----	----	262,388	25
4431	45D155V301	48	0.1	5	10.9	0.49	321,891	25
4432	45D155V304	55	0.1	5	----	----	27,606	25
4433	45D155V303	41	0.1	10	9.5	0.51	770,759	25
4434	45D155V302	41	0.1	10	9.5	0.50	1,233,580	25
4435	45D155V310	41	0.1	10	10.6	0.44	1,289,647	25
4436	45D155V161	-69	10	10	----	----	4,975,500	25 R

MATERIAL 45D155P2

Lay-up = $[\pm45]_3$, V_F = 0.404, Ave. thickness = 3.05 mm, S.D. = 0.02 mm, CoRezyn 75-AQ-010 Isopolyester

4622	ISO45114	55	0.1	3	11.9	0.57	4,934	25
4623	ISO45101	55	0.1	2	10.9	0.63	5,740	25
4624	ISO45102	41	0.1	5	11.7	0.39	202,047	25
4625	ISO45103	41	0.1	5	11.3	0.42	192,822	25
4626	ISO45111	41	0.1	5	11.5	0.40	179,293	25
4627	ISO45110	38	0.1	7	11.3	0.37	811,700	25
4628	ISO45112	55	0.1	2	11.8	0.58	6,965	25
4629	ISO45109	48	0.1	3	----	----	21,334	25
4630	ISO45108	48	0.1	2	10.8	0.54	17,395	25
4631	ISO45107	48	0.1	2	----	----	9,479	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4632	ISO45106	38	0.1	4	10.8	0.41	422,361	25
4633	ISO45105	95	*	13	12.0	13	1	25
4634	ISO45104	97	*	13	12.0	14	1	25
4635	ISO45113	96	*	13	11.3	14	1	25
4636	ISO45119	-156	*	13	----	----	1	25
4637	ISO45116	-165	*	13	----	----	1	25
4638	ISO45115	-158	*	13	----	----	1	25
4639	ISO45117	-161	*	13	----	----	1	25

MATERIAL 45D155V

Lay-up = $[45]_3$, V_F = 0.411, Ave. thickness = 3.00 mm, S.D. = 0.07 mm, Derakane 411C-50 vinyl ester

4869	41145113	41.4	0.1	10	10.2	0.40	4,000,000	25 R
4870	41145101	69	0.1	2	10.5	0.84	4,581	25
4871	41145109	130	*	13	10.8	21	1	25
4872	41145106	118	*	13	10.1	15	1	25
4873	41145107	116	*	13	10.5	23	1	25
4874	41145105	55.2	0.1	3	10.5	0.64	38,539	25
4875	41145104	55.2	0.1	4	10.8	0.61	51,501	25
4876	41145102	55.2	0.1	3	11.4	0.60	62,968	25
4877	41145110	69	0.1	2	11.2	0.86	7,247	25
4879	41145112	69	0.1	2	----	----	6,339	25
5908	41145116	-155	*	13	----	----	1	25
5909	41145115	-153	*	13	----	----	1	25
5910	41145119	-154	*	13	----	----	1	25
5911	41145118	-154	*	13	----	----	1	25

MATERIAL 50D155

Lay-up = $[\pm 50]_3$, V_F = 0.381, Ave. thickness = 3.23 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester

2454	50D155114	67	*	13	8.33	20	1	25
2455	50D155113	67	*	13	8.39	19	1	25
2456	50D155107	63	*	13	8.43	17	1	25
2457	50D155104	35	0.1	20	8.62	0.41	136,803	25
2458	50D155116	35	0.1	15	9.00	0.41	72,943	25
2459	50D155115	35	0.1	15	8.32	0.42	96,273	25
2460	50D155111	28	0.1	15	8.11	0.36	1,855,523	25
2461	50D155106	41	0.1	5	8.81	0.48	11,555	25
2462	50D155108	41	0.1	7	8.74	0.52	11,608	25
2463	50D155112	41	0.1	4	8.90	0.53	11,509	25
2464	50D155105	28	0.1	15	8.42	0.37	1,159,160	25
2465	50D155101	58	*	13	8.43	30.0	1	25
2466	50D155102	67	*	13	9.52	22.2	1	25
2603	50D155301	-132	*	13	----	----	1	25
2604	50D155302	-142	*	13	----	----	1	25
2605	50D155303	-139	*	13	----	----	1	25
2606	50D155304	-138	*	13	----	----	1	25
4468	50D155134	-90	10	3	----	----	10,617	25
4469	50D155133	-90	10	3	----	----	9,472	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4470	50D155132	-90	10	3	----	----	11,783	25
4471	50D155131	-69	10	8	----	----	2,313,976	25
4472	50D155135	-79	10	4	----	----	38,964	25
4473	50D155136	-76	10	4	----	----	128,196	25
4613	50D155137	-79	10	4	----	----	83,779	25
4619	50D155145	-100	10	2	----	----	2,213	25

MATERIAL 60D155

Lay-up = $[\pm 60]_3$, V_F = 0.396, Ave. thickness = 3.11 mm, S.D. = 0.14 mm, CoRezyn 63-AX-051 Polyester

2482	60D155103	37	*	13	7.02	0.65	1	25
2483	60D155106	34	*	13	7.04	0.65	1	25
2484	60D155101	36	*	13	7.44	0.62	1	25
2576	60D155146	40	*	13	7.99	0.60	1	25
2548	60D155108	24	0.1	10	8.00	0.31	23,872	25
2549	60D155115	24	0.1	15	8.33	0.32	35,211	25
2550	60D155113	24	0.1	10	8.26	0.32	17,122	25
2551	60D155104	21	0.1	20	7.81	0.27	160,347	25
2552	60D155105	21	0.1	15	8.30	0.25	369,336	25
2553	60D155109	28	0.1	4	8.20	0.38	4,716	25
2554	60D155107	28	0.1	5	7.75	0.37	3,715	25
2555	60D155110	28	0.1	5	7.23	0.36	2,270	25
2556	60D155116	19	0.1	15	7.24	0.25	1,915,213	25
2557	60D155102	21	0.1	10	7.33	0.27	217,771	25
2607	60D155301	-144	*	13	----	----	1	25
2608	60D155302	-133	*	13	----	----	1	25
2609	60D155303	-143	*	13	----	----	1	25
2610	60D155304	-144	*	13	----	----	1	25
4437	60D155162	-103	10	4	----	----	2,461	25
4438	60D155141	-103	10	4	----	----	1,786	25
4439	60D155166	-103	10	4	----	----	4,011	25
4440	60D155160	-86	10	6	----	----	19,416	25
4441	60D155165	-86	10	6	----	----	21,746	25
4442	60D155142	-86	10	6	----	----	33,065	25
4443	60D155114	-79	10	10	----	----	573,969	25
4444	60D155164	-79	10	10	----	----	434,136	25

MATERIAL 70D155

Lay-up = $[\pm 70]_3$, V_F = 0.389, Ave. thickness = 3.17 mm, S.D. = 0.04 mm, CoRezyn 63-AX-051 Polyester

2485	70D155101	28	*	13	6.67	0.49	1	25
2486	70D155104	27	*	13	6.86	0.46	1	25
2487	70D155107	26	*	13	6.51	0.44	1	25
2577	70D155141	30	*	13	7.51	0.49	1	25
2525	70D155111	17	0.1	10	7.84	0.21	30,672	25
2526	70D155109	17	0.1	12	8.16	0.19	51,196	25
2527	70D155106	17	0.1	12	7.90	0.23	43,825	25
2528	70D155110	14	0.1	20	7.31	0.19	1,045,443	25
2529	70D155108	17	0.1	15	7.14	0.28	27,455	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2530	70D155103	16	0.1	20	7.47	0.20	296,781	25
2531	70D155102	19	0.1	5	7.09	0.27	8,217	25
2532	70D155134	19	0.1	5	7.21	0.26	10,888	25
2533	70D155123	19	0.1	5	7.19	0.27	27,256	25
2534	70D155121	16	0.1	15	6.66	0.24	246,630	25
2535	70D155122	16	0.1	15	7.17	0.22	421,514	25
2611	70D155301	-133	*	13	----	----	1	25
2612	70D155302	-136	*	13	----	----	1	25
2613	70D155303	-138	*	13	----	----	1	25
2614	70D155304	-138	*	13	----	----	1	25

MATERIAL 80D155

Lay-up = $[\pm 80]_3$, V_F = 0.371, Ave. thickness = 3.32 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

2488	80D155105	27	*	13	7.79	0.38	1	25
2489	80D155103	25	*	13	7.00	0.34	1	25
2490	80D155101	24	*	13	7.05	0.37	1	25
2536	80D155141	27	*	13	7.75	0.38	1	25
2580	80D155201	26	*	13	9.30	0.30	1	25
2581	80D155202	26	*	13	8.15	0.34	1	25
2582	80D155203	27	*	13	8.65	0.34	1	25
2494	80D155120	26	*	13	6.95	0.35	1	25
2495	80D155122	24	*	13	6.43	0.35	1	25
2491	80D155102	17	0.1	2	7.59	0.24	2,096	25
2492	80D155112	17	0.1	2	6.79	0.25	865	25
2493	80D155104	17	0.1	2	7.35	0.24	3,673	25
2496	80D155121	12	0.1	25	7.49	0.15	8,000,000	25 R
2497	80D155106	16	0.1	5	8.42	0.19	34,973	25
2498	80D155109	16	0.1	15	7.02	0.20	16,756	25
2499	80D155111	16	0.1	10	7.81	0.20	24,111	25
2500	80D155123	14	0.1	10	7.42	0.18	135,541	25
2501	80D155145	14	0.1	10	7.06	0.18	261,230	25
2502	80D155146	14	0.1	10	7.20	0.18	186,407	25
2619	80D155205	-148	*	13	----	----	1	25
2620	80D155206	-146	*	13	----	----	1	25
2621	80D155207	-156	*	13	----	----	1	25
2622	80D155208	-162	*	13	----	----	1	25

MATERIAL 90D155

Lay-up = $[\pm 90]_3$, V_F = 0.371, Ave. thickness = 3.32 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester

2467	90D155105	27	*	13	7.21	0.38	1	25
2468	90D155110	26	*	13	7.30	0.34	1	25
2469	90D155104	24	*	13	6.44	0.34	1	25
2579	90D155141	29	*	13	9.04	0.34	1	25
2470	90D155101	17	0.1	5	7.23	0.24	17,903	25
2471	90D155102	17	0.1	5	7.60	0.24	22,344	25
2472	90D155103	17	0.1	5	7.00	0.25	27,113	25
2473	90D155107	14	0.1	15	7.31	0.17	612,541	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2474	90D155108	19	0.1	2	7.62	0.25	783	25
2475	90D155113	19	0.1	2	7.58	0.24	1,800	25
2476	90D155109	19	0.1	2	7.05	0.25	1,179	25
2477	90D155125	14	0.1	20	6.97	0.20	1,190,051	25
2578	90D155130	14	0.1	20	7.45	0.19	1,712,400	25
2479	90D155120	28	*	13	7.50	0.41	1	25
2480	90D155122	28	*	13	7.24	0.40	1	25
2481	90D155121	27	*	13	6.89	0.40	1	25
2623	90D155112	-108	*	13	----	----	1	25
2624	90D155111	-129	*	13	----	----	1	25
2625	90D155301	-126	*	13	----	----	1	25
2626	90D155302	-128	*	13	----	----	1	25
4614	90D155139	-66	10	15	----	----	20,000,000	25 R
4615	90D155130	-90	10	5	----	----	39,215	25
4616	90D155131	-79	10	8	----	----	400,785	25
4617	90D155132	-79	10	10	----	----	515,123	25
4618	90D155133	-79	10	10	----	----	780,009	25 R
4620	90D155134	-90	10	5	----	----	27,023	25
4621	90D155139	-90	10	5	----	----	26,104	25

MATERIAL 90D155V2

Lay-up = $[90]_6$, V_F = 0.372, Ave. thickness = 3.31 mm, S.D. = 0.09 mm, Derakane 8084 vinyl ester

4760	808490207	17.2	0.1	15	8.72	0.20	2,000,000	25 R
4761	808490213	51.1	*	13	9.32	0.56	1	25
4762	808490211	34.5	0.1	2	8.61	0.41	1,486	25
4763	808490215	27.6	0.1	2	9.32	0.32	85,350	25
4764	808490214	20.7	0.1	5	9.12	0.23	248,600	25
4765	808490212	20.7	0.1	7	8.76	0.24	153,624	25
4766	808490209	20.7	0.1	10	8.74	0.24	2,163,003	25
4767	808490208	27.6	0.1	5	9.38	0.30	10,162	25
4768	808490206	27.6	0.1	5	8.70	0.33	19,542	25
4769	808490216	34.5	0.1	1	8.42	0.41	422	25
4770	808490202	34.5	0.1	1	8.25	0.43	548	25
4771	808490217	55.8	*	13	9.66	0.58	1	25
4772	808490201	52.0	*	13	8.09	0.64	1	25
5912	808490218	-175	*	13	----	----	1	25
5913	808490219	-172	*	13	----	----	1	25
5914	808490221	-172	*	13	----	----	1	25
5915	808490200	-166	*	13	----	----	1	25

MATERIAL 90D155V

Lay-up = $[90]_6$, V_F = 0.413, Ave. thickness = 2.98 mm, S.D. = 0.10 mm, Derakane 411C-50 vinyl ester

4776	41190130	43.8	*	13	7.63	0.40	1	25
4777	41190140	51.2	*	13	9.81	0.52	1	25
4778	41190136	52.8	*	13	10.3	0.51	1	25
4779	41190141	20.7	0.1	10	11.8	0.19	223,965	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4780	41190131	20.7	0.1	8	13.0	0.19	184,528	25
4781	41190149	20.7	0.1	10	11.1	0.19	138,110	25
4782	41190148	27.6	0.1	5	9.42	0.31	2,730	25
4783	41190135	27.6	0.1	5	10.8	0.26	15,581	25
4784	41190134	27.6	0.1	4	10.1	0.28	12,939	25
4785	41190147	24.1	0.1	5	8.21	0.31	77,719	25
4786	41190146	24.1	0.1	8	11.8	0.25	52,833	25
4787	41190138	24.1	0.1	4	10.1	0.24	30,181	25
4788	41190137	17.2	0.1	15	10.3	0.17	2,000,000	25 R
5916	41190145	-173	*	13	----	----	1	25
5917	41190144	-164	*	13	----	----	1	25
5918	41190132	-173	*	13	----	----	1	25
5919	41190139	-158	*	13	----	----	1	25

MATERIAL 90D155E2

Lay-up = $[90]_6$, V_F = 0.361, Ave. thickness = 3.41 mm, S.D. = 0.20 mm, SC14 epoxy

4789	SC1490216	27.6	0.1	0.1	9.29	0.35	254	25
4790	SC1490215	20.7	1	0.1	5.48	0.40	1,161	25
4791	SC1490207	38.2	*	13	6.72	0.57	1	25
4792	SC1490204	39.8	*	13	7.20	0.55	1	25
4793	SC1490208	43	*	13	8.34	0.52	1	25
4794	SC1490206	13.8	0.1	15	9.10	0.15	3,000,000	25 R
4795	SC1490209	20.7	0.1	3	5.30	0.40	8,141	25
4796	SC1490213	17.2	0.1	5	7.30	0.26	292,196	25
4797	SC1490210	20.7	0.1	3	8.06	0.27	27,984	25
4798	SC1490212	26.1	0.1	3	5.93	0.44	402	25
5904	SC1490211	-151	*	13	----	----	1	25
5905	SC1490201	-153	*	13	----	----	1	25
5906	SC1490203	-151	*	13	----	----	1	25
5907	SC1490205	-151	*	13	----	----	1	25

0/90 WOVEN ROVING

MATERIAL ROV1 (0/90 ROVING)

Lay-up = $[0/90]_7$, V_F = 0.486, Ave. thickness = 2.96 mm, S.D. = 0.16 mm, CoRezyn 63-AX-051 Polyester.
Tests 2095 - 2108 in this section were done for Table 17. Compression tests involved a 13 mm gage length.

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2094	ROV01	380	*	0.25	22.8	2.40	1	ZERO
2095	ROV02	364	*	0.25	22.5	2.20	1	ZERO
2096	ROV03	374	*	0.25	24.8	2.20	1	ZERO
2097	ROV04	97	*	0.25	11.0	----	1	±45
2098	ROV05	102	*	0.25	11.4	----	1	±45
2099	ROV06	99	*	0.25	11.4	----	1	±45
2100	ROV07	-213	*	0.25	20.3	----	1	ZERO
2101	ROV08	-230	*	0.25	21.6	----	1	ZERO
2102	ROV09	-240	*	0.25	23.9	----	1	ZERO
2103	ROV10	98	*	0.25	10.6	----	1	±45
2104	ROV11	-100	*	0.25	11.2	----	1	±45
2105	ROV12	-97	*	0.25	11.3	----	1	±45
2106	ROV50	-207	*	0.25	13.7	----	1	ZERO
2107	ROV51	410	*	0.25	25.4	---	1	ZERO
2108	ROV52	102	*	0.25	13.9	----	1	±45

MATERIAL ROV2 (0/90 ROVING)

Lay-up = $[0/90]_4$, V_F = 0.353, Ave. thickness = 4.08 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

4193	ROV217	326	*	13	----	----	1	25
4194	ROV215	103	0.1	10	----	----	3,200,000	25 R
4195	ROV218	380	*	13	21.0	1.9	1	25
4196	ROV206	381	*	13	21.6	1.8	1	25
4197	ROV205	241	0.1	1	21.3	1.45	1,642	25
4198	ROV201	172	0.1	3	21.7	0.96	13,794	25
4199	ROV200	138	0.1	5	21.2	0.74	608,189	25
4200	ROV204	172	0.1	2	22.4	0.87	40,071	25
4201	ROV203	172	0.1	3	23.1	0.89	63,917	25
4202	ROV214	138	0.1	10	21.2	0.78	723,201	25
4203	ROV212	138	0.1	10	21.0	0.81	483,611	25
4204	ROV207	241	0.1	1	20.9	1.50	1,043	25
4205	ROV219	241	0.1	1	20.7	1.58	494	25
4226	ROV231	-266	*	13	----	----	1	25
4227	ROV230	-245	*	13	----	----	1	25
4228	ROV232	-217	*	13	----	----	1	25
4229	ROV238	-247	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL ROV3 (0/90 ROVING)

Lay-up = $[0/90]_5$, V_F = 0.40, Ave. thickness = 3.15 mm, S.D. = 0.05 mm, CoRezyn 63-AX-051 Polyester

4284	ROV3106	406	*	13	21.1	2.3	1	25
4285	ROV3109	443	*	13	21.4	2.4	1	25
4286	ROV3103	416	*	13	21.0	2.3	1	25
4287	ROV3107	207	0.1	2	20.1	1.35	3,055	25
4288	ROV3112	207	0.1	2	21.5	1.26	8,236	25
4289	ROV3108	207	0.1	3	20.9	1.34	3,720	25
4290	ROV3114	172	0.1	4	20.0	1.10	23,506	25
4291	ROV3110	172	0.1	4	20.2	1.06	14,233	25
4292	ROV3111	172	0.1	4	20.7	1.03	28,712	25
4293	ROV3102	103	0.1	10	21.2	0.58	4,320,474	25
4294	ROV3113	138	0.1	6	19.9	0.85	351,549	25
4295	ROV3115	138	0.1	6	22.0	0.79	690,805	25
4296	ROV3104	138	0.1	6	21.1	0.80	216,248	25
4297	ROV3101	138	0.1	6	20.7	0.84	264,008	25
4314	ROV3130	-201	*	13	----	----	1	25
4315	ROV3131	-204	*	13	----	----	1	25
4316	ROV3132	-204	*	13	----	----	1	25
4320	ROV3105	103	0.1	10	21.7	0.61	4,855,537	25
4327	ROV3130	103	0.1	8	21.0	0.63	5,981,053	25

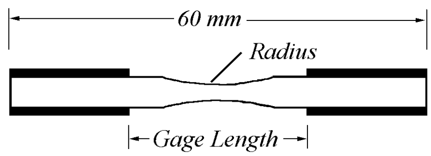
MATERIAL ROV4 (0/90 ROVING)

Lay-up = $[0/90]_8$, V_F = 0.53, Ave. thickness = 3.71 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

4298	ROV4109	207	0.1	2	27.5	1.04	1,501	25
4299	ROV4110	207	0.1	2	28.1	1.05	1,558	25
4300	ROV4111	207	0.1	2	26.4	1.11	2,319	25
4301	ROV4106	172	0.1	3	28.1	0.83	4,371	25
4302	ROV4105	172	0.1	3	24.4	0.98	3,514	25
4303	ROV4114	172	0.1	3	26.8	0.90	4,498	25
4304	ROV4115	138	0.1	5	27.0	0.67	14,689	25
4305	ROV4107	138	0.1	5	28.1	0.65	8,459	25
4306	ROV4113	138	0.1	5	27.2	0.67	11,994	25
4307	ROV4112	103	0.1	6	25.1	0.51	68,112	25
4308	ROV4104	502	*	13	25.3	2.2	1	25
4309	ROV4108	524	*	13	24.3	2.4	1	25
4310	ROV4102	488	*	13	25.4	2.1	1	25
4311	ROV4117	103	0.1	5	28.0	0.47	76,081	25
4312	ROV4116	103	0.1	5	27.7	0.46	147,753	25
4313	ROV4103	86	0.1	15	26.7	0.36	1,965,313	25
4317	ROV4130	-351	*	13	----	----	1	25
4318	ROV4131	-302	*	13	----	----	1	25
4319	ROV4132	-289	*	13	----	----	1	25
4321	ROV4101	86	0.1	15	26.9	0.35	924,136	25
4324	ROV4120	86	0.1	10	27.2	0.36	273,658	25
4326	ROV4121	86	0.1	5	27.1	0.35	1,135,918	25

$(0)_2$ and $(90)_4$ HIGH CYCLE TESTS

This series of tests studied two basic composite materials, a $(0)_2$ and a $(90)_4$ laminate, at R values of 2, 10, -1, 0.1 and 0.5. The Fatigue tests were carried out to 100 million cycles and involved testing frequencies up to 100 Hz. Smaller and thinner composites were necessary to avoid thermal fatigue failures.



Gage Length, Radius and Width of $[0]_2$ and $[90]_4$ Test Coupons			
Direction and R value	Gage Length	Radius	Width
[0], R = 2, 10	5 mm	No radius	6 mm
[90], R = 2, 10, -1	5 mm		19 mm
[90], R = 0.1, 0.5	25 mm		19 mm
[0], R = 0.1, 0.5	10 mm	17 mm	6 mm
[0], R = -1	5 mm		

MATERIAL $(0)_2$

Lay-up = $(0)_2$, V_F = 0.48 - 0.52, Average Thickness (Non-Tapered Coupons) = 0.815 mm, S.D. = 0.051 mm (min = 0.711 mm, max = 0.889 mm), Owens Corning D155 Fabric (527 g/m^2), CoRezyn 63-AX-051 Polyester

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5001	CT4	1627	*	6	46.2	3.53	1	6 tab
5002	AT2	1517	*	6	46.2	3.28	1	6 tab
5003	AT26	1393	*	3	46.2	3.01	1	6 tab
5004	CT3	1344	*	0.01	46.2	2.91	1	6 tab
5146	TF514	1332	*	5	39	2.88	1	6 tab
5148	TF504	1398	*	5	39	3.03	1	6 tab
5149	TF505	1329	*	5	39	2.88	1	6 tab
2248	TF501A	1274	*	5	39	2.76	1	6 tab
2249	TF502A	1589	*	5	39	3.43	1	6 tab
2250	TF503A	1496	*	5	39	3.23	1	6 tab
2251	TF510	1249	*	5	39	2.70	1	6 tab
2252	AT5	1270	*	0.5	46.2	2.75	1	6 tab
2253	AT4	1343	*	0.5	46.2	2.91	1	6 tab
2254	T1	1684	*	5	46.2	3.64	1	6 tab
2255	TFT5	1692	*	5	39	3.66	1	6 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2256	TF501	1713	*	5	39	3.70	1	6 tab
2257	TF502	1391	*	5	39	3.01	1	6 tab
5005	AT27	690	0.1	20	46.2	1.49	2,982	6 tab
5006	CT1	690	0.1	20	46.2	1.49	45,845	6 tab
5007	AT19	469	0.1	60	46.2	1.01	157,502	6 tab
5008	AT18	469	0.1	60	46.2	1.01	702,844	6 tab
5009	AT23	414	0.1	80	46.2	0.90	602,984	6 tab
5010	AT20	414	0.1	80	46.2	0.90	2,269,945	6 tab
5011	CT5	310	0.1	100	46.2	0.67	5,902,329	6 tab
5012	CT7	310	0.1	100	46.2	0.67	78,810,903	6 R tab
5013	CT2	310	0.1	100	46.2	0.67	110,539,817	6 R tab
2258	T1	345	0.1	60	46.2	0.60	5,151,390	6 tab
2259	T2	345	0.1	40	46.2	0.60	772,447	6 tab
2260	FT6	538	0.1	60	46.2	1.16	144,728	6 tab
2261	TF503	345	0.1	60	46.2	0.75	6,889,310	6 R tab
2262	TF506	538	0.1	60	46.2	1.16	891,716	6 tab
2263	AT3	207	0.1	100	46.2	0.45	14,715,704	6 R tab
2264	AT21	414	0.1	80	46.2	0.90	80,439	6 tab
2265	AT22	414	0.1	80	46.2	0.90	98,566	6 tab
5014	TF513	1310	*	5	39.2	3.31	1	6 tab
5015	TF512	1426	*	5	39.2	3.64	1	6 tab
5016	TF515	1396	*	5	39.2	3.56	1	6 tab
5017	TF516	1295	*	20	39.2	3.34	1	6 tab
5018	TF525	602	0.5	60	39.2	1.54	235,881	6 tab
5019	TF526	602	0.5	60	39.2	1.54	284,150	6 tab
2266	TF524	602	0.5	40	39.2	1.54	2,513,501	6 tab
5020	TF527	606	0.5	60	39.2	1.54	850,428	6 tab
5021	TF521	535	0.5	80	39.2	1.36	417,082	6 tab
5022	TF528	535	0.5	80	39.2	1.36	1,095,381	6 tab
5023	TF522	535	0.5	80	39.2	1.36	4,112,276	6 tab
2267	TF517	535	0.5	60	39.2	1.36	486,856	6 tab
2268	TF518	535	0.5	60	39.2	1.36	368,725	6 tab
5024	TF529	468	0.5	100	39.2	1.19	11,927,857	6 tab
5025	TF520	468	0.5	100	39.2	1.19	16,711,593	6 tab
5026	TF519	401	0.5	100	39.2	1.02	100,686,430	6 R tab
2269	TF507	717	0.5	40	39.2	1.82	474,816	6 tab
2270	TF508	627	0.5	60	39.2	1.60	11,276,771	6 tab
2271	TF504A	807	0.5	40	39.2	2.06	245,223	6 tab
2272	TF505A	627	0.5	60	39.2	1.60	3,527,508	6 tab
Brackets after the sample ID indicate the coupon fiber volume in the radius								
5027	AC14 (57)	-742	*	0.8	35.6	-2.09	1	6 tab
5028	AC17 (46)	-741	*	0.8	35.6	-2.09	1	6 tab
5029	AC13 (45)	-683	*	0.8	35.6	-1.93	1	6 tab
5030	AC11 (48)	-414	10	40	35.6	-1.17	8,226	6 tab
5031	AC12 (49)	-414	10	40	35.6	-1.17	10,886	6 tab
5032	AC8 (61)	-414	10	40	35.6	-1.17	19,210	6 tab
5033	AC15 (61)	-345	10	60	35.6	-0.97	337,992	6 tab
5034	AC16 (46)	-345	10	60	35.6	-0.97	375,478	6 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5035	AC7 (50)	-345	10	60	35.6	-0.97	587,407	6 tab
5036	AC30 (48)	-276	10	100	35.6	-0.78	103,112,335	6 R tab
5037	AC10 (51)	-276	10	100	35.6	-0.78	103,573,682	6 R tab
2273	AC2	-414	10	40	35.6	-1.17	2,688	6 tab
2274	AC1	-345	10	60	35.6	-0.97	76,726	6 tab
2275	C2A	-264	10	80	35.6	-0.74	13,990,000	6 tab
2276	C6	-207	10	100	35.6	-0.58	51,028,261	6 R tab
2277	7A	-207	10	20	35.6	-0.58	10,188,794	6 R tab
2278	WA1	-276	10	30	35.6	-0.78	12,635,375	6 R tab
2279	WA4	-276	10	30	35.6	-0.78	9,707,898	6 R tab
2280	WA5	-345	10	30	35.6	-0.97	52,740	6 tab
2281	WA10	-276	10	30	35.6	-0.78	10,106,247	6 tab
2282	CC3	-345	10	60	35.6	-0.97	69,631	6 tab
2283	CC4	-345	10	10	35.6	-0.97	781,804	6 R tab
2284	CC5	-379	10	10	35.6	-1.06	4,021	6 tab
2285	CC6	-379	10	10	35.6	-1.06	496,974	6 tab
2286	CC7	-379	10	50	35.6	-1.06	12,660	6 tab
2287	CC8	-379	10	10	35.6	-1.06	3,638,153	6 tab
2288	CC9	-379	10	50	35.6	-1.06	4,765	6 tab
2289	CC10	-379	10	50	35.6	-1.06	8,349	6 tab
2290	CC11	-379	10	10	35.6	-1.06	1,336,317	6 tab
2291	CC12	-379	10	30	35.6	-1.06	10,192	6 tab
2292	CC13	-379	10	30	35.6	-1.06	6,550	6 tab
2293	C2	-345	10	30	35.6	-0.97	37,274	6 tab
2294	FC1	-234	10	60	35.6	-0.66	23,110,567	6 tab
5038	AC19 (49)	-552	2	60	35.4	-1.56	9,255	6 tab
5039	AC26 (49)	-552	2	60	35.4	-1.56	12,319	6 tab
5040	AC29 (49)	-552	2	60	35.4	-1.56	22,071	6 tab
5041	AC20 (51)	-552	2	60	35.4	-1.56	46,085	6 tab
5042	AC21 (47)	-483	2	80	35.4	-1.36	11,347	6 tab
5043	AC24 (52)	-483	2	80	35.4	-1.36	38,158	6 tab
5044	AC31 (44)	-483	2	80	35.4	-1.36	45,312	6 tab
5045	AC22 (46)	-483	2	80	35.4	-1.36	103,970	6 tab
5046	AC32 (46)	-448	2	100	35.4	-1.26	17,937	6 tab
5047	AC35 (48)	-448	2	100	35.4	-1.26	3,891,657	6 tab
5048	AC25 (49)	-448	2	100	35.4	-1.26	100,081,219	6 R tab
5049	AC23 (50)	-414	2	100	35.4	-1.17	107,413,026	6 R tab
2295	AC34	-448	2	100	35.4	-1.26	403,736	6 tab
2296	AC33	-448	2	100	35.4	-1.26	34,426	6 tab
2297	AC32	-448	2	100	35.4	-1.26	17,937	6 tab
5050	TCT1	1367	*	20	39.2	3.49	1	6 tab
5051	TCT2	1387	*	20	39.2	3.54	1	6 tab
5052	TCT3	1279	*	20	39.2	3.26	1	6 tab
5053	TCT4	1527	*	20	39.2	3.89	1	6 tab
5054	TCC1	-646	*	20	41.2	-1.57	1	6 tab
5055	TCC2	-463	*	20	41.2	-1.13	1	6 tab
5056	TCC3	-689	*	20	41.2	-1.68	1	6 tab
5057	TCC4	-537	*	20	41.2	-1.30	1	6 tab
2298	0STC1	-481	*	0.2	--	-----	1	6 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2299	0STC3	-478	*	0.2	--	-----	1	6 tab
2300	0FTC1	-513	*	5	--	-----	1	6 tab
2301	0FTC2	-534	*	5	--	-----	1	6 tab
2302	AC36	-592	*	5	--	-----	1	6 tab
2303	AC37	-639	*	5	--	-----	1	6 tab
2304	9A	-501	*	5	--	-----	1	6 tab
2305	10A	-500	*	5	--	-----	1	6 tab
2306	13A	-502	*	5	--	-----	1	6 tab
2307	WA7	-613	*	5	--	-----	1	6 tab
2308	WA8	-588	*	5	--	-----	1	6 tab
2309	WA9	-596	*	5	--	-----	1	6 tab
2310	TC1	293	-1	20	--	----	3,596	6 tab
2311	0FTS4	267	-1	10	--	----	146,258	6 tab
5058	TC15 (45)	264	-1	30	40.2	0.66	124,950	6 tab
5059	TC16 (45)	264	-1	30	40.2	0.66	337,226	6 tab
5060	TC13 (45)	264	-1	30	40.2	0.66	437,113	6 tab
2312	TC14	264	-1	30	40.2	0.66	1,260,397	6 tab
2313	TC12	234	-1	30	40.2	0.58	754,410	6 tab
5061	TC11 (40)	234	-1	30	40.2	0.58	591,914	6 tab
5062	TC7 (40)	234	-1	30	40.2	0.58	781,045	6 tab
5063	TC9 (40)	234	-1	30	40.2	0.58	1,981,821	6 tab
5064	TC22	205	-1	40	40.2	0.51	2,037,672	6 tab
5065	TC18 (35)	205	-1	40	40.2	0.51	6,141,627	6 tab
5066	TC6 (35)	205	-1	40	40.2	0.51	7,080,727	6 tab
5067	TC10 (35)	205	-1	40	40.2	0.51	7,605,707	6 tab
5068	TC21	176	-1	50	40.2	0.44	10,382,631	6 tab
5069	TC19	176	-1	50	40.2	0.44	17,272,745	6 tab
5070	TC20	176	-1	50	40.2	0.44	100,000,000	6 R tab
2314	0FTC11	160	-1	60	40.2	0.40	25,924,921	6 R tab
2315	0FTC12	187	-1	40	40.2	0.47	4,850,470	6 tab
2316	0FTS19	187	-1	30	40.2	0.47	3,267,903	6 tab
2317	0FTC20	187	-1	30	40.2	0.47	6,909,213	6 tab
5071	TC601	1618	*	20	40.2	4.02	1	6 tab
5072	TC602	1382	*	20	40.2	3.44	1	6 tab
5073	TC603	1410	*	20	40.2	3.51	1	6 tab
5074	TC604	-746	*	20	40.2	-1.86	1	6 tab
5075	TC605	-716	*	20	40.2	-1.78	1	6 tab
5076	TC606	-687	*	20	40.2	-1.71	1	6 tab
5077	TC608	294	-0.5	20	40.2	0.73	54,401	6 tab
5078	TC609	294	-0.5	20	40.2	0.73	151,631	6 tab
5079	TC613	294	-0.5	20	40.2	0.73	2,215,625	6 tab
5080	TC610	257	-0.5	20	40.2	0.64	338,635	6 tab
5081	TC611	257	-0.5	20	40.2	0.64	677,151	6 tab
5082	TC616	257	-0.5	20	40.2	0.64	4,237,939	6 tab
5083	TC614	257	-0.5	20	40.2	0.64	4,554,382	6 tab
5084	TC612	220	-0.5	20	40.2	0.55	3,089,148	6 tab
5085	TC615	220	-0.5	20	40.2	0.55	11,113,718	6 R tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL $(90)_4$

Lay-up = $(90)_4$, V_F = 0.381, Average Thickness = 1.38 mm, S.D. = 0.15 mm (min = 1.07 mm, max = 1.75 mm)
Hexcel D100 Fabric (340 g/m^2), CoRezyn 63-AX-051 Polyester

2318	90CF7	-111	*	4	9.0	-1.23	1	13 tab
2319	90CF6	-127	*	4	9.0	-1.41	1	13 tab
2320	90CF5	-112	*	4	9.0	-1.24	1	13 tab
2321	90CF4	-128	*	4	9.0	-1.42	1	13 tab
2322	90CF4A	-157	*	4	9.0	-1.74	1	13 tab
2323	90CF2	-136	*	4	9.0	-1.51	1	13 tab
2324	90CF8	-110	*	4	9.0	-1.22	1	13 tab
2325	90CF6A	-136	*	4	9.0	-1.51	1	13 tab
5086	90CF6T	-145	*	4	9.0	-1.61	1	13 tab
5087	90CF5T	-160	*	4	9.0	-1.78	1	13 tab
5088	90CF7T	-124	*	4	9.0	-1.38	1	13 tab
2326	90CF4A	-76	10	40	9.0	-0.84	76,674	13 tab
5089	90CF10T	-70	10	50	9.0	-0.79	13,122	13 tab
5090	90CF17T	-70	10	50	9.0	-0.79	33,632	13 tab
5091	90CF15T	-70	10	50	9.0	-0.79	268,262	13 tab
5092	90CF12T	-64	10	70	9.0	-0.72	290,252	13 tab
5093	90CF11T	-64	10	70	9.0	-0.72	697,512	13 tab
5094	90CF18T	-64	10	70	9.0	-0.72	1,330,488	13 tab
2327	90CF19	-59	10	70	9.0	-0.65	1,407,676	13 tab
2328	90CF16	-59	10	70	9.0	-0.65	2,218,971	13 tab
2329	90CF13	-59	10	100	9.0	-0.65	45,789,443	13 tab
5095	90CF21T	-59	10	100	9.0	-0.65	12,000,998	13 tab
5096	90CF9T	-59	10	100	9.0	-0.65	34,986,168	13 tab
5097	90CF20T	-55	10	100	9.0	-0.65	107,839,549	13 R tab
2330	90CF22	-55	10	100	9.0	-0.65	15,368,000	13 R tab
5098	CF501T	-113	*	20	9.0	-1.26	1	13 tab
5099	CF502T	-113	*	20	9.0	-1.26	1	13 tab
5100	CF503T	-121	*	20	9.0	-1.34	1	13 tab
5101	CF504T	-115	*	20	9.0	-1.27	1	13 tab
5102	CF518T	-88	2	40	9.0	-0.98	121,730	13 tab
5103	CF514T	-88	2	40	9.0	-0.98	511,744	13 tab
5104	CF517T	-88	2	40	9.0	-0.98	621,878	13 tab
5105	CF513T	-82	2	60	9.0	-0.92	853,552	13 tab
5106	CF512T	-82	2	60	9.0	-0.92	2,675,404	13 tab
5107	CF507T	-82	2	60	9.0	-0.92	3,705,190	13 tab
5108	CF511T	-76	2	80	9.0	-0.85	31,971,669	13 tab
5109	CF519T	-76	2	80	9.0	-0.85	100,682,804	13 R tab
2331	90CF505	-76	2	70	9.0	-0.79	11,667,961	13 tab
5110	90FT5T	22	*	20	8.6	0.25	1	13 tab
5111	90FT6T	18	*	20	8.6	0.21	1	13 tab
5112	90FT7T	23	*	20	8.6	0.27	1	13 tab
5113	90FT1T	22	*	20	8.6	0.36	1	13 tab
2332	90FT12	18	*	1	8.6	0.21	1	13 tab
5114	90FT18TA	14	0.1	60	8.6	0.16	9,383	13 tab
5235	90FT9	14	0.1	30	8.6	0.16	3,257	13 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
2333	90FT11	13	0.1	40	8.6	0.14	2,720,600	13 R tab
5115	90FT15A	13	0.1	60	8.6	0.15	34,592	13 tab
5116	90FT3T	13	0.1	60	8.6	0.15	31,952	13 tab
5117	90FT26T	12	0.1	80	8.6	0.14	3,895,837	13 tab
5118	90FT17	12	0.1	80	8.6	0.14	2,372,150	13 tab
5119	90FT15T	12	0.1	80	8.6	0.14	13,531,172	13 tab
5120	90FT8T	12	0.1	100	8.6	0.14	2,987,855	13 tab
2334	90FT12	12	0.1	80	8.6	0.14	3,810,385	13 tab
5121	90FT4T	11	0.1	100	8.6	0.13	21,111,725	13 tab
5122	90FT11T	11	0.1	100	8.6	0.12	102,350,298	13 R tab
2339	90FT15	14	0.1	30	8.6	0.16	9,383	13 tab
2336	90FT13	11	0.1	40	8.6	0.12	1,813,684	13 tab
2337	90FT14A	12	0.1	40	8.6	0.14	2,372,150	13 tab
2679	90FT8	12	0.1	80	8.6	0.14	2,987,855	13 tab
2680	90FT10	10	0.1	100	8.6	0.11	208,516	13 tab
2681	90FT13A	13	0.1	70	8.6	0.15	2,759	13 tab
2682	90FT14	13	0.1	40	8.6	0.15	385	13 tab
2683	90FT15	12	0.1	70	8.6	0.14	1,471	13 tab
2684	90FT20	12	0.1	60	8.6	0.14	647	13 tab
2685	90TCA1	19	0.1	40	8.6	0.21	1,707,026	13 tab
2686	90TCB1	21	0.1	40	8.6	0.23	49,498	13 tab
2687	90FTC2	24	0.1	80	8.6	0.27	112,928	13 tab
2688	90FTC3	24	0.1	80	8.6	0.27	46,842	13 tab
2689	90FT18	20	*	1	8.6	0.22	1	13 tab
2690	90FT19B	19	*	1	8.6	0.21	1	13 tab
2691	90FT14	23	*	1	8.6	0.26	1	13 tab
5123	TI501T	21	*	20	8.7	0.24	1	13 tab
5124	TI502T	21	*	20	8.7	0.25	1	13 tab
5125	TI503T	23	*	20	8.7	0.27	1	13 tab
5126	TI509T	15	0.5	60	8.7	0.18	53,275	13 tab
5127	TI507T	15	0.5	60	8.7	0.18	114,090	13 tab
5128	TI505T	15	0.5	60	8.7	0.18	528,634	13 tab
5129	TI508T	14	0.5	80	8.7	0.16	1,308,671	13 tab
5130	TI504T	14	0.5	80	8.7	0.16	1,665,220	13 tab
5131	TI506T	14	0.5	80	8.7	0.16	9,806,694	13 tab
5132	TK514T	10	0.5	80	8.7	0.15	31,443,023	13 tab
2692	TK515T	10	0.5	80	8.7	0.15	34,693,646	13 tab
5133	TK513T	11	0.5	80	8.7	0.15	50,666,199	13 tab
5134	TCH2T	18	*	20	8.8	0.21	1	13 tab
5135	TCH3T	19	*	20	8.8	0.19	1	13 tab
5136	TCH4T	17	*	20	8.8	0.19	1	13 tab
2693	90FT16	21	*	5	8.8	0.24	1	13 tab
2694	90FT17	19	*	5	8.8	0.22	1	13 tab
2695	90FTC1	23	*	5	9.27	0.25	1	13 tab
5137	TCH11T	8	-1	20	8.8	0.09	45,172	13 tab
5138	TCH12T	8	-1	30	8.8	0.09	151,465	13 tab
5139	TCH10T	8	-1	30	8.8	0.09	794,513	13 tab
5140	TCH14T	7	-1	60	8.8	0.08	47,385	13 tab
5141	TCH13T	7	-1	60	8.8	0.08	1,043,369	13 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5142	TCH16T	7	-1	60	8.8	0.08	3,009,395	13 tab
5143	TCH7T	7	-1	60	8.8	0.08	3,973,407	13 tab
5144	TCH15T	6	-1	80	8.8	0.07	11,733,016	13 tab
5145	TCH19T	6	-1	100	8.8	0.07	100,151,319	13 R tab

GLASS ROVING TESTS

D155 STRAND TESTS

Owens Corning Fabrics roving number E-450-PVE, Catalog Number OC107B-AC-450, OC111A-AB-450, 2000 fibers (average fiber diameter = 15.98 µm, standard deviation = 1.53 µm, maximum = 19.4 µm, minimum = 12.5 µm, sample size = 14,000) The following six D155 fabric rolls were obtained over the time period of 1993 to 2000 (Quality control static tests). All Strand tests were performed at a displacement rate of 13 mm/second with a 25 mm gage section.

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

D155 Roll 1

3739	D155TA1	1054	*	13	---	--	1	tow
3740	D155TA2	1061	*	13	---	--	1	tow
3741	D155TA3	993	*	13	---	--	1	tow
3742	D155TA4	940	*	13	---	--	1	tow
3743	D155TA5	1015	*	13	---	--	1	tow
3744	D155TA6	967	*	13	---	--	1	tow
3745	D155TA7	973	*	13	---	--	1	tow
3746	D155TA8	1014	*	13	---	--	1	tow
3747	D155TA9	987	*	13	---	--	1	tow
3748	D155TA10	1054	*	13	---	--	1	tow
3749	D155TA11	1019	*	13	---	--	1	tow
3750	D155TA12	1084	*	13	---	--	1	tow
3751	D155TA13	970	*	13	---	--	1	tow
3752	D155TA14	1084	*	13	---	--	1	tow
3753	D155TA15	975	*	13	---	--	1	tow
3754	D155TA16	1064	*	13	---	--	1	tow
3755	D155TA17	982	*	13	---	--	1	tow
3756	D155TA18	999	*	13	---	--	1	tow
3757	D155TA19	1015	*	13	---	--	1	tow
3758	D155TA20	981	*	13	---	--	1	tow
3759	D155TA21	1012	*	13	---	--	1	tow
3760	D155TA22	1040	*	13	---	--	1	tow
3761	D155TA23	1081	*	13	---	--	1	tow
3762	D155TA24	1036	*	13	---	--	1	tow
3763	D155TA25	1010	*	13	---	--	1	tow
3764	D155TA26	912	*	13	---	--	1	tow
3765	D155TA27	922	*	13	---	--	1	tow
3766	D155TA28	1051	*	13	---	--	1	tow
3767	D155TA29	991	*	13	---	--	1	tow
3768	D155TA30	995	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

D155 Roll 2

3769	D155TB1	1401	*	13	---	--	1	tow
3770	D155TB2	1310	*	13	---	--	1	tow
3771	D155TB3	1431	*	13	---	--	1	tow
3772	D155TB4	1403	*	13	---	--	1	tow
3773	D155TB5	1380	*	13	---	--	1	tow
3774	D155TB6	1347	*	13	---	--	1	tow
3775	D155TB7	1398	*	13	---	--	1	tow
3776	D155TB8	1361	*	13	---	--	1	tow
3777	D155TB9	1386	*	13	---	--	1	tow
3778	D155TB10	1362	*	13	---	--	1	tow
3779	D155TB11	1339	*	13	---	--	1	tow
3780	D155TB12	1413	*	13	---	--	1	tow
3781	D155TB13	1352	*	13	---	--	1	tow
3782	D155TB14	1366	*	13	---	--	1	tow
3783	D155TB15	1459	*	13	---	--	1	tow
3784	D155TB16	1412	*	13	---	--	1	tow
3785	D155TB17	1279	*	13	---	--	1	tow
3786	D155TB18	1381	*	13	---	--	1	tow
3787	D155TB19	1416	*	13	---	--	1	tow
3788	D155TB20	1420	*	13	---	--	1	tow
3789	D155TB21	1322	*	13	---	--	1	tow
3790	D155TB22	1263	*	13	---	--	1	tow
3791	D155TB23	1353	*	13	---	--	1	tow
3792	D155TB24	1446	*	13	---	--	1	tow
3793	D155TB25	1411	*	13	---	--	1	tow
3794	D155TB26	1310	*	13	---	--	1	tow
3795	D155TB27	1378	*	13	---	--	1	tow
3796	D155TB28	1372	*	13	---	--	1	tow
3797	D155TB29	1349	*	13	---	--	1	tow
3798	D155TB30	1319	*	13	---	--	1	tow

D155 Roll 3

3799	D155TC1	1419	*	13	---	--	1	tow
3800	D155TC2	1256	*	13	---	--	1	tow
3801	D155TC3	1356	*	13	---	--	1	tow
3802	D155TC4	1375	*	13	---	--	1	tow
3803	D155TC5	1322	*	13	---	--	1	tow
3804	D155TC6	1410	*	13	---	--	1	tow
3805	D155TC7	1407	*	13	---	--	1	tow
3806	D155TC8	1392	*	13	---	--	1	tow
3807	D155TC9	1467	*	13	---	--	1	tow
3808	D155TC10	1456	*	13	---	--	1	tow
3809	D155TC11	1444	*	13	---	--	1	tow
3810	D155TC12	1367	*	13	---	--	1	tow
3811	D155TC13	1399	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3812	D155TC14	1336	*	13	---	--	1	tow
3813	D155TC15	1429	*	13	---	--	1	tow
3814	D155TC16	1326	*	13	---	--	1	tow
3815	D155TC17	1404	*	13	---	--	1	tow
3816	D155TC18	1353	*	13	---	--	1	tow
3817	D155TC19	1456	*	13	---	--	1	tow
3818	D155TC20	1336	*	13	---	--	1	tow
3819	D155TC21	1366	*	13	---	--	1	tow
3820	D155TC22	1379	*	13	---	--	1	tow
3821	D155TC23	1325	*	13	---	--	1	tow
3822	D155TC24	1250	*	13	---	--	1	tow
3823	D155TC25	1358	*	13	---	--	1	tow
3824	D155TC26	1401	*	13	---	--	1	tow
3825	D155TC27	1345	*	13	---	--	1	tow
3826	D155TC28	1387	*	13	---	--	1	tow
3827	D155TC29	1428	*	13	---	--	1	tow
3828	D155TC30	1350	*	13	---	--	1	tow

D155 Roll 4 (Owens Corning 3002395001)

4474	D155TD1	1117	*	13	---	--	1	tow
4475	D155TD2	1096	*	13	---	--	1	tow
4476	D155TD3	1123	*	13	---	--	1	tow
4477	D155TD4	1089	*	13	---	--	1	tow
4478	D155TD5	1078	*	13	---	--	1	tow
4479	D155TD6	1077	*	13	---	--	1	tow
4480	D155TD7	1075	*	13	---	--	1	tow
4481	D155TD8	1119	*	13	---	--	1	tow
4482	D155TD9	1108	*	13	---	--	1	tow
4483	D155TD10	1170	*	13	---	--	1	tow
4484	D155TD11	534	0.1	10	---	--	603,854	tow
4485	D155TD12	534	0.1	10	---	--	900,234	tow
4486	D155TD13	534	0.1	10	---	--	470,103	tow
4487	D155TD14	534	0.1	10	---	--	1,503,261	tow
4488	D155TD15	534	0.1	10	---	--	852,853	tow
4489	D155TD16	667	0.1	5	---	--	101,867	tow
4490	D155TD17	667	0.1	5	---	--	15,456	tow
4491	D155TD18	667	0.1	5	---	--	10,218	tow
4492	D155TD19	667	0.1	5	---	--	10,426	tow
4493	D155TD20	667	0.1	5	---	--	20,883	tow
4494	D155TD21	667	0.1	5	---	--	59,688	tow
4495	D155TD22	445	0.1	20	---	--	4,002,694	tow
4496	D155TD23	445	0.1	20	---	--	6,168,942	tow
4497	D155TD24	445	0.1	20	---	--	2,727,395	tow
4498	D155TD25	445	0.1	20	---	--	5,748,860	tow
4499	D155TD26	445	0.1	20	---	--	3,634,752	tow
4500	D155TD27	356	0.1	50	---	--	41,981,341	tow
4501	D155TD28	356	0.1	50	---	--	23,548,030	tow
4502	D155TD29	356	0.1	50	---	--	67,748,394	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4503	D155TD30	356	0.1	50	---	--	71,247,839	tow
4504	D155TD31	356	0.1	50	---	--	12,245,917	tow
4505	D155TD32	311	0.1	80	---	--	169,484,151	tow
4506	D155TD33	311	0.1	80	---	--	254,226,085	tow
4507	D155TD34	311	0.1	80	---	--	382,095,430	tow
4508	D155TD35	311	0.1	80	---	--	180,760,560	tow
4509	D155TD36	311	0.1	80	---	--	671,734,540	tow
4563	D155TD37	778	0.1	2	---	--	526	tow
4564	D155TD38	778	0.1	2	---	--	375	tow
4565	D155TD39	778	0.1	2	---	--	160	tow
4567	D155TD40	778	0.1	2	---	--	433	tow
4568	D155TD41	778	0.1	2	---	--	544	tow

D155 Roll 4B (Owens Corning 3002395001)

4640	D155TD42	1212	*	13	---	--	1	tow
4641	D155TD43	1287	*	13	---	--	1	tow
4642	D155TD44	1278	*	13	---	--	1	tow
4643	D155TD45	1187	*	13	---	--	1	tow
4644	D155TD46	1187	*	13	---	--	1	tow
4645	D155TD47	1195	*	13	---	--	1	tow
4646	D155TD48	1212	*	13	---	--	1	tow
4647	D155TD49	1212	*	13	---	--	1	tow
4648	D155TD50	1187	*	13	---	--	1	tow
4649	D155TD51	1295	*	13	---	--	1	tow
4650	D155TD52	1183	*	13	---	--	1	tow
4651	D155TD53	1195	*	13	---	--	1	tow
4652	D155TD54	1241	*	13	---	--	1	tow
4653	D155TD55	1095	*	13	---	--	1	tow
4654	D155TD56	1183	*	13	---	--	1	tow
4655	D155TD57	1145	*	13	---	--	1	tow
4656	D155TD58	1187	*	13	---	--	1	tow
4657	D155TD59	1053	*	13	---	--	1	tow
4658	D155TD60	1087	*	13	---	--	1	tow
4659	D155TD61	1303	*	13	---	--	1	tow
4660	D155TD62	1204	*	13	---	--	1	tow
4661	D155TD63	1212	*	13	---	--	1	tow
4662	D155TD64	1145	*	13	---	--	1	tow
4663	D155TD65	1062	*	13	---	--	1	tow
4664	D155TD66	1157	*	13	---	--	1	tow
4665	D155TD67	1287	*	13	---	--	1	tow
4666	D155TD68	1250	*	13	---	--	1	tow
4667	D155TD69	1129	*	13	---	--	1	tow
4668	D155TD70	1274	*	13	---	--	1	tow
4669	D155TD71	1254	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

D155 Roll 5 (Owens Corning 3504830021, manufactured 1/23/97)

4510	D155TE551	1220	*	13	---	--	1	tow
4511	D155TE546	1208	*	13	---	--	1	tow
4512	D155TE515	1205	*	13	---	--	1	tow
4513	D155TE527	1182	*	13	---	--	1	tow
4514	D155TE547	1193	*	13	---	--	1	tow
4515	D155TE516	1161	*	13	---	--	1	tow
4516	D155TE564	1181	*	13	---	--	1	tow
4517	D155TE555	1143	*	13	---	--	1	tow
4518	D155TE572	1157	*	13	---	--	1	tow
4519	D155TE548	1122	*	13	---	--	1	tow
4520	D155TE549	1246	*	13	---	--	1	tow
4521	D155TE566	1203	*	13	---	--	1	tow
4522	D155TE556	1276	*	13	---	--	1	tow
4523	D155TE559	1205	*	13	---	--	1	tow
4524	D155TE517	1164	*	13	---	--	1	tow
4525	D155TE534	1233	*	13	---	--	1	tow
4526	D155TE538	1124	*	13	---	--	1	tow
4527	D155TE532	1162	*	13	---	--	1	tow
4528	D155TE520	1142	*	13	---	--	1	tow
4529	D155TE550	1171	*	13	---	--	1	tow
4530	D155TE557	1193	*	13	---	--	1	tow
4531	D155TE563	1264	*	13	---	--	1	tow
4532	D155TE539	1090	*	13	---	--	1	tow
4533	D155TE567	1128	*	13	---	--	1	tow
4534	D155TE554	1139	*	13	---	--	1	tow
4535	D155TE569	1146	*	13	---	--	1	tow
4536	D155TE558	1195	*	13	---	--	1	tow
4537	D155TE576	1249	*	13	---	--	1	tow
4538	D155TE570	1151	*	13	---	--	1	tow
4539	D155TE571	1201	*	13	---	--	1	tow
4540	D155TE553	778	0.1	5	---	--	11,640	tow
4541	D155TE552	778	0.1	5	---	--	2,983	tow
4542	D155TE518	778	0.1	5	---	--	4,596	tow
4543	D155TE561	778	0.1	5	---	--	3,678	tow
4544	D155TE562	778	0.1	5	---	--	4,817	tow
4546	D155TE509	667	0.1	5	---	--	30,953	tow
4547	D155TE505	667	0.1	5	---	--	10,943	tow
4548	D155TE512	667	0.1	5	---	--	19,520	tow
4549	D155TE511	667	0.1	5	---	--	10,173	tow
4550	D155TE510	667	0.1	5	---	--	14,350	tow
4551	D155TE531	534	0.1	10	---	--	858,810	tow
4552	D155TE542	534	0.1	10	---	--	159,944	tow
4553	D155TE541	534	0.1	10	---	--	254,240	tow
4554	D155TE525	534	0.1	10	---	--	386,380	tow
4555	D155TE533	534	0.1	10	---	--	235,364	tow
4556	D155TE514	534	0.1	10	---	--	525,623	tow
4557	D155TE591	445	0.1	20	---	--	3,218,504	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4558	D155TE592	445	0.1	20	---	--	3,924,363	tow
4559	D155TE596	445	0.1	20	---	--	2,319,792	tow
4560	D155TE593	445	0.1	20	---	--	6,759,244	tow
4561	D155TE597	445	0.1	20	---	--	2,535,198	tow
4562	D155TE598	445	0.1	20	---	--	4,468,170	tow

D155 Roll 5B (Owens Corning 3504830021, manufactured 1/23/97)

4670	D155TE99	1412	*	13	---	--	1	tow
4671	D155TE100	1408	*	13	---	--	1	tow
4672	D155TE101	1462	*	13	---	--	1	tow
4673	D155TE102	1362	*	13	---	--	1	tow
4674	D155TE103	1391	*	13	---	--	1	tow
4675	D155TE104	1454	*	13	---	--	1	tow
4676	D155TE105	1462	*	13	---	--	1	tow
4677	D155TE106	1420	*	13	---	--	1	tow
4678	D155TE107	1437	*	13	---	--	1	tow
4679	D155TE108	1375	*	13	---	--	1	tow
4680	D155TE109	1475	*	13	---	--	1	tow
4681	D155TE110	1350	*	13	---	--	1	tow
4682	D155TE111	1337	*	13	---	--	1	tow
4683	D155TE112	1370	*	13	---	--	1	tow
4684	D155TE113	1375	*	13	---	--	1	tow
4685	D155TE114	1445	*	13	---	--	1	tow
4686	D155TE115	1342	*	13	---	--	1	tow
4687	D155TE116	1356	*	13	---	--	1	tow
4688	D155TE117	1387	*	13	---	--	1	tow
4689	D155TE118	1475	*	13	---	--	1	tow
4690	D155TE119	1429	*	13	---	--	1	tow
4691	D155TE120	1417	*	13	---	--	1	tow
4692	D155TE121	1387	*	13	---	--	1	tow
4693	D155TE122	1371	*	13	---	--	1	tow
4694	D155TE123	1446	*	13	---	--	1	tow
4695	D155TE124	1404	*	13	---	--	1	tow
4696	D155TE125	1362	*	13	---	--	1	tow
4697	D155TE126	1342	*	13	---	--	1	tow
4698	D155TE127	1471	*	13	---	--	1	tow
4699	D155TE128	1396	*	13	---	--	1	tow

D155 Roll 6 (Owens Corning 3415534012, manufactured 3/29/99)

4700	D155TF1	1195	*	13	---	--	1	tow
4701	D155TF2	1262	*	13	---	--	1	tow
4702	D155TF3	1171	*	13	---	--	1	tow
4759	D155TF4	1171	*	13	---	--	1	tow
4703	D155TF5	1321	*	13	---	--	1	tow
4704	D155TF6	1237	*	13	---	--	1	tow
4705	D155TF7	1171	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4706	D155TF8	1204	*	13	---	--	1	tow
4707	D155TF9	1208	*	13	---	--	1	tow
4708	D155TF10	1154	*	13	---	--	1	tow
4709	D155TF11	1287	*	13	---	--	1	tow
4710	D155TF12	1188	*	13	---	--	1	tow
4711	D155TF13	1197	*	13	---	--	1	tow
4712	D155TF14	1171	*	13	---	--	1	tow
4713	D155TF15	1229	*	13	---	--	1	tow
4714	D155TF16	1208	*	13	---	--	1	tow
4715	D155TF17	1213	*	13	---	--	1	tow
4716	D155TF18	1229	*	13	---	--	1	tow
4717	D155TF19	1146	*	13	---	--	1	tow
4718	D155TF20	1204	*	13	---	--	1	tow
4719	D155TF21	1262	*	13	---	--	1	tow
4720	D155TF22	1183	*	13	---	--	1	tow
4721	D155TF23	1487	*	13	---	--	1	tow
4722	D155TF24	1296	*	13	---	--	1	tow
4723	D155TF25	1137	*	13	---	--	1	tow
4724	D155TF26	1204	*	13	---	--	1	tow
4725	D155TF27	1271	*	13	---	--	1	tow
4726	D155TF28	1314	*	13	---	--	1	tow
4727	D155TF29	1246	*	13	---	--	1	tow
4728	D155TF30	1246	*	13	---	--	1	tow

D155 Roll 6B (Owens Corning 3415534012, manufactured 3/29/99)

4729	D155TF31	1404	*	13	---	--	1	tow
4730	D155TF32	1262	*	13	---	--	1	tow
4731	D155TF33	1221	*	13	---	--	1	tow
4732	D155TF34	1350	*	13	---	--	1	tow
4733	D155TF35	1179	*	13	---	--	1	tow
4734	D155TF36	1146	*	13	---	--	1	tow
4735	D155TF37	1338	*	13	---	--	1	tow
4736	D155TF38	1221	*	13	---	--	1	tow
4737	D155TF39	1262	*	13	---	--	1	tow
4738	D155TF40	1362	*	13	---	--	1	tow
4739	D155TF41	1254	*	13	---	--	1	tow
4740	D155TF42	1396	*	13	---	--	1	tow
4741	D155TF43	1313	*	13	---	--	1	tow
4742	D155TF44	1346	*	13	---	--	1	tow
4743	D155TF45	1387	*	13	---	--	1	tow
4744	D155TF46	1279	*	13	---	--	1	tow
4745	D155TF47	1287	*	13	---	--	1	tow
4746	D155TF48	1362	*	13	---	--	1	tow
4747	D155TF49	1096	*	13	---	--	1	tow
4748	D155TF50	1296	*	13	---	--	1	tow
4749	D155TF51	1246	*	13	---	--	1	tow
4750	D155TF52	1304	*	13	---	--	1	tow
4751	D155TF53	1287	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4752	D155TF54	1304	*	13	---	--	1	tow
4753	D155TF55	1237	*	13	---	--	1	tow
4754	D155TF56	1267	*	13	---	--	1	tow
4755	D155TF57	1304	*	13	---	--	1	tow
4756	D155TF58	1338	*	13	---	--	1	tow
4757	D155TF59	1304	*	13	---	--	1	tow
4758	D155TF60	1262	*	13	---	--	1	tow

D155 Roll 6C (Owens Corning 3415534012, manufactured 3/29/99)

4800	D155TF61	1393	*	13	---	--	1	tow
4801	D155TF62	1260	*	13	---	--	1	tow
4802	D155TF63	1268	*	13	---	--	1	tow
4803	D155TF64	1410	*	13	---	--	1	tow
4804	D155TF65	1385	*	13	---	--	1	tow
4805	D155TF66	1443	*	13	---	--	1	tow
4806	D155TF67	1402	*	13	---	--	1	tow
4807	D155TF68	1260	*	13	---	--	1	tow
4808	D155TF69	1318	*	13	---	--	1	tow
4809	D155TF70	1310	*	13	---	--	1	tow
4810	D155TF71	1314	*	13	---	--	1	tow
4811	D155TF72	1331	*	13	---	--	1	tow
4812	D155TF73	1277	*	13	---	--	1	tow
4813	D155TF74	1302	*	13	---	--	1	tow
4814	D155TF75	1393	*	13	---	--	1	tow
4815	D155TF76	1064	*	13	---	--	1	tow
4816	D155TF77	1210	*	13	---	--	1	tow
4817	D155TF78	1293	*	13	---	--	1	tow
4818	D155TF79	1314	*	13	---	--	1	tow
4819	D155TF80	1310	*	13	---	--	1	tow
4820	D155TF81	1427	*	13	---	--	1	tow
4821	D155TF82	1306	*	13	---	--	1	tow
4822	D155TF83	1277	*	13	---	--	1	tow
4823	D155TF84	1343	*	13	---	--	1	tow
4824	D155TF85	1368	*	13	---	--	1	tow
4825	D155TF86	1268	*	13	---	--	1	tow
4826	D155TF87	1335	*	13	---	--	1	tow
4827	D155TF88	1331	*	13	---	--	1	tow
4828	D155TF89	1352	*	13	---	--	1	tow
4829	D155TF90	1310	*	13	---	--	1	tow

D155 Roll 6D (Owens Corning 3415534012, manufactured 3/29/99)

4830	D155TF91	1168	*	13	---	--	1	tow
4831	D155TF92	1368	*	13	---	--	1	tow
4832	D155TF93	1389	*	13	---	--	1	tow
4833	D155TF94	1298	*	13	---	--	1	tow
4834	D155TF95	1285	*	13	---	--	1	tow
4835	D155TF96	1364	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4836	D155TF97	1318	*	13	---	--	1	tow
4837	D155TF98	1310	*	13	---	--	1	tow
4838	D155TF99	1326	*	13	---	--	1	tow
4839	D155TF100	1343	*	13	---	--	1	tow
4840	D155TF101	1310	*	13	---	--	1	tow
4841	D155TF102	1410	*	13	---	--	1	tow
4862	D155TF103	1343	*	13	---	--	1	tow
4842	D155TF104	1335	*	13	---	--	1	tow
4843	D155TF105	1210	*	13	---	--	1	tow
4844	D155TF106	1160	*	13	---	--	1	tow
4845	D155TF107	1385	*	13	---	--	1	tow
4846	D155TF108	1110	*	13	---	--	1	tow
4847	D155TF109	1352	*	13	---	--	1	tow
4848	D155TF110	1298	*	13	---	--	1	tow
4849	D155TF111	1343	*	13	---	--	1	tow
4850	D155TF112	1352	*	13	---	--	1	tow
4851	D155TF113	1318	*	13	---	--	1	tow
4852	D155TF114	1352	*	13	---	--	1	tow
4853	D155TF115	1335	*	13	---	--	1	tow
4854	D155TF116	1356	*	13	---	--	1	tow
4855	D155TF117	1285	*	13	---	--	1	tow
4856	D155TF118	1293	*	13	---	--	1	tow
4857	D155TF119	1243	*	13	---	--	1	tow
4858	D155TF120	1335	*	13	---	--	1	tow

D155 Roll 8 (Owens Corning 991782496011, manufactured 1/25/00)

6900	D155TG1	1520	*	13	---	--	1	tow
6901	D155TG2	1306	*	13	---	--	1	tow
6902	D155TG3	1400	*	13	---	--	1	tow
6903	D155TG4	1358	*	13	---	--	1	tow
6904	D155TG5	1514	*	13	---	--	1	tow
6905	D155TG6	1467	*	13	---	--	1	tow
6906	D155TG7	1349	*	13	---	--	1	tow
6907	D155TG8	1451	*	13	---	--	1	tow
6948	D155TG9	1336	*	13	---	--	1	tow
6949	D155TG10	1424	*	13	---	--	1	tow
6950	D155TG11	1438	*	13	---	--	1	tow
6951	D155TG12	1496	*	13	---	--	1	tow
6952	D155TG13	1370	*	13	---	--	1	tow
6953	D155TG14	1423	*	13	---	--	1	tow
6954	D155TG15	1388	*	13	---	--	1	tow
6955	D155TG16	1356	*	13	---	--	1	tow
6956	D155TG17	1458	*	13	---	--	1	tow
6957	D155TG18	1511	*	13	---	--	1	tow
6958	D155TG19	1446	*	13	---	--	1	tow
6959	D155TG20	1472	*	13	---	--	1	tow
6960	D155TG21	1397	*	13	---	--	1	tow
6961	D155TG22	1451	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6962	D155TG23	1467	*	13	---	--	1	tow
6963	D155TG24	1415	*	13	---	--	1	tow
6964	D155TG25	1553	*	13	---	--	1	tow
6965	D155TG26	1394	*	13	---	--	1	tow
6966	D155TG27	1424	*	13	---	--	1	tow
6967	D155TG28	1418	*	13	---	--	1	tow
6968	D155TG29	1296	*	13	---	--	1	tow
6969	D155TG30	1402	*	13	---	--	1	tow

DB120 Fabric Strands

Owens Corning Fabrics Roving number E-1200-PVE, catalog number OC-380-JC-451 (1200). (750 fibers, 16 μm average diameter)

DB120 Roll 5

4569	DB120TA1	370	*	13	---	--	1	tow
4570	DB120TA2	317	*	13	---	--	1	tow
4571	DB120TA3	374	*	13	---	--	1	tow
4572	DB120TA4	389	*	13	---	--	1	tow
4573	DB120TA5	396	*	13	---	--	1	tow
4574	DB120TA6	377	*	13	---	--	1	tow
4575	DB120TA7	284	*	13	---	--	1	tow
4576	DB120TA8	329	*	13	---	--	1	tow
4577	DB120TA9	310	*	13	---	--	1	tow
4578	DB120TA10	370	*	13	---	--	1	tow
4579	DB120TA11	378	*	13	---	--	1	tow
4580	DB120TA12	314	*	13	---	--	1	tow
4581	DB120TA13	304	*	13	---	--	1	tow
4582	DB120TA14	373	*	13	---	--	1	tow
4583	DB120TA15	348	*	13	---	--	1	tow
4584	DB120TA16	375	*	13	---	--	1	tow
4585	DB120TA17	344	*	13	---	--	1	tow
4586	DB120TA18	305	*	13	---	--	1	tow
4587	DB120TA19	371	*	13	---	--	1	tow
4588	DB120TA20	393	*	13	---	--	1	tow
4589	DB120TA21	351	*	13	---	--	1	tow
4590	DB120TA22	350	*	13	---	--	1	tow
4591	DB120TA23	332	*	13	---	--	1	tow
4592	DB120TA24	293	*	13	---	--	1	tow
4593	DB120TA25	387	*	13	---	--	1	tow
4594	DB120TA26	347	*	13	---	--	1	tow
4595	DB120TA27	358	*	13	---	--	1	tow
4596	DB120TA28	364	*	13	---	--	1	tow
4597	DB120TA29	307	*	13	---	--	1	tow
4598	DB120TA30	320	*	13	---	--	1	tow
4599	DB120TA31	403	*	13	---	--	1	tow
4600	DB120TA32	377	*	13	---	--	1	tow
4601	DB120TA33	346	*	13	---	--	1	tow
4602	DB120TA34	352	*	13	---	--	1	tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4603	DB120TA35	377	*	13	---	--	1	tow
4604	DB120TA36	317	*	13	---	--	1	tow
4605	DB120TA37	376	*	13	---	--	1	tow
4606	DB120TA38	366	*	13	---	--	1	tow
4607	DB120TA39	319	*	13	---	--	1	tow
4608	DB120TA40	330	*	13	---	--	1	tow
4609	DB120TA41	351	*	13	---	--	1	tow
4610	DB120TA42	358	*	13	---	--	1	tow
4611	DB120TA43	376	*	13	---	--	1	tow
4612	DB120TA44	339	*	13	---	--	1	tow

Owens Corning 990-BC-2385-4093, 208 Fiber Strand

(Average fiber diameter = 10.66 μm, standard deviation = 0.93 μm, maximum = 13.96 μm, minimum = 8.33 μm, sample size = 1,939). The average area used for stress calculations was 0.003999 mm^2 (for 45 fibers). A nominal 45 fiber strand, impregnated with CoRezyn 63-AX-051 orthothalic polyester resin, was manufactured from this strand. The gage length of these coupons were 25 ±5 mm. The listed stress (IN BRACKETS) was calculated from microscope and weight samples taken from the individual coupons. The notes column also lists the number of fibers in the gage length if there were not 45 fibers present (F44 = 44 fibers). Strain was calculated using an E = 72.4 GPa. TESTING IS CONTINUING

TEST & SAMPLE ID #		MAX. Load grams (stress, MPa)	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4900	STR63	1266 (3309)	*	120	----	4.57	1	tow
4901	STR60	1506 (3128)	*	120	----	4.32	1	tow
4902	STR54	1383 (3145)	*	120	----	4.34	1	tow
4903	STR52	1181 (2967)	*	120	----	4.10	1	tow
4904	STR40	1376 (3061)	*	120	----	4.23	1	tow F47
4905	STR44	1687 (3258)	*	120	----	4.50	1	tow F48
4906	STR33	1281 (3142)	*	120	----	4.34	1	tow
4907	STR17	1367 (3216)	*	120	----	4.44	1	tow
4908	STR14	1189 (2991)	*	120	----	4.13	1	tow
4909	STR12	1126 (2984)	*	120	----	4.12	1	tow
4910	STR10	1214 (3218)	*	120	----	4.44	1	tow
4911	STR152	1349 (3309)	*	120	----	4.57	1	tow
4912	STR141	1344 (3330)	*	120	----	4.60	1	tow
4913	STR133	1300 (2943)	*	120	----	4.06	1	tow F44
4914	STR122	1285 (3377)	*	120	----	4.66	1	tow F42
4915	STR71	1192 (2871)	*	120	----	3.97	1	tow
4916	STR102	1261 (3135)	*	120	----	4.33	1	tow
4917	STR11	300 (757)	0.1	200	----	1.05	1,100,000,000	tow R F41
4918	STR16	500 (1226)	0.1	80	----	1.69	3,151,637	tow F40
4919	STR13	500 (1270)	0.1	80	----	1.75	521,416	tow
4920	STR19	500 (1299)	0.1	80	----	1.79	1,887,512	tow
4921	STR61	500 (1208)	0.1	80	----	1.67	10,590,546	tow
4922	STR34	500 (1153)	0.1	80	----	1.59	660,762	tow
4923	STR43	500(1282)	0.1	80	----	1.77	2,970,613	tow F44
4924	STR51	500 (1318)	0.1	80	----	1.82	6,271,853	tow
4925	STR32	500 (1342)	0.1	80	----	1.85	1,163,044	tow
4926	STR64	500 (1308)	0.1	80	----	1.81	2,371,532	tow F44
4927	STR42	500 (1007)	0.1	80	----	1.39	23,198,205	tow F51
4928	STR50	500 (1355)	0.1	80	----	1.87	877,701	tow
4929	STR31	500 (1301)	0.1	80	----	1.80	1,867,185	tow
4930	STR53	400 (983)	0.1	100	----	1.36	21,256,335	tow
4931	STR41	400 (907)	0.1	100	----	1.25	541,168,069	tow F48
4932	STR154	700 (1686)	0.1	50	----	2.33	28,026	tow
4933	STR150	700 (1634)	0.1	50	----	2.26	117,135	tow
4934	STR153	700 (1699)	0.1	50	----	2.35	87,956	tow
4935	STR143	700 (1739)	0.1	50	----	2.40	820,108	tow
4936	STR121	700 (1664)	0.1	50	----	2.30	37,208	tow

TEST & SAMPLE ID #		MAX. Load grams (stress, MPa)	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4937	STR130	700 (1725)	0.1	50	----	2.38	119,137	tow
4938	STR151	700 (1710)	0.1	50	----	2.36	834,738	tow
4939	STR72	700 (1734)	0.1	50	----	2.40	446,679	tow
4940	STR120	700 (1730)	0.1	50	----	2.39	174,072	tow
4941	STR132	700 (1720)	0.1	50	----	2.38	204,871	tow
4942	STR144	700 (1756)	0.1	50	----	2.43	154,706	tow
4943	STR123	700 (1717)	0.1	50	----	2.37	14,218	tow
4944	STR140	600 (1422)	0.1	100	----	1.96	2,313,678	tow
4945	STR84	600 (1535)	0.1	100	----	2.12	4,138,791	tow
4946	STR83	600 (1420)	0.1	100	----	1.96	3,185,311	tow
4947	STR131	600 (1466)	0.1	100	----	2.02	2,564,971	tow
4948	STR94	600 (1437)	0.1	100	----	1.98	19,248,908	tow
4949	STR30	400 (981)	0.1	120	----	1.36	1,000,000,000	tow R
4950	STR134	450 (1178)	0.1	150	----	1.63	1,000,000,000	tow R
4951	STR142	1396 (3424)	*	120	----	4.73	1	tow
4952	STR90	1284 (3149)	*	120	----	4.35	1	tow
4953	STR70	1335 (3349)	*	120	----	4.63	1	tow F44
4954	STR109	450 (1104)	0.1	200	----	1.52	255,520,000	tow
4955	STR62	450 (1104)	0.1	200	----	1.52	332,300,000	tow
4956	STR180	600 (1493)	0.1	100	----	2.06	680,779	tow
4957	STR190	600 (1398)	0.1	100	----	1.93	917,943	tow
4958	STR194	600 (1398)	0.1	100	----	1.93	1,667,477	tow
4959	STR182	600 (1531)	0.1	100	----	2.11	369,667	tow
4960	STR183	600 (1437)	0.1	100	----	1.99	1,077,008	tow
4961	STR80	450 (1104)	0.1	200	----	1.52	827,220,000	tow
4962	STR100	450 (1104)	0.1	200	----	1.52	10,000,000,000	tow R
4963	STR73	450 (1104)	0.1	200	----	1.52	5,000,000,000	tow R
4964	STR103	400 (981)	0.1	200	----	1.36	10,000,000,000	tow R
4965	STR93	600 (1433)	0.1	100	----	1.98	6,123,489	tow
4966	STR74	600 (1484)	0.1	100	----	2.05	2,798,167	tow
4967	STR170	475 (1124)	0.1	200	----	1.55	92,310,139	tow
4968	STR161	475 (1147)	0.1	200	----	1.58	8,164,732	tow
4969	STR173	475 (1160)	0.1	200	----	1.60	11,348,757	tow
4970	STR164	475 (1190)	0.1	200	----	1.64	157,165,630	tow
4971	STR92	475 (1181)	0.1	200	----	1.63	221,007,402	tow
4972	STR104	600 (1421)	0.1	100	----	1.96	37,141,573	tow F47
4973	STR82	600 (1456)	0.1	100	----	2.01	7,375,336	tow
4974	STR91	600 (1366)	0.1	100	----	1.89	39,267,215	tow F47
4975	STR9	475 (1134)	0.1	200	----	1.57	262,049,575	tow
4976	STR15	475 (1175)	0.1	200	----	1.62	572,535,000	tow
4977	STR201	475 (1156)	0.1	200	----	1.60	123,108,655	tow F46
4978	STR202	475 (996)	0.1	200	----	1.38	104,584,113	tow F50
4979	STR21	475 (1106)	0.1	200	----	1.53	85,419,550	tow
4980	STR22	475 (1212)	0.1	200	----	1.67	424,245,141	tow
4981	STR47	475 (1138)	0.1	200	----	1.57	21,256,335	tow
4982	STR203	900 (2255)	0.1	20	----	3.11	17,497	tow
4983	STR204	900 (2179)	0.1	20	----	3.01	824	tow

TEST & SAMPLE ID #		MAX. Load grams (stress, MPa)	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4984	STR205	900 (2200)	0.1	20	----	3.04	14,796	tow
4985	STR206	900 (2227)	0.1	20	----	3.08	7,317	tow
4986	STR207	900 (2280)	0.1	20	----	3.15	19,412	tow
4987	STR208	900 (2179)	0.1	20	----	3.01	1,899	tow
4988	STR209	900 (2119)	0.1	20	----	2.93	34,730	tow
4989	STR210	900 (2187)	0.1	20	----	3.02	8,531	tow
4990	STR240	800 (1901)	0.1	20	----	2.63	178,922	tow
4991	STR241	800 (1954)	0.1	20	----	2.70	161,812	tow
4992	STR242	800 (2007)	0.1	20	----	2.77	26,774	tow
4993	STR243	800 (1997)	0.1	20	----	2.76	63,052	tow
4994	STR244	800 (2060)	0.1	20	----	2.85	14,997	tow
4995	STR245	800 (2049)	0.1	20	----	2.83	38,614	tow
4996	STR246	800 (1962)	0.1	20	----	2.71	84,357	tow
4997	STR247	800 (2059)	0.1	20	----	2.84	101,444	tow
4998	STR125	450 (1104)	0.1	200	----	1.52	2,000,000,000	tow R
4999	STR221	600 (1440)	0.1	200	----	1.99	8,891,725	tow
5000	STR217	650 (1594)	0.1	100	----	2.20	606,191	tow
5001	STR219	650 (1594)	0.1	100	----	2.20	5,922,625	tow

FIBER STRAND - FIBER VOLUME EFFECT TESTING

A glass strand was removed from the Owens Corning Fabric (D155) and impregnated with polyester resin at four different fiber volume fractions: 0.50 (approximately), 0.56, 0.61 and 0.66. This was to observe the effect of increasing fiber volume in the individual strands on the fatigue performance. The manufacturing was achieved by impregnating the strand with polyester resin and then drawing it into a metal capillary tube to cure. The D155-VF50 strand was drawn through the tube, but not cured within, which created a larger range of resin contents with a fiber volume fraction of 0.50 being the maximum. The D155-VF50 strand manufacturing was the same as all the other D155 strand tests (static and fatigue) in the fatigue database.

MATERIAL D155-VF50

Lay-up = D155 Tow impregnated with CoRezyn 63-AX-051 polyester resin. V_F = 0.45 to 0.50.

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6400	6k1	1147	*	13	----	----	1	Tow
6401	6k2	1193	*	13	----	----	1	Tow
6402	6k3	1167	*	13	----	----	1	Tow
6403	6k4	1278	*	13	----	----	1	Tow
6404	6k5	1261	*	13	----	----	1	Tow
6405	6k6	1206	*	13	----	----	1	Tow
6406	6k7	667	0.1	10	----	----	15,997	Tow
6407	6k8	667	0.1	10	----	----	11,353	Tow
6408	6k9	667	0.1	10	----	----	27,483	Tow
6409	6k10	667	0.1	10	----	----	17,628	Tow
6410	6k11	667	0.1	10	----	----	70,000	Tow
6411	6k12	534	0.1	15	----	----	343,667	Tow
6412	6k13	534	0.1	15	----	----	577,139	Tow
6413	6k14	534	0.1	15	----	----	178,556	Tow
6414	6k15	534	0.1	15	----	----	759,224	Tow
6415	6k16	534	0.1	15	----	----	360,357	Tow
6416	6k30	890	0.1	1	----	----	89	Tow
6417	6k31	890	0.1	1	----	----	161	Tow
6418	6k32	890	0.1	1	----	----	99	Tow
6419	6k33	890	0.1	1	----	----	244	Tow
6420	6k34	890	0.1	1	----	----	1,031	Tow
6421	6k35	1001	0.1	1	----	----	43	Tow
6422	6k36	1001	0.1	1	----	----	22	Tow
6423	6k37	1001	0.1	1	----	----	19	Tow
6424	6k38	1001	0.1	1	----	----	18	Tow
6425	6k39	1001	0.1	1	----	----	35	Tow
6426	6k80	356	0.1	25	----	----	9,809,128	Tow
6427	6k81	356	0.1	25	----	----	20,685,678	Tow
6428	6k82	356	0.1	25	----	----	10,963,354	Tow
6429	6k83	356	0.1	25	----	----	6,923,727	Tow
6430	6k84	356	0.1	25	----	----	6,292,156	Tow
6431	6k85	445	0.1	15	----	----	1,854,765	Tow
6432	6k86	445	0.1	15	----	----	817,124	Tow
6433	6k87	445	0.1	15	----	----	1,132,367	Tow
6434	6k88	445	0.1	15	----	----	1,027,096	Tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6435	6k89	445	0.1	15	----	----	509,088	Tow

MATERIAL D155-VF56

Lay-up = D155 Tow impregnated with CoRezyn 63-AX-051 polyester resin.
Average V_F =0.56, S.D. = 0.009, min = 0.543, max = 0.584.

6436	4x	1232	*	13	----	----	1	Tow
6437	6x	1230	*	13	----	----	1	Tow
6438	12x	1208	*	13	----	----	1	Tow
6439	17x	1222	*	13	----	----	1	Tow
6440	18x	1207	*	13	----	----	1	Tow
6441	27x	778	0.1	5	----	----	9,302	Tow
6442	28x	778	0.1	5	----	----	5,230	Tow
6443	46x	778	0.1	5	----	----	2,131	Tow
6444	36x	778	0.1	5	----	----	5,691	Tow
6445	45x	778	0.1	5	----	----	2,625	Tow
6446	47x	667	0.1	7	----	----	22,943	Tow
6447	49x	667	0.1	7	----	----	21,805	Tow
6448	44x	667	0.1	7	----	----	11,222	Tow
6449	43x	667	0.1	7	----	----	32,491	Tow
6450	59x	667	0.1	7	----	----	15,061	Tow
6451	48x	534	0.1	10	----	----	63,975	Tow
6452	52x	534	0.1	10	----	----	212,610	Tow
6453	58x	534	0.1	10	----	----	52,326	Tow
6454	57x	356	0.1	20	----	----	6,578,336	Tow
6455	53x	445	0.1	10	----	----	713,957	Tow
6456	51x	445	0.1	10	----	----	609,384	Tow
6457	54x	445	0.1	10	----	----	476,462	Tow
6458	55x	445	0.1	10	----	----	325,807	Tow
6459	56x	356	0.1	20	----	----	1,529,184	Tow
6460	42x	356	0.1	20	----	----	4,231,823	Tow
6461	74x	356	0.1	20	----	----	2,585,711	Tow
6462	75x	356	0.1	20	----	----	3,562,790	Tow
6463	50x	289	0.1	50	----	----	11,296,036	Tow
6464	70x	289	0.1	50	----	----	71,487,444	Tow
6465	71x	289	0.1	50	----	----	25,158,816	Tow
6466	72x	289	0.1	50	----	----	52,054,868	Tow
6467	73x	289	0.1	50	----	----	42,239,581	Tow

MATERIAL D155-VF61

Lay-up = D155 Tow impregnated with CoRezyn 63-AX-051 polyester resin. Average V_F =0.614, S.D. = 0.015, min = 0.616, max = 0.637.

6468	7501	1188	*	13	----	----	1	Tow
6469	7503	1213	*	13	----	----	1	Tow
6470	7505	1116	*	13	----	----	1	Tow
6471	7507	1216	*	13	----	----	1	Tow
6472	7508	1201	*	13	----	----	1	Tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6473	7509	1122	*	13	----	----	1	Tow
6474	7510	667	0.1	5	----	----	11,306	Tow
6475	7511	667	0.1	5	----	----	5,044	Tow
6476	7513	667	0.1	5	----	----	5,914	Tow
6477	7514	667	0.1	5	----	----	6,952	Tow
6478	7515	667	0.1	5	----	----	8,436	Tow
6479	7516	534	0.1	10	----	----	174,587	Tow
6480	7519	534	0.1	10	----	----	98,826	Tow
6481	7521	534	0.1	10	----	----	116,190	Tow
6482	7522	534	0.1	10	----	----	51,571	Tow
6483	7523	534	0.1	10	----	----	37,775	Tow
6484	7524	445	0.1	15	----	----	266,352	Tow
6485	7525	445	0.1	15	----	----	874,815	Tow
6486	7526	445	0.1	15	----	----	342,830	Tow
6487	7529	445	0.1	15	----	----	366,220	Tow
6488	7530	445	0.1	15	----	----	440,352	Tow
6489	7531	289	0.1	30	----	----	19,145,514	Tow
6490	7532	289	0.1	30	----	----	23,049,604	Tow
6491	7533	289	0.1	30	----	----	12,041,322	Tow
6492	7534	289	0.1	30	----	----	38,545,410	Tow
6493	7537	356	0.1	20	----	----	4,198,555	Tow
6494	7538	356	0.1	20	----	----	7,886,207	Tow
6495	7541	356	0.1	20	----	----	6,958,772	Tow
6496	7590	778	0.1	1	----	----	347	Tow
6497	7579	778	0.1	1	----	----	512	Tow
6498	7577	778	0.1	1	----	----	531	Tow
6499	7576	778	0.1	1	----	----	497	Tow
6500	7575	778	0.1	1	----	----	405	Tow

MATERIAL D155-VF66

Lay-up = D155 Tow impregnated with CoRezyn 63-AX-051 polyester resin. Average V_F =0.663, S.D. = 0.006, min = 0.639, max = 0.705.

6501	7025	1171	*	13	----	----	1	Tow
6502	7065	1197	*	13	----	----	1	Tow
6503	7095	1171	*	13	----	----	1	Tow
6504	7155	1179	*	13	----	----	1	Tow
6505	7174	1289	*	13	----	----	1	Tow
6506	7194	1210	*	13	----	----	1	Tow
6507	7204	1276	*	13	----	----	1	Tow
6508	7005	667	0.1	5	----	----	11,970	Tow
6509	7015	667	0.1	5	----	----	6,654	Tow
6510	7035	667	0.1	5	----	----	4,798	Tow
6511	7045	667	0.1	5	----	----	3,789	Tow
6512	7055	667	0.1	5	----	----	14,218	Tow
6513	7075	534	0.1	10	----	----	87,147	Tow
6514	7085	534	0.1	10	----	----	21,667	Tow
6515	7105	534	0.1	10	----	----	13,688	Tow
6516	7115	534	0.1	10	----	----	77,953	Tow

TEST & SAMPLE ID #		MAX. Load N	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6517	7125	534	0.1	10	----	----	49,829	Tow
6518	7135	445	0.1	10	----	----	109,805	Tow
6519	7145	445	0.1	10	----	----	46,681	Tow
6520	7165	445	0.1	10	----	----	169,231	Tow
6521	7184	445	0.1	10	----	----	676,855	Tow
6522	7214	445	0.1	10	----	----	63,406	Tow
6523	7265	356	0.1	15	----	----	1,002,081	Tow
6524	7285	356	0.1	15	----	----	1,380,127	Tow
6525	7295	356	0.1	15	----	----	1,747,378	Tow
6526	7305	356	0.1	15	----	----	2,464,214	Tow
6527	7315	356	0.1	15	----	----	1,244,966	Tow
6528	7325	289	0.1	25	----	----	21,453,280	Tow
6529	7345	289	0.1	25	----	----	15,997,106	Tow
6530	7355	289	0.1	25	----	----	10,738,800	Tow
6531	7365	289	0.1	25	----	----	6,269,025	Tow
6532	7375	289	0.1	25	----	----	16,818,682	Tow
6533	7224	245	0.1	40	----	----	163,451,124	Tow
6534	7244	245	0.1	40	----	----	92,509,644	Tow
6535	7254	245	0.1	40	----	----	13,752,070	Tow
6536	7001	890	0.1	1	----	----	18	Tow
6537	7002	890	0.1	1	----	----	12	Tow
6538	7003	890	0.1	1	----	----	17	Tow
6539	7004	778	0.1	1	----	----	347	Tow
6540	7005	778	0.1	1	----	----	254	Tow
6541	7006	778	0.1	1	----	----	304	Tow
6542	7007	245	0.1	40	----	----	8,785,729	Tow
6543	7008	245	0.1	40	----	----	15,879,432	Tow
6544	7511	245	0.1	40	----	----	40,284,284	Tow
6545	7512	245	0.1	40	----	----	70,326,223	Tow

RESIDUAL STRENGTH

(Covering test numbered 5150 - 5234)

MATERIAL DD16A

Lay-up = $[90/0/\pm45/0]_S$, V_F = 0.389, Ave. thickness = 3.95 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Tests 5150 - 5188 were baseline static strength and fatigue tests								
5150	R59	661	*	13	----	----	1	8
5151	R27	658	*	13	----	----	1	8
5152	R26	657	*	13	----	----	1	8
5153	R16	701	*	13	----	----	1	8
5154	R102	685	*	13	----	----	1	8
5155	R61	686	*	13	----	----	1	8
5156	R120	658	*	13	----	----	1	8
5157	R121	678	*	13	----	----	1	8
5158	R122	683	*	13	----	----	1	8
5159	R123	691	*	13	----	----	1	8
5160	R124	625	*	13	----	----	1	8
5161	R125	675	*	13	----	----	1	8
5162	R42	684	*	13	----	----	1	8
5163	R74	673	*	13	----	----	1	8
5164	R56	705	*	13	----	----	1	8
5165	R71	674	*	13	----	----	1	8
5166	R110	664	*	13	----	----	1	8
5167	R111	665	*	13	----	----	1	8
5168	R21	665	*	13	----	----	1	8
5169	R11	680	*	13	----	----	1	8
5170	R35	207	0.1	10	----	----	192,780	8
5171	R58	207	0.1	10	----	----	636,742	8 R
5172	R22	207	0.1	10	----	----	1,694,879	8
5173	R57	207	0.1	10	----	----	961,214	8
5174	R44	276	0.1	6	----	----	38,152	8
5175	R23	241	0.1	8	----	----	104,645	8
5176	R13	241	0.1	8	----	----	256,923	8
5177	R46	241	0.1	8	----	----	169,108	8
5178	R7	241	0.1	8	----	----	236,617	8
5179	R48	241	0.1	8	----	----	176,479	8
5180	R50	241	0.1	8	----	----	149,778	8
5181	R43	241	0.1	8	----	----	325,439	8
5182	R41	241	0.1	8	----	----	78,445	8
5183	R64	241	0.1	8	----	----	52,320	8
5184	R68	241	0.1	8	----	----	67857	8
5185	R77	241	0.1	8	----	----	116,518	8
5186	R52	241	0.1	8	----	----	157,118	8
5187	R78	241	0.1	8	----	----	382,653	8
5188	R62	241	0.1	8	----	----	105,738	8

Test coupons were selected for three testing sequences: 50,000, 100,000 and 200,000 cycles at a maximum stress of 241 MPa (R = 0.1), after which the test coupon was statically tested for residual strength. Test coupons which failed prior to the completion of the designated number of cycles are listed, but should not be used in the baseline fatigue behavior due to sample biasing.

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Tests 5189 - 5205, 100,000 cycles at 241 MPa, R=0.1								
Tests 5189 - 5193 failed prior to completion of the 100,000 cycle sequence								
5189	R3	241	0.1	8	----	----	94,718	8 X
5190	R65	241	0.1	8	----	----	88,082	8 X
5191	R60	241	0.1	8	----	----	83,962	8 X
5192	R8	241	0.1	8	----	----	82,768	8 X
5193	R38	241	0.1	8	----	----	66,757	8 X
Tests 5194 - 5205 were cycled for 100,000 cycles at 241/24 MPa and then tested for residual strength								
5194	R5	241	0.1	8	----	----	100,000	8
	R5	602	*	13	----	----	1	8 RS
5195	R34	241	0.1	8	----	----	100,000	8
	R34	543	*	13	----	----	1	8 RS
5196	R101	241	0.1	8	----	----	100,000	8
	R101	583	*	13	----	----	1	8 RS
5197	R63	241	0.1	8	----	----	100,000	8
	R63	423	*	13	----	----	1	8 RS
5198	R29	241	0.1	8	----	----	100,000	8
	R29	482	*	13	----	----	1	8 RS
5199	R19	241	0.1	8	----	----	100,000	8
	R19	623	*	13	----	----	1	8 RS
5200	R6	241	0.1	8	----	----	100,000	8
	R6	563	*	13	----	----	1	8 RS
5201	R24	241	0.1	8	----	----	100,000	8
	R24	314	*	13	----	----	1	8 RS
5202	R39	241	0.1	8	----	----	100,000	8
	R39	571	*	13	----	----	1	8 RS
5203	R72	241	0.1	8	----	----	100,000	8
	R72	454	*	13	----	----	1	8 RS
5204	R45	241	0.1	8	----	----	100,000	8
	R45	480	*	13	----	----	1	8 RS
5205	R54	241	0.1	8	----	----	100,000	8
	R54	270	*	13	----	----	1	8 RS
Tests 5206 - 5217, 50,000 cycles								
5206	R12	241	0.1	8	----	----	50,000	8
	R12	485	*	13	----	----	1	8 RS
5207	R10	241	0.1	8	----	----	50,000	8
	R10	554	*	13	----	----	1	8 RS
5208	R20	241	0.1	8	----	----	50,000	8
	R20	628	*	13	----	----	1	8 RS
5209	R31	241	0.1	8	----	----	50,000	8
	R31	583	*	13	----	----	1	8 RS
5210	R67	241	0.1	8	----	----	50,000	8
	R67	427	*	13	----	----	1	8 RS

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5211	R53	241	0.1	8	----	----	50,000	8
	R53	540	*	13	----	----	1	8 RS
5212	R28	241	0.1	8	----	----	50,000	8
	R28	568	*	13	----	----	1	8 RS
5213	R32	241	0.1	8	----	----	50,000	8
	R32	583	*	13	----	----	1	8 RS
5214	R37	241	0.1	8	----	----	50,000	8
	R37	582	*	13	----	----	1	8 RS
5215	R66	241	0.1	8	----	----	50,000	8
	R66	566	*	13	----	----	1	8 RS
5216	R117	241	0.1	8	----	----	50,000	8
	R117	529	*	13	----	----	1	8 RS
5217	R79	241	0.1	8	----	----	50,000	8
	R79	568	*	13	----	----	1	8 RS
Tests 5218 - 5234, 200,000 cycles								
Tests 5218 - 5228 failed prior to completion of the 200,000 cycle sequence								
5218	R17	241	0.1	8	----	----	162,465	8 X
5219	R47	241	0.1	8	----	----	47,182	8 X
5220	R25	241	0.1	8	----	----	177,640	8 X
5221	R55	241	0.1	8	----	----	93,300	8 X
5222	R9	241	0.1	8	----	----	84,703	8 X
5223	R36	241	0.1	8	----	----	168,069	8 X
5224	R15	241	0.1	8	----	----	93,877	8 X
5225	R75	241	0.1	8	----	----	113,114	8 X
5226	R40	241	0.1	8	----	----	60,592	8 X
5227	R70	241	0.1	8	----	----	103,240	8 X
5228	R18	241	0.1	8	----	----	133,677	8 X
Tests 5229 - 5234 were cycled for 200,000 cycles at 241/24 MPa and then tested for residual strength								
5229	R51	241	0.1	8	----	----	200,000	8
	R51	249	*	13	----	----	1	8 RS
5230	R4	241	0.1	8	----	----	200,000	8
	R4	464	*	13	----	----	1	8 RS
5231	R73	241	0.1	8	----	----	200,000	8
	R73	269	*	13	----	----	1	8 RS
5232	R14	241	0.1	8	----	----	200,000	8
	R14	541	*	13	----	----	1	8 RS
5233	R33	241	0.1	8	----	----	200,000	8
	R33	298	*	13	----	----	1	8 RS
5234	R69	241	0.1	8	----	----	200,000	8
	R69	337	*	13	----	----	1	8 RS

Environmental testing of different matrix materials in $[0/\pm45/0]_S$, $[90/\pm45/90]_S$, and $[\pm45]_3$ laminates.

Tests 5235 through 5714 involved static tests of five different matrix materials at different temperatures (25, 40, 55 and 70 °C) and different moisture contents. For composite moisture gain, the test coupons were placed in a distilled water bath at a temperature of 50 °C for 1,200 hours (433 hours for the Iso-Polyester). The temperature that the coupons were tested at is listed in the last data column. Moisture gain was calculated by weight percent. Materials used D155 0° and DB120 ±45° fabrics

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Lay-up = $[0/\pm45/0]_S$, V_F = 0.354, Ave. thickness = 3.16 mm, S.D. = 0.11 mm, CoRezyn 63-AX-051 Polyester								
Tests 5235 - 5246 were dry control coupons (no moisture gain)								
5235	p-t-1	478	*	0.1	23.7	----	1	25 °C
5236	p-t-2	489	*	0.1	23.4	----	1	25 °C
5237	p-t-3	495	*	0.1	22.9	----	1	25 °C
5238	p-t-15	477	*	0.1	21.9	----	1	40 °C
5239	p-t-5	517	*	0.1	22.7	----	1	40 °C
5240	p-t-6	496	*	0.1	23.5	----	1	40 °C
5241	p-t-7	460	*	0.1	22.0	----	1	55 °C
5242	p-t-8	482	*	0.1	23.5	----	1	55 °C
5243	p-t-9	497	*	0.1	23.9	----	1	55 °C
5244	p-t-10	422	*	0.1	19.9	----	1	70 °C
5245	p-t-11	432	*	0.1	22.2	----	1	70 °C
5246	p-t-12	403	*	0.1	20.5	----	1	70 °C
Tests 5247 - 5258 had an average moisture gain of 0.92% (conditioned 1,200 hours in 50°C water (DI))								
5247	w-p-t-1	434	*	0.1	20.3	----	1	25 °C
5248	w-p-t-2	441	*	0.1	21.2	----	1	25 °C
5249	w-p-t-3	455	*	0.1	23.0	----	1	25 °C
5250	w-p-t-4	444	*	0.1	20.6	----	1	40 °C
5251	w-p-t-5	442	*	0.1	22.7	----	1	40 °C
5252	w-p-t-6	411	*	0.1	20.2	----	1	40 °C
5253	w-p-t-7	409	*	0.1	22.2	----	1	55 °C
5254	w-p-t-8	387	*	0.1	22.5	----	1	55 °C
5255	w-p-t-9	401	*	0.1	20.8	----	1	55 °C
5256	w-p-t-10	390	*	0.1	21.4	----	1	70 °C
5257	w-p-t-11	392	*	0.1	21.3	----	1	70 °C
5258	w-p-t-12	383	*	0.1	21.1	----	1	70 °C
Tests 5259 - 5270 were dry control coupons (no moisture gain)								
5259	p-c-1	-604	*	13	----	----	1	25 °C
5260	p-c-2	-634	*	13	----	----	1	25 °C
5261	p-c-3	-641	*	13	----	----	1	25 °C
5262	p-c-4	-522	*	13	----	----	1	40 °C
5263	p-c-5	-591	*	13	----	----	1	40 °C
5264	p-c-6	-580	*	13	----	----	1	40 °C
5265	p-c-7	-455	*	13	----	----	1	55 °C
5266	p-c-8	-480	*	13	----	----	1	55 °C
5267	p-c-9	-437	*	13	----	----	1	55 °C
5268	p-c-10	-348	*	13	----	----	1	70 °C
5269	p-c-11	-388	*	13	----	----	1	70 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5270	p-c-12	-405	*	13	----	----	1	70 °C
Tests 5271 - 5282 had an average moisture gain of 0.87% (conditioned 1,200 hours in 50 °C water (DI))								
5271	w-p-c-1	-327	*	13	----	----	1	25 °C
5272	w-p-c-2	-341	*	13	----	----	1	25 °C
5273	w-p-c-3	-334	*	13	----	----	1	25 °C
5274	w-p-c-4	-306	*	13	----	----	1	40 °C
5275	w-p-c-5	-307	*	13	----	----	1	40 °C
5276	w-p-c-6	-317	*	13	----	----	1	40 °C
5277	w-p-c-10	-266	*	13	----	----	1	55 °C
5278	w-p-c-11	-277	*	13	----	----	1	55 °C
5279	w-p-c-12	-268	*	13	----	----	1	55 °C
5280	w-p-c-7	-240	*	13	----	----	1	70 °C
5281	w-p-c-8	-243	*	13	----	----	1	70 °C
5282	w-p-c-9	-243	*	13	----	----	1	70 °C
Lay-up = $[90/\pm45/90]_S$, V_F = 0.354, Ave. thickness = 3.15 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester								
Tests 5283 - 5294 were dry control coupons (no moisture gain)								
5283	p-tt-1	78.7	*	0.1	8.9	----	1	25 °C
5284	p-tt-2	75.0	*	0.1	9.6	----	1	25 °C
5285	p-tt-3	68.5	*	0.1	9.3	----	1	25 °C
5715	1T01	68.2	*	0.1	10.7	2.26	1	25 °C
5716	1T02	75.2	*	0.1	10.5	3.14	1	25 °C
5717	1T03	77.8	*	0.1	10.1	3.51	1	25 °C
5286	p-tt-4	86.0	*	0.1	8.3	----	1	40 °C
5287	p-tt-5	84.7	*	0.1	8.8	----	1	40 °C
5288	p-tt-6	85.1	*	0.1	8.3	----	1	40 °C
5289	p-tt-7	84.1	*	0.1	6.1	----	1	55 °C
5290	p-tt-8	84.0	*	0.1	6.0	----	1	55 °C
5291	p-tt-9	81.1	*	0.1	6.3	----	1	55 °C
5292	p-tt-10	70.8	*	0.1	4.7	----	1	70 °C
5293	p-tt-11	72.3	*	0.1	5.3	----	1	70 °C
5294	p-tt-12	70.6	*	0.1	3.8	----	1	70 °C
Tests 5295 - 5306 had an average moisture gain of 0.92% (conditioned 1,200 hours in 50 °C water (DI))								
5295	w-p-tt-1	56.4	*	0.1	7.3	----	1	25 °C
5296	w-p-tt-2	55.8	*	0.1	7.1	----	1	25 °C
5297	w-p-tt-3	56.3	*	0.1	7.0	----	1	25 °C
5839	1t04	77.2	*	0.1	8.94	2.95	1	25 °C
5840	1t05	71.9	*	0.1	8.68	2.78	1	25 °C
5841	1t06	75.8	*	0.1	9.02	2.79	1	25 °C
5298	w-p-tt-4	59.2	*	0.1	6.1	----	1	40 °C
5299	w-p-tt-5	58.5	*	0.1	6.2	----	1	40 °C
5300	w-p-tt-6	59.2	*	0.1	5.8	----	1	40 °C
5301	w-p-tt-7	53.1	*	0.1	5.4	----	1	55 °C
5302	w-p-tt-8	54.2	*	0.1	5.4	----	1	55 °C
5303	w-p-tt-9	53.8	*	0.1	5.4	----	1	55 °C
5304	w-p-tt-10	47.2	*	0.1	3.8	----	1	70 °C
5305	w-p-tt-11	48.5	*	0.1	3.7	----	1	70 °C
5306	w-p-tt-12	50.9	*	0.1	3.4	----	1	70 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Lay-up = $[\pm45]_3$, V_F = 0.279, Ave. thickness = 3.12 mm, S.D. = 0.08 mm, CoRezyn 63-AX-051 Polyester								
Tests 5307 - 5318 were dry control coupons (no moisture gain)								
5307	p-45t-1	111	*	0.1	10.2	----	1	25 °C
5308	p-45t-2	115	*	0.1	11.3	----	1	25 °C
5309	p-45t-3	111	*	0.1	11.3	----	1	25 °C
5310	p-45t-4	108	*	0.1	8.9	----	1	40 °C
5311	p-45t-5	105	*	0.1	10.1	----	1	40 °C
5312	p-45t-6	108	*	0.1	9.2	----	1	40 °C
5313	p-45t-7	91.5	*	0.1	7.6	----	1	55 °C
5314	p-45t-8	90.3	*	0.1	7.7	----	1	55 °C
5315	p-45t-9	88.9	*	0.1	7.3	----	1	55 °C
5316	p-45t-10	72.8	*	0.1	5.1	----	1	70 °C
5317	p-45t-11	72.4	*	0.1	4.9	----	1	70 °C
5318	p-45t-12	72.9	*	0.1	5.4	----	1	70 °C
Tests 5319 - 5330 had an average moisture gain of 0.86% (conditioned 1,200 hours in 50 °C water (DI))								
5319	w-p-45t-1	65.8	*	0.1	7.6	----	1	25 °C
5320	w-p-45t-2	69.4	*	0.1	7.7	----	1	25 °C
5321	w-p-45t-3	66.6	*	0.1	7.5	----	1	25 °C
5322	w-p-45t-4	68.5	*	0.1	6.1	----	1	40 °C
5323	w-p-45t-5	69.2	*	0.1	7.1	----	1	40 °C
5324	w-p-45t-6	64.6	*	0.1	6.2	----	1	40 °C
5325	w-p-45t-7	58.7	*	0.1	5.4	----	1	55 °C
5326	w-p-45t-8	59.6	*	0.1	5.1	----	1	55 °C
5327	w-p-45t-9	61.2	*	0.1	5.5	----	1	55 °C
5328	w-p-45t-10	43.5	*	0.1	3.0	----	1	70 °C
5329	w-p-45t-11	45.1	*	0.1	3.3	----	1	70 °C
5330	w-p-45t-12	46.2	*	0.1	3.0	----	1	70 °C
Lay-up = $[0/\pm45/0]_S$, V_F = 0.354, Ave. thickness = 3.16 mm, S.D. = 0.11 mm, Derakane 411C-50, vinyl ester								
Tests 5331 - 5342 were dry control coupons (no moisture gain)								
5331	411-t-1	599	*	0.1	27.0	----	1	25 °C
5332	411-t-2	525	*	0.1	25.6	----	1	25 °C
5333	411-t-3	621	*	0.1	25.9	----	1	25 °C
5334	411-t-4	546	*	0.1	24.6	----	1	40 °C
5335	411-t-5	518	*	0.1	25.4	----	1	40 °C
5336	411-t-6	595	*	0.1	25.2	----	1	40 °C
5337	411-t-7	546	*	0.1	25.6	----	1	55 °C
5338	411-t-8	558	*	0.1	25.4	----	1	55 °C
5339	411-t-9	562	*	0.1	24.5	----	1	55 °C
5340	411-t-10	463	*	0.1	30.0	----	1	70 °C
5341	411-t-11	538	*	0.1	27.9	----	1	70 °C
5342	411-t-12	502	*	0.1	23.2	----	1	70 °C
Tests 5343 - 5354 had an average moisture gain of 0.34% (conditioned 1,200 hours in 50 °C water (DI))								
5343	w-411-t-1	445	*	0.1	24.3	----	1	25 °C
5344	w-411-t-2	441	*	0.1	25.9	----	1	25 °C
5345	w-411-t-3	417	*	0.1	23.3	----	1	25 °C
5346	w-411-t-4	413	*	0.1	25.9	----	1	40 °C
5347	w-411-t-5	434	*	0.1	25.0	----	1	40 °C
5348	w-411-t-6	409	*	0.1	26.3	----	1	40 °C
5349	w-411-t-7	405	*	0.1	25.9	----	1	55 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5350	w-411-t-8	384	*	0.1	25.1	----	1	55 °C
5351	w-411-t-9	383	*	0.1	23.9	----	1	55 °C
5352	w-411-t-10	378	*	0.1	25.5	----	1	70 °C
5353	w-411-t-11	381	*	0.1	26.4	----	1	70 °C
5354	w-411-t-12	380	*	0.1	24.1	----	1	70 °C
Tests 5355 - 5366 were dry control coupons (no moisture gain)								
5355	411-c-1	-555	*	13	----	----	1	25 °C
5356	411-c-2	-509	*	13	----	----	1	25 °C
5357	411-c-3	-594	*	13	----	----	1	25 °C
5358	411-c-4	-505	*	13	----	----	1	40 °C
5359	411-c-5	-513	*	13	----	----	1	40 °C
5360	411-c-6	-504	*	13	----	----	1	40 °C
5361	411-c-7	-438	*	13	----	----	1	55 °C
5362	411-c-8	-447	*	13	----	----	1	55 °C
5363	411-c-9	-492	*	13	----	----	1	55 °C
5364	411-c-10	-445	*	13	----	----	1	70 °C
5365	411-c-11	-453	*	13	----	----	1	70 °C
5366	411-c-12	-447	*	13	----	----	1	70 °C
Tests 5367 - 5378 had an average moisture gain of 0.32% (conditioned 1,200 hours in 50 °C water (DI))								
5367	w-411-c-1	-519	*	13	----	----	1	25 °C
5368	w-411-c-2	-536	*	13	----	----	1	25 °C
5369	w-411-c-3	-508	*	13	----	----	1	25 °C
5370	w-411-c-4	-522	*	13	----	----	1	40 °C
5371	w-411-c-5	-514	*	13	----	----	1	40 °C
5372	w-411-c-6	-505	*	13	----	----	1	40 °C
5373	w-411-c-10	-516	*	13	----	----	1	55 °C
5374	w-411-c-11	-477	*	13	----	----	1	55 °C
5375	w-411-c-12	-486	*	13	----	----	1	55 °C
5376	w-411-c-7	-455	*	13	----	----	1	70 °C
5377	w-411-c-8	-475	*	13	----	----	1	70 °C
5378	w-411-c-9	-494	*	13	----	----	1	70 °C
Lay-up = $[90/\pm45/90]_S$, V_F = 0.354, Ave. thickness = 3.15 mm, S.D. = 0.10 mm, Derakane 411C-50								
Tests 5379 - 5390, 5718 - 7520 were dry control coupons (no moisture gain)								
5379	411-tt-1	56.9	*	0.1	11.1	----	1	25 °C
5380	411-tt-2	56.2	*	0.1	11.7	----	1	25 °C
5381	411-tt-3	54.8	*	0.1	12.4	----	1	25 °C
5382	411-tt-4	61.5	*	0.1	10.9	----	1	40 °C
5383	411-tt-5	62.3	*	0.1	10.3	----	1	40 °C
5384	411-tt-6	63.3	*	0.1	10.8	----	1	40 °C
5385	411-tt-7	63.2	*	0.1	6.9	----	1	55 °C
5386	411-tt-8	61.5	*	0.1	7.1	----	1	55 °C
5387	411-tt-9	61.5	*	0.1	7.3	----	1	55 °C
5388	411-tt-10	60.4	*	0.1	6.6	----	1	70 °C
5389	411-tt-11	52.6	*	0.1	6.0	----	1	70 °C
5390	411-tt-12	56.4	*	0.1	6.4	----	1	70 °C
5718	ts4111	57.6	*	0.1	9.3	4.39	1	25 °C
5719	ts4112	54.8	*	0.1	9.2	4.92	1	25 °C
5720	ts4113	56.6	*	0.1	9.5	4.01	1	25 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Tests 5391 - 5402 had an average moisture gain of 0.34% (conditioned 1,200 hours in 50°C water (DI))								
5391	w-411-tt-1	51.1	*	0.1	8.6	----	1	25 °C
5392	w-411-tt-2	51.4	*	0.1	8.2	----	1	25 °C
5393	w-411-tt-3	50.9	*	0.1	8.5	----	1	25 °C
5394	w-411-tt-4	56	*	0.1	8.5	----	1	40 °C
5395	w-411-tt-5	55.5	*	0.1	8.2	----	1	40 °C
5396	w-411-tt-6	50.9	*	0.1	8.4	----	1	40 °C
5397	w-411-tt-7	48.4	*	0.1	8.1	----	1	55 °C
5398	w-411-tt-8	52.1	*	0.1	7.9	----	1	55 °C
5399	w-411-tt-9	52.1	*	0.1	8.2	----	1	55 °C
5400	w-411-tt-10	52.6	*	0.1	7.3	----	1	70 °C
5401	w-411-tt-11	52	*	0.1	7.5	----	1	70 °C
5402	w-411-tt-12	50.1	*	0.1	7.2	----	1	70 °C
Lay-up = $[\pm 45]_3$, V_F = 0.279, Ave. thickness = 3.12 mm, S.D. = 0.08 mm, Derakane 411C-50 vinyl ester								
Tests 5403 - 5414 were dry control coupons (no moisture gain)								
5403	411-45t-1	140	*	0.1	11.0	----	1	25 °C
5404	411-45t-2	133	*	0.1	10.8	----	1	25 °C
5405	411-45t-3	130	*	0.1	10.9	----	1	25 °C
5406	411-45t-4	121	*	0.1	10.5	----	1	40 °C
5407	411-45t-5	121	*	0.1	10.6	----	1	40 °C
5408	411-45t-6	123	*	0.1	9.8	----	1	40 °C
5409	411-45t-7	112	*	0.1	9.8	----	1	55 °C
5410	411-45t-8	116	*	0.1	9.6	----	1	55 °C
5411	411-45t-9	117	*	0.1	10	----	1	55 °C
5412	411-45t-10	103	*	0.1	9.7	----	1	70 °C
5413	411-45t-11	100	*	0.1	8.5	----	1	70 °C
5414	411-45t-12	100	*	0.1	8.9	----	1	70 °C
Tests 5415 - 5426 had an average moisture gain of 0.24% (conditioned 1,200 hours in 50°C water (DI))								
5415	w-411-45t-1	135	*	0.1	11.4	----	1	25 °C
5416	w-411-45t-2	135	*	0.1	11.4	----	1	25 °C
5417	w-411-45t-3	133	*	0.1	10.2	----	1	25 °C
5418	w-411-45t-4	129	*	0.1	----	----	1	40 °C
5419	w-411-45t-5	125	*	0.1	9.7	----	1	40 °C
5420	w-411-45t-6	127	*	0.1	9.5	----	1	40 °C
5421	w-411-45t-7	110	*	0.1	9.0	----	1	55 °C
5422	w-411-45t-8	119	*	0.1	9.2	----	1	55 °C
5423	w-411-45t-9	121	*	0.1	10.3	----	1	55 °C
5424	w-411-45t-10	110	*	0.1	9.2	----	1	70 °C
5425	w-411-45t-11	112	*	0.1	9.2	----	1	70 °C
5426	w-411-45t-12	112	*	0.1	9.3	----	1	70 °C
Lay-up = $[0/\pm 45/0]_S$, V_F = 0.354, Ave. thickness = 3.16 mm, S.D. = 0.11 mm, SC-14 Epoxy								
Tests 5427 - 5438 were dry control coupons (no moisture gain)								
5427	sc14-t-1	696	*	0.1	26.6	----	1	25 °C
5428	sc14-t-2	727	*	0.1	28.0	----	1	25 °C
5429	sc14-t-3	648	*	0.1	24.6	----	1	25 °C
5430	sc14-t-4	561	*	0.1	25.1	----	1	40 °C
5431	sc14-t-5	603	*	0.1	25.3	----	1	40 °C
5432	sc14-t-6	572	*	0.1	25.8	----	1	40 °C
5433	sc14-t-7	584	*	0.1	24.2	----	1	55 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5434	sc14-t-8	548	*	0.1	27.0	----	1	55 °C
5435	sc14-t-9	578	*	0.1	23.5	----	1	55 °C
5436	sc14-t-10	570	*	0.1	23.5	----	1	70 °C
5437	sc14-t-11	569	*	0.1	23.4	----	1	70 °C
5438	sc14-t-12	595	*	0.1	24.8	----	1	70 °C
Tests 5439 - 5450 had an average moisture gain of 1.34% (conditioned 1,200 hours in 50°C water (DI))								
5439	w-sc14-t-1	569	*	0.1	25.0	----	1	25 °C
5440	w-sc14-t-2	437	*	0.1	23.9	----	1	25 °C
5441	w-sc14-t-3	454	*	0.1	24.3	----	1	25 °C
5442	w-sc14-t-4	426	*	0.1	23.6	----	1	40 °C
5443	w-sc14-t-5	428	*	0.1	25.4	----	1	40 °C
5444	w-sc14-t-6	434	*	0.1	23.3	----	1	40 °C
5445	w-sc14-t-7	396	*	0.1	23.5	----	1	55 °C
5446	w-sc14-t-8	404	*	0.1	25.5	----	1	55 °C
5447	w-sc14-t-9	408	*	0.1	23.8	----	1	55 °C
5448	w-sc14-t-10	362	*	0.1	22.1	----	1	70 °C
5449	w-sc14-t-11	351	*	0.1	21.8	----	1	70 °C
5450	w-sc14-t-12	357	*	0.1	23.1	----	1	70 °C
Tests 5451 - 5462 were dry control coupons (no moisture gain)								
5451	sc14-c-1	-563	*	13	----	----	1	25 °C
5452	sc14-c-2	-508	*	13	----	----	1	25 °C
5453	sc14-c-3	-532	*	13	----	----	1	25 °C
5454	sc14-c-4	-511	*	13	----	----	1	40 °C
5455	sc14-c-5	-555	*	13	----	----	1	40 °C
5456	sc14-c-6	-537	*	13	----	----	1	40 °C
5457	sc14-c-7	-492	*	13	----	----	1	55 °C
5458	sc14-c-8	-464	*	13	----	----	1	55 °C
5459	sc14-c-9	-480	*	13	----	----	1	55 °C
5460	sc14-c-10	-414	*	13	----	----	1	70 °C
5461	sc14-c-11	-406	*	13	----	----	1	70 °C
5462	sc14-c-12	-424	*	13	----	----	1	70 °C
Tests 5463 - 5474 had an average moisture gain of 1.41% (conditioned 1,200 hours in 50 °C water (DI))								
5463	w-sc14-c-1	-454	*	13	----	----	1	25 °C
5464	w-sc14-c-2	-456	*	13	----	----	1	25 °C
5465	w-sc14-c-3	-462	*	13	----	----	1	25 °C
5466	w-sc14-c-4	-428	*	13	----	----	1	40 °C
5467	w-sc14-c-5	-334	*	13	----	----	1	40 °C
5468	w-sc14-c-6	-412	*	13	----	----	1	40 °C
5469	w-sc14-c-10	-318	*	13	----	----	1	55 °C
5470	w-sc14-c-11	-371	*	13	----	----	1	55 °C
5471	w-sc14-c-12	-368	*	13	----	----	1	55 °C
5472	w-sc14-c-7	-375	*	13	----	----	1	70 °C
5473	w-sc14-c-8	-293	*	13	----	----	1	70 °C
5474	w-sc14-c-9	-349	*	13	----	----	1	70 °C
Lay-up = $[90/\pm45/90]_S$, V_F = 0.355, Ave. thickness = 3.15 mm, S.D. = 0.10 mm, SC-14 Epoxy								
Tests 5475 - 5486, 5721 - 5723 were dry control coupons (no moisture gain)								
5475	sc14-tt-14	86.6	*	0.1	9.1	----	1	25 °C
5476	sc14-tt-2	92.4	*	0.1	9.5	----	1	25 °C
5477	sc14-tt-3	91.8	*	0.1	8.8	----	1	25 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5478	sc14-tt-4	97	*	0.1	8.7	----	1	40 °C
5479	sc14-tt-5	89.7	*	0.1	8.4	----	1	40 °C
5480	sc14-tt-6	92.1	*	0.1	8.2	----	1	40 °C
5481	sc14-tt-7	93.4	*	0.1	7.9	----	1	55 °C
5482	sc14-t-8	93.1	*	0.1	7.6	----	1	55 °C
5483	sc14-t-9	88.3	*	0.1	7.7	----	1	55 °C
5484	sc14-tt-10	100	*	0.1	7.6	----	1	70 °C
5485	sc14-tt-11	93.4	*	0.1	7.4	----	1	70 °C
5486	sc14-tt-12	90.1	*	0.1	7.6	----	1	70 °C
5721	tsc141	109	*	0.1	9.4	3.21	1	25 °C
5722	tsc142	121	*	0.1	9.5	4.73	1	25 °C
5723	tsc143	104	*	0.1	9.4	3.45	1	25 °C
Tests 5487 - 5498 had an average moisture gain of 1.34% (conditioned 1,200 hours in 50 °C water (DI))								
5487	w-sc14-tt-1	76.2	*	0.1	8.6	----	1	25 °C
5488	w-sc14-tt-2	70.1	*	0.1	8.2	----	1	25 °C
5489	w-sc14-tt-3	69.9	*	0.1	7.8	----	1	25 °C
5490	w-sc14-tt-4	73.9	*	0.1	7.5	----	1	40 °C
5491	w-sc14-tt-5	68.3	*	0.1	7.1	----	1	40 °C
5492	w-sc14-tt-6	76.9	*	0.1	7.1	----	1	40 °C
5493	w-sc14-tt-7	68.1	*	0.1	6.3	----	1	55 °C
5494	w-sc14-tt-8	66.1	*	0.1	6.8	----	1	55 °C
5495	w-sc14-tt-9	71.1	*	0.1	6.3	----	1	55 °C
5496	w-sc14-tt-10	66.8	*	0.1	5.2	----	1	70 °C
5497	w-sc14-tt-11	67.3	*	0.1	5.1	----	1	70 °C
5498	w-sc14-tt-12	70.4	*	0.1	5.5	----	1	70 °C
Lay-up = $[\pm 45]_3$, V_F = 0.280, Ave. thickness = 3.12 mm, S.D. = 0.08 mm, SC-14 Epoxy								
Tests 5499 - 5510 were dry control coupons (no moisture gain)								
5499	sc14-45t-1	92	*	0.1	9.6	----	1	25 °C
5500	sc14-45t-2	87.6	*	0.1	9.2	----	1	25 °C
5501	sc14-45t-3	92.7	*	0.1	8.8	----	1	25 °C
5502	sc14-45t-4	85.9	*	0.1	8.6	----	1	40 °C
5503	sc14-45t-5	84	*	0.1	7.4	----	1	40 °C
5504	sc14-45t-6	85.1	*	0.1	7.7	----	1	40 °C
5505	sc14-45t-7	75.7	*	0.1	6.4	----	1	55 °C
5506	sc14-45t-8	79.9	*	0.1	7.1	----	1	55 °C
5507	sc14-45t-9	74.7	*	0.1	6.9	----	1	55 °C
5508	sc14-45t-10	64.2	*	0.1	6.4	----	1	70 °C
5509	sc14-45t-11	73.6	*	0.1	6.7	----	1	70 °C
5510	sc14-45t-12	64.9	*	0.1	5.7	----	1	70 °C
Tests 5511 - 5522 had an average moisture gain of 1.24% (conditioned 1,200 hours in 50 °C water (DI))								
5511	w-sc1445t1	93.1	*	0.1	8.1	----	1	25 °C
5512	w-sc1445t2	81.4	*	0.1	7.8	----	1	25 °C
5513	w-sc1445t3	89	*	0.1	8.2	----	1	25 °C
5514	w-sc1445t4	84	*	0.1	7.2	----	1	40 °C
5515	w-sc1445t5	73.7	*	0.1	6.8	----	1	40 °C
5516	w-sc1445t6	75.4	*	0.1	6.5	----	1	40 °C
5517	w-sc1445t7	66.4	*	0.1	6.1	----	1	55 °C
5518	w-sc1445t8	67.6	*	0.1	6.0	----	1	55 °C
5519	w-sc1445t9	65	*	0.1	5.7	----	1	55 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5520	w-sc1445t10	55	*	0.1	4.0	----	1	70 °C
5521	w-sc1445t11	51.9	*	0.1	3.8	----	1	70 °C
5522	w-sc1445t12	49.5	*	0.1	3.5	----	1	70 °C
Lay-up = $[0/\pm45/0]_S$, V_F = 0.354, Ave. thickness = 3.16 mm, S.D. = 0.11 mm, Derakane 8084 vinyl ester								
Tests 5523 - 5534 were dry control coupons (no moisture gain)								
5523	8084-t-1	698	*	0.1	24.9	----	1	25 °C
5524	8084-t-2	684	*	0.1	25.1	----	1	25 °C
5525	8084-t-3	539	*	0.1	23.9	----	1	25 °C
5526	8084-t-4	480	*	0.1	22.9	----	1	40 °C
5527	8084-t-5	471	*	0.1	24.0	----	1	40 °C
5528	8084-t-6	550	*	0.1	24.4	----	1	40 °C
5529	8084-t-7	532	*	0.1	24.4	----	1	55 °C
5530	8084-t-8	656	*	0.1	23.6	----	1	55 °C
5531	8084-t-9	588	*	0.1	24.1	----	1	55 °C
5532	8084-t-10	556	*	0.1	23.5	----	1	70 °C
5533	8084-t-11	536	*	0.1	22.5	----	1	70 °C
5534	8084-t-12	550	*	0.1	22.3	----	1	70 °C
Tests 5535 - 5546 had an average moisture gain of 0.44% (conditioned 1,200 hours in 50 °C water (DI))								
5535	w-8084-t-1	461	*	0.1	25.6	----	1	25 °C
5536	w-8084-t-2	463	*	0.1	25.1	----	1	25 °C
5537	w-8084-t-3	472	*	0.1	24.3	----	1	25 °C
5538	w-8084-t-4	443	*	0.1	24.6	----	1	40 °C
5539	w-8084-t-5	435	*	0.1	23.6	----	1	40 °C
5540	w-8084-t-6	436	*	0.1	24.8	----	1	40 °C
5541	w-8084-t-7	423	*	0.1	23.9	----	1	55 °C
5542	w-8084-t-8	419	*	0.1	24.9	----	1	55 °C
5543	w-8084-t-9	413	*	0.1	26.2	----	1	55 °C
5544	w-8084-t-10	379	*	0.1	23.8	----	1	70 °C
5545	w-8084-t-11	397	*	0.1	24.2	----	1	70 °C
5546	w-8084-t-12	393	*	0.1	24.4	----	1	70 °C
Tests 5547 - 5558 were dry control coupons (no moisture gain)								
5547	8084-c-1	-600	*	13	----	----	1	25 °C
5548	8084-c-2	-569	*	13	----	----	1	25 °C
5549	8084-c-3	-611	*	13	----	----	1	25 °C
5550	8084-c-4	-494	*	13	----	----	1	40 °C
5551	8084-c-5	-478	*	13	----	----	1	40 °C
5552	8084-c-6	-470	*	13	----	----	1	40 °C
5553	8084-c-7	-464	*	13	----	----	1	55 °C
5554	8084-c-8	-444	*	13	----	----	1	55 °C
5555	8084-c-9	-455	*	13	----	----	1	55 °C
5556	8084-c-10	-445	*	13	----	----	1	70 °C
5557	8084-c-11	-444	*	13	----	----	1	70 °C
5558	8084-c-12	-449	*	13	----	----	1	70 °C
Tests 5559 - 5570 had an average moisture gain of 0.42% (conditioned 1,200 hours in 50 °C water (DI))								
5559	w-8084-c-1	-521	*	13	----	----	1	25 °C
5560	w-8084-c-2	-492	*	13	----	----	1	25 °C
5561	w-8084-c-3	-513	*	13	----	----	1	25 °C
5562	w-8084-c-4	-487	*	13	----	----	1	40 °C
5563	w-8084-c-5	-502	*	13	----	----	1	40 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5564	w-8084-c-6	-450	*	13	----	----	1	40 °C
5565	w-8084-c-10	-431	*	13	----	----	1	55 °C
5566	w-8084-c-11	-466	*	13	----	----	1	55 °C
5567	w-8084-c-12	-465	*	13	----	----	1	55 °C
5568	w-8084-c-7	-414	*	13	----	----	1	70 °C
5569	w-8084-c-8	-435	*	13	----	----	1	70 °C
5570	w-8084-c-9	-388	*	13	----	----	1	70 °C
Lay-up = $[90/\pm45/90]_S$, V_F = 0.355, Ave. thickness = 3.15 mm, S.D. = 0.10 mm, Derakane 8084 vinyl ester								
Tests 5571 - 5582, 5724 - 5726 were dry control coupons (no moisture gain)								
5571	8084-tt-1	79.5	*	0.1	12.8	----	1	25 °C
5572	8084-tt-2	82.8	*	0.1	12.3	----	1	25 °C
5573	8084-tt-3	82	*	0.1	13.0	----	1	25 °C
5574	8084-tt-4	87.2	*	0.1	11.0	----	1	40 °C
5575	8084-tt-5	82.6	*	0.1	10.7	----	1	40 °C
5576	8084-tt-13	62.6	*	0.1	10.4	----	1	40 °C
5577	8084-tt-7	80.5	*	0.1	8.3	----	1	55 °C
5578	8084-tt-8	89.4	*	0.1	8.2	----	1	55 °C
5579	8084-tt-9	83.1	*	0.1	7.9	----	1	55 °C
5580	8084-tt-10	58.3	*	0.1	6.2	----	1	70 °C
5581	8084-tt-11	59.3	*	0.1	6.2	----	1	70 °C
5582	8084-tt-12	57.6	*	0.1	6.2	----	1	70 °C
5724	t80841	62.7	*	0.1	8.6	3.7	1	25 °C
5725	t80842	62.9	*	0.1	8.3	4.4	1	25 °C
5726	t80843	63.3	*	0.1	8.1	4.2	1	25 °C
Tests 5583 - 5594 had an average moisture gain of 0.44% (conditioned 1,200 hours in 50 °C water (DI))								
5583	w-8084-tt-1	47.5	*	0.1	8.4	----	1	25 °C
5584	w-8084-tt-2	48.4	*	0.1	8.5	----	1	25 °C
5585	w-8084-tt-3	49.5	*	0.1	8.3	----	1	25 °C
5586	w-8084-tt-4	51.3	*	0.1	8.3	----	1	40 °C
5587	w-8084-tt-5	49.5	*	0.1	7.4	----	1	40 °C
5588	w-8084-tt-6	49.7	*	0.1	8.0	----	1	40 °C
5589	w-8084-tt-7	49.2	*	0.1	7.3	----	1	55 °C
5590	w-8084-tt-8	53.1	*	0.1	7.3	----	1	55 °C
5591	w-8084-tt-9	45.7	*	0.1	7.4	----	1	55 °C
5592	w-8084-tt-10	53.4	*	0.1	6.6	----	1	70 °C
5593	w-8084-tt-11	51.2	*	0.1	7.0	----	1	70 °C
5594	w-8084-tt-12	52	*	0.1	6.8	----	1	70 °C
Lay-up = $[\pm45]_3$, V_F = 0.280, Ave. thickness = 3.12 mm, S.D. = 0.08 mm, Derakane 8084 vinyl ester								
Tests 5595 - 5606 were dry control coupons (no moisture gain)								
5595	8084-45t-1	122	*	0.1	9.7	----	1	25 °C
5596	8084-45t-2	134	*	0.1	10.4	----	1	25 °C
5597	8084-45t-3	125	*	0.1	10.8	----	1	25 °C
5598	8084-45t-4	118	*	0.1	9.0	----	1	40 °C
5599	8084-45t-5	117	*	0.1	9.6	----	1	40 °C
5600	8084-45t-6	116	*	0.1	9.3	----	1	40 °C
5601	8084-45t-7	113	*	0.1	8.7	----	1	55 °C
5602	8084-45t-8	114	*	0.1	8.6	----	1	55 °C
5603	8084-45t-9	113	*	0.1	8.5	----	1	55 °C
5604	8084-45t-10	100	*	0.1	7.4	----	1	70 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5605	8084-45t-11	104	*	0.1	7.8	----	1	70 °C
5606	8084-45t-12	103	*	0.1	7.3	----	1	70 °C
Tests 5607 - 5618 had an average moisture gain of 0.38% (conditioned 1,200 hours in 50°C water (DI))								
5607	w-8084-45t-1	115	*	0.1	10.3	----	1	25 °C
5608	w-8084-45t-2	115	*	0.1	10.1	----	1	25 °C
5609	w-8084-45t-3	116	*	0.1	10.3	----	1	25 °C
5610	w-8084-45t-4	108	*	0.1	9.6	----	1	40 °C
5611	w-8084-45t-5	112	*	0.1	10.1	----	1	40 °C
5612	w-8084-45t-6	110	*	0.1	9.7	----	1	40 °C
5613	w-8084-45t-7	102	*	0.1	9.1	----	1	55 °C
5614	w-8084-45t-8	102	*	0.1	9.4	----	1	55 °C
5615	w-8084-45t-9	101	*	0.1	9.4	----	1	55 °C
5616	w-8084-45t-10	95	*	0.1	8.0	----	1	70 °C
5617	w-8084-45t-11	88	*	0.1	7.3	----	1	70 °C
5618	w-8084-45t-12	94	*	0.1	7.8	----	1	70 °C
Lay-up = $[0/\pm45/0]_S$, V_F = 0.354, Ave. thickness = 3.16 mm, S.D. = 0.11 mm, CoRezyn -AQ-051 Iso-Polyester								
Tests 5619 - 5630 were dry control coupons (no moisture gain)								
5619	tp-t-1	694	*	0.1	24.9	----	1	25 °C
5620	tp-t-2	652	*	0.1	23.8	----	1	25 °C
5621	tp-t-3	557	*	0.1	23.9	----	1	25 °C
5622	tp-t-4	656	*	0.1	23.9	----	1	40 °C
5623	tp-t-5	578	*	0.1	25.3	----	1	40 °C
5624	tp-t-6	646	*	0.1	25.0	----	1	40 °C
5625	tp-t-7	629	*	0.1	23.8	----	1	55 °C
5626	tp-t-8	607	*	0.1	24.0	----	1	55 °C
5627	tp-t-9	660	*	0.1	24.2	----	1	55 °C
5628	tp-t-10	601	*	0.1	24.2	----	1	70 °C
5629	tp-t-11	529	*	0.1	23.5	----	1	70 °C
5630	tp-t-12	601	*	0.1	23.0	----	1	70 °C
Tests 5631 - 5642 had an average moisture gain of 0.5% (conditioned 430 hours in 50 °C water (DI))								
5631	w-tp-t-1	582	*	0.1	26.6	----	1	25 °C
5632	w-tp-t-2	635	*	0.1	24.1	----	1	25 °C
5633	w-tp-t-3	531	*	0.1	25.5	----	1	25 °C
5634	w-tp-t-4	618	*	0.1	25.0	----	1	40 °C
5636	w-tp-t-6	628	*	0.1	25.0	----	1	40 °C
5637	w-tp-t-7	609	*	0.1	24.9	----	1	55 °C
5638	w-tp-t-8	599	*	0.1	25.2	----	1	55 °C
5639	w-tp-t-9	618	*	0.1	25.0	----	1	55 °C
5640	w-tp-t-10	557	*	0.1	22.8	----	1	70 °C
5641	w-tp-t-11	553	*	0.1	24.4	----	1	70 °C
5642	w-tp-t-12	541	*	0.1	23.0	----	1	70 °C
Tests 5643 - 5654 were dry control coupons (no moisture gain)								
5643	tp-c-1	-531	*	13	----	----	1	25 °C
5644	tp-c-2	-574	*	13	----	----	1	25 °C
5645	tp-c-3	-626	*	13	----	----	1	25 °C
5646	tp-c-4	-559	*	13	----	----	1	40 °C
5647	tp-c-5	-525	*	13	----	----	1	40 °C
5648	tp-c-6	-569	*	13	----	----	1	40 °C
5649	tp-c-7	-545	*	13	----	----	1	55 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5650	tp-c-8	-536	*	13	----	----	1	55 °C
5651	tp-c-9	-540	*	13	----	----	1	55 °C
5652	tp-c-10	-494	*	13	----	----	1	70 °C
5653	tp-c-11	-500	*	13	----	----	1	70 °C
5654	tp-c-12	-494	*	13	----	----	1	70 °C
Tests 5655 - 5666 had an average moisture gain of 0.5% (conditioned 430 hours in 50 °C water (DI))								
5655	w-tp-c-1	-595	*	13	----	----	1	25 °C
5656	w-tp-c-2	-583	*	13	----	----	1	25 °C
5657	w-tp-c-3	-547	*	13	----	----	1	25 °C
5658	w-tp-c-4	-534	*	13	----	----	1	40 °C
5659	w-tp-c-5	-495	*	13	----	----	1	40 °C
5660	w-tp-c-6	-580	*	13	----	----	1	40 °C
5661	w-tp-c-10	-476	*	13	----	----	1	55 °C
5662	w-tp-c-11	-514	*	13	----	----	1	55 °C
5663	w-tp-c-12	-539	*	13	----	----	1	55 °C
5664	w-tp-c-7	-480	*	13	----	----	1	70 °C
5665	w-tp-c-8	-499	*	13	----	----	1	70 °C
5666	w-tp-c-9	-509	*	13	----	----	1	70 °C
Lay-up = $[90/\pm45/90]_S$, V_F = 0.355, Ave. thickness = 3.15 mm, S.D. = 0.10 mm, CoRezyn Iso-Polyester								
Tests 5667 - 5678 were dry control coupons (no moisture gain)								
5667	tp-tt-1	67.8	*	0.1	9.2	----	1	25 °C
5668	tp-tt-2	68.4	*	0.1	9.0	----	1	25 °C
5669	tp-tt-3	64.8	*	0.1	9.3	----	1	25 °C
5670	tp-tt-4	71.7	*	0.1	8.3	----	1	40 °C
5671	tp-tt-5	68.5	*	0.1	8.8	----	1	40 °C
5672	tp-tt-6	68.1	*	0.1	8.3	----	1	40 °C
5673	tp-tt-7	64.4	*	0.1	7.7	----	1	55 °C
5674	tp-tt-8	69.9	*	0.1	7.9	----	1	55 °C
5675	tp-tt-9	68.8	*	0.1	7.9	----	1	55 °C
5676	tp-tt-10	69.1	*	0.1	7.4	----	1	70 °C
5677	tp-tt-11	71.7	*	0.1	7.2	----	1	70 °C
5678	tp-tt-12	70.3	*	0.1	7.4	----	1	70 °C
Tests 5679 - 5690 had an average moisture gain of 0.5% (conditioned 430 hours in 50 °C water (DI))								
5679	w-tp-tt-1	64.8	*	0.1	9.4	----	1	25 °C
5680	w-tp-tt-2	68.8	*	0.1	9.7	----	1	25 °C
5681	w-tp-tt-3	66.6	*	0.1	9.1	----	1	25 °C
5682	w-tp-tt-4	66.6	*	0.1	9.0	----	1	40 °C
5683	w-tp-tt-5	69	*	0.1	9.1	----	1	40 °C
5684	w-tp-tt-6	70.8	*	0.1	9.0	----	1	40 °C
5685	w-tp-tt-7	67.9	*	0.1	8.5	----	1	55 °C
5686	w-tp-tt-8	66.3	*	0.1	8.9	----	1	55 °C
5687	w-tp-tt-9	61.6	*	0.1	8.4	----	1	55 °C
5688	w-tp-tt-10	64.6	*	0.1	7.6	----	1	70 °C
5689	w-tp-tt-11	66.2	*	0.1	7.6	----	1	70 °C
5690	w-tp-tt-12	67.7	*	0.1	7.1	----	1	70 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Lay-up = $[\pm45]_3$, V_F = 0.280, Ave. thickness = 3.12 mm, S.D. = 0.08 mm, CoRezyn Iso-Polyester								
Tests 5691 - 5702 were dry control coupons (no moisture gain)								
5691	tp-45t-1	133	*	0.1	11.5	----	1	25 °C
5692	tp-45t-2	135	*	0.1	12.3	----	1	25 °C
5693	tp-45t-3	132	*	0.1	11.2	----	1	25 °C
5694	tp-45t-4	124	*	0.1	11.5	----	1	40 °C
5695	tp-45t-5	127	*	0.1	10.7	----	1	40 °C
5696	tp-45t-6	128	*	0.1	10.0	----	1	40 °C
5697	tp-45t-7	116	*	0.1	10.1	----	1	55 °C
5698	tp-45t-8	116	*	0.1	10.2	----	1	55 °C
5699	tp-45t-9	114	*	0.1	10.0	----	1	55 °C
5700	tp-45t-10	93.2	*	0.1	8.9	----	1	70 °C
5701	tp-45t-11	93.2	*	0.1	9.6	----	1	70 °C
5702	tp-45t-12	100	*	0.1	8.8	----	1	70 °C
Tests 5703 - 5714 had an average moisture gain of 0.28% (conditioned 430 hours in 50 °C water (DI))								
5703	w-tp-45t-1	131	*	0.1	11.9	----	1	25 °C
5704	w-tp-45t-2	125	*	0.1	12.0	----	1	25 °C
5705	w-tp-45t-3	132	*	0.1	12.1	----	1	25 °C
5706	w-tp-45t-4	124	*	0.1	11.3	----	1	40 °C
5707	w-tp-45t-5	126	*	0.1	10.8	----	1	40 °C
5708	w-tp-45t-6	122	*	0.1	10.5	----	1	40 °C
5709	w-tp-45t-7	114	*	0.1	10.0	----	1	55 °C
5710	w-tp-45t-8	107	*	0.1	9.9	----	1	55 °C
5711	w-tp-45t-9	110	*	0.1	9.2	----	1	55 °C
5712	w-tp-45t-10	94.8	*	0.1	7.7	----	1	70 °C
5713	w-tp-45t-11	96.8	*	0.1	7.5	----	1	70 °C
5714	w-tp-45t-12	102	*	0.1	8.9	----	1	70 °C

Materials DD5P and DD11 Static Tests (15355 hours in water)

Tests 5739 through 5838 involved (0/±45/0) laminates with D155/DB120 and A130/DB120 fabrics. These laminates were placed in distilled water and monitored for moisture absorption and ultimate compressive strength changes with moisture content. Two of these laminates were taken out of the water, bonded back-to-back, and compression tested. The back-to-back configuration gave the coupon added buckling resistance and simulated Material DD5P (denoted with a "D" for D155) and Material DD11 (denoted with an "A" for A130).

Fiber volume fractions for these tests were between 0.34 and 0.38.

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	Test Temperature
Tests 5739 - 5746 control group, no moisture conditioning, after 24 hours at 40 °C								
5739	D6456	-497	*	13	----	----	1	25 °C
5740	D6327	-565	*	13	----	----	1	25 °C
5741	D6533	-532	*	13	----	----	1	25 °C
5742	D6212	-476	*	13	----	----	1	25 °C
5743	A6034	-274	*	13	----	----	1	25 °C
5744	A6140	-302	*	13	----	----	1	25 °C
5745	A5962	-211	*	13	----	----	1	25 °C
5746	A5974	-272	*	13	----	----	1	25 °C
Tests 5747-5754 were tested after 24 hours in 40 °C water, (D-0.20% moisture gain, A-0.29% moisture gain)								
5747	D6229	-492	*	13	----	----	1	25 °C
5748	D6517	-529	*	13	----	----	1	25 °C
5749	D6559	-533	*	13	----	----	1	25 °C
5750	D5866	-509	*	13	----	----	1	25 °C
5751	A6046	-239	*	13	----	----	1	25 °C
5752	A6236	-334	*	13	----	----	1	25 °C
5753	A6141	-272	*	13	----	----	1	25 °C
5754	A6147	-205	*	13	----	----	1	25 °C
Tests 5755-5765 were tested after 144 hours in 40 °C water, (D-0.47% moist. gain, A-0.54% moist. gain)								
5755	D6229	-665	*	13	----	----	1	25 °C
5756	D6194	-464	*	13	----	----	1	25 °C
5757	D6112	-517	*	13	----	----	1	25 °C
5758	D6205	-464	*	13	----	----	1	25 °C
5759	A6070	-250	*	13	----	----	1	25 °C
5760	A6090	-314	*	13	----	----	1	25 °C
5761	A6236	-288	*	13	----	----	1	25 °C
5762	A5950	-295	*	13	----	----	1	25 °C
5763	D6441	-519	*	13	----	----	1	0 °C
5764	D6365	-486	*	13	----	----	1	0 °C
5765	D6369	-452	*	13	----	----	1	0 °C
Tests 5766-5765 were tested after 1315 hours in 40 °C water,(D-0.61% moist. gain, A-0.73% moist. gain)								
5766	D6443	-471	*	13	----	----	1	25 °C
5767	D6489	-519	*	13	----	----	1	25 °C
5768	D6846	-474	*	13	----	----	1	25 °C
5769	D6590	-420	*	13	----	----	1	25 °C
5770	A6570	-213	*	13	----	----	1	25 °C
5771	A5976	-211	*	13	----	----	1	25 °C
5772	A6021	-260	*	13	----	----	1	25 °C
5773	A6228	-191	*	13	----	----	1	25 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
Tests 5774-5779 control group, no moisture conditioning, after 1315 hours at 40 °C								
5774	D6490	-509	*	13	----	----	1	25 °C
5775	D6370	-404	*	13	----	----	1	25 °C
5776	D5924	-621	*	13	----	----	1	25 °C
5777	A6119	-283	*	13	----	----	1	25 °C
5778	A5980	-261	*	13	----	----	1	25 °C
5779	A6007	-279	*	13	----	----	1	25 °C
Tests 5780-5786 control group, no moisture conditioning, after 2000 hours at 40 °C, 2650 hours at 20 °C								
5780	D6210	-560	*	13	----	----	1	25 °C
5781	D6401	-568	*	13	----	----	1	25 °C
5782	D6219	-539	*	13	----	----	1	25 °C
5783	A5970	-218	*	13	----	----	1	25 °C
5784	A6070	-307	*	13	----	----	1	25 °C
5785	A5983	-300	*	13	----	----	1	25 °C
Tests 5786-5801 were tested after 2000 hours in 40 °C water and 2650 hours in 20 °C water, (D-0.62% moisture gain, A-0.64% moisture gain)								
5786	D6212	-405	*	13	----	----	1	25 °C
5787	D6220	-393	*	13	----	----	1	25 °C
5788	D6171	-473	*	13	----	----	1	25 °C
5789	D6794	-413	*	13	----	----	1	25 °C
5790	D5978	-352	*	13	----	----	1	50 °C
5791	D6349	-414	*	13	----	----	1	50 °C
5792	D6491	-423	*	13	----	----	1	50 °C
5793	D6270	-423	*	13	----	----	1	50 °C
5794	A6008	-228	*	13	----	----	1	25 °C
5795	A6506	-267	*	13	----	----	1	25 °C
5796	A6119	-240	*	13	----	----	1	25 °C
5797	A6034	-224	*	13	----	----	1	25 °C
5798	A6149	-176	*	13	----	----	1	50 °C
5799	A6396	-125	*	13	----	----	1	50 °C
5800	A6223	-216	*	13	----	----	1	50 °C
5801	A6149	-179	*	13	----	----	1	50 °C
Tests 5802-5817 were tested after 2000 hours in 40 °C water and 13355 hours in 20 °C water, (D-0.97% moisture gain, A-1.01% moisture gain)								
5802	D6223	-442	*	13	----	----	1	25 °C
5803	D6883	-406	*	13	----	----	1	25 °C
5804	D6037	-404	*	13	----	----	1	25 °C
5805	D5992	-366	*	13	----	----	1	25 °C
5806	A6026	-163	*	13	----	----	1	25 °C
5807	A5972	-215	*	13	----	----	1	25 °C
5808	A6188	-229	*	13	----	----	1	25 °C
5809	A6061	-203	*	13	----	----	1	25 °C
5810	D5864	-377	*	13	----	----	1	50 °C
5811	D5960	-332	*	13	----	----	1	50 °C
5812	D5842	-309	*	13	----	----	1	50 °C
5813	D6316	-375	*	13	----	----	1	50 °C
5814	A5975	-132	*	13	----	----	1	50 °C
5815	A6218	-154	*	13	----	----	1	50 °C
5816	A5894	-188	*	13	----	----	1	50 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5817	A6165	-225	*	13	----	----	1	50 °C
Tests 5818-5786 control group, no moisture conditioning, after 2000 hours at 40 °C, 13355 hours at 20 °C								
5818	D6394	-448	*	13	----	----	1	25 °C
5819	D6248	-361	*	13	----	----	1	25 °C
5820	D6265	-434	*	13	----	----	1	25 °C
5821	D6472	-583	*	13	----	----	1	25 °C
5822	D6485	-532	*	13	----	----	1	25 °C
5823	D6428	-559	*	13	----	----	1	25 °C
5824	D6183	-516	*	13	----	----	1	50 °C
5825	D6351	-468	*	13	----	----	1	50 °C
5826	D6217	-542	*	13	----	----	1	50 °C
5827	D6411	-430	*	13	----	----	1	50 °C
5828	D6530	-405	*	13	----	----	1	50 °C
5829	A6040	-250	*	13	----	----	1	25 °C
5830	A6161	-283	*	13	----	----	1	25 °C
5831	A6008	-298	*	13	----	----	1	25 °C
5832	A6036	-222	*	13	----	----	1	25 °C
5833	A5911	-249	*	13	----	----	1	25 °C
5834	A5951	-251	*	13	----	----	1	50 °C
5835	A6259	-270	*	13	----	----	1	50 °C
5836	A6079	-232	*	13	----	----	1	50 °C
5837	A6420	-264	*	13	----	----	1	50 °C
5838	A6056	-233	*	13	----	----	1	50 °C

Compression Testing Summary of Coupons (0/±45/0) Exposed to 20 - 40 ^{O}C Distilled Water (D155 and A130 0^{O} fabrics with DB120 ±45^{O} fabric, V_F = 0.35, Tests 5739 - 5838)							
Exposure Time, hours	Test Temperature, °C	Average Moisture Gain (S.D.), %		D155 Ave. strength (S.D.), MPa	% Change	A130 Ave. strength (S.D.), MPa	% Change
		D155	A130				
0	20	0	0	517 (39)	--	265 (39)	--
24	20	0.20 (0.01)	0.29 (0.03)	516 (19)	-0.3	262 (55)	-0.8
144	20	0.47 (0.01)	0.54 (0.02)	481 (30)	-6.9	286 (27)	8.4
1,315	20	0.61 (0.06)	0.73 (0.04)	471(35)	-9.0	219 (26)	-17
4,650	20	0.62 (0.11)	0.64 (0.08)	420 (31)	-19	240 (17)	-9.3
4,650	50	0.62	0.64	403 (30)	-15	174 (32)	-30
15,355	20	0.94 (0.25)	1.02 (0.05)	404 (31)	-22	202 (28)	-23
15,355	50	0.99 (0.22)	0.99 (0.04)	348 (34)	-26	175 (40)	-30
Baseline D155 modulus = 24.8 GPa, Baseline A130 modulus = 23.7 GPa at 1% moisture - D155 = 24.8 GPa, at 1% moisture - A130 = 19.9 GPa Coupons were tested in a double thickness configuration at 13 mm/s with a 13 mm gage length.							

Compression Testing Summary of Dry Control Coupons (0/±45/0) (D155 and A130 0^{O} fabric with DB120 $\pm45^{O}$ fabric, $V_F = 0.35$)					
Exposure Time, hours	Testing Temperature, °C	D155 Ave. strength (S.D.), MPa	% Change	A130 Ave. strength (S.D.), MPa	% Change
0	20	517 (39)	--	265 (39)	--
1,315 dry control	20	511 (89)	-1.2	274 (10)	+3.8
4,650 dry control	20	556 (13)	+7.4	275 (40)	+3.9
15,355 dry control	20	486 (86)	-6.4	260 (30)	+1.6
15,355 dry control	50	472 (57)	-9.6	250 (17)	-5.8

DD5P Static and Fatigue Tests (7200 hours in water)

Tests 4880 - 4899, 5860 - 5899 involved full thickness DD5P coupons which were immersed in distilled water for a total of 300 days The first 91 days were at a temperature of 40 °C with the remaining time at room temperature (18-22 °C). **These "WET" coupons averaged 1.0 percent moisture absorption at the time of testing.** All the tensile coupons in this series were dog boned shaped with a minimum width of 22 mm. The compression coupons were 25 mm wide and involved a gage length of 13 mm. The last column of data lists the temperature that the test was run under, and whether or not the coupon was "DRY" (not soaked in water, ~0 % moisture content) or WET (coupons that were soaked in distilled water, as described above). For "Wet" coupons, the fatigue tests were performed with the gage section of the test coupon in a sealed plastic bag containing a water soaked cotton fabric.

Material DD5P Environmental
Lay-up = $[0/\pm45/0]_S$, V_F = 0.357 (dry), Ave. thickness (dry) = 3.13 mm, S.D. (dry) = 0.004 mm,
V_F = 0.379 (wet) Ave. thickness (wet) = 2.95 mm, S.D. (wet) = 0.004 mm, CoRezyn 63-AX-051 Polyester

TEST &	SAMPLE ID #	MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	Temperature and condition
"WET" coupons averaged 1.0 percent moisture absorption at the time of testing.								
4880	DD5P820	310	0.1	3	21.6	1.62	178,431	50 °C Dry
4881	DD5P816	310	0.1	3	20.8	1.64	233,742	50 °C Dry
4882	DD5P816	310	0.1	3	21.1	1.52	246,075	50 °C Dry
4883	DD5P819	710	*	13	19.5	3.6	1	50 °C Dry
4884	DD5P814	730	*	13	22.3	3.3	1	50 °C Dry
4885	DD5P817	742	*	13	22.3	3.4	1	50 °C Dry
4886	DD5P812	414	0.1	2	22.1	2.21	4,207	50 °C Dry
4887	DD5P821	414	0.1	2	22	2.03	3,614	50 °C Dry
4888	DD5P818	414	0.1	2	21.5	1.86	1,132	50 °C Dry
4891	DD5P908W	241	0.1	5	----	----	2,145,373	50 °C Wet
4892	DD5P900W	310	0.1	3	20	1.42	17,971	50 °C Wet
4893	DD5P901W	241	0.1	5	20.6	1.19	1,733,316	50 °C Wet
4894	DD5P902W	241	0.1	5	20.8	1.22	2,033,339	50 °C Wet
4895	DD5P903W	310	0.1	3	21.3	1.51	45,534	50 °C Wet
4896	DD5P904W	310	0.1	3	20	1.54	35,346	50 °C Wet
4897	DD5P905W	693	*	13	21.6	----	1	50 °C Wet
4898	DD5P907W	688	*	13	22	----	1	50 °C Wet
4899	DD5P906W	734	*	13	21	----	1	50 °C Wet
5860	DD5P909W	-345	10	1	----	----	16	50 °C Wet
5861	DD5P910W	-426	*	13	----	----	1	50 °C Wet
5862	DD5P911W	-384	*	13	----	----	1	50 °C Wet
5863	DD5P912W	-401	*	13	----	----	1	50 °C Wet
5864	DD5P913W	-381	*	13	----	----	1	50 °C Wet
5865	DD5P914W	-276	10	2	----	----	1,410	50 °C Wet
5866	DD5P915W	-207	10	2	----	----	37,673	50 °C Wet
5867	DD5P916W	-207	10	5	----	----	44,469	50 °C Wet
5868	DD5P917W	-207	10	5	----	----	54,737	50 °C Wet
5869	DD5P918W	-165	10	8	----	----	190,729	50 °C Wet
5870	DD5P919W	-165	10	10	----	----	342,905	50 °C Wet
5871	DD5P920W	-165	10	10	----	----	141,564	50 °C Wet

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5872	DD5P921	-345	10	1	----	----	130	50 °C Dry
5873	DD5P930	-207	10	5	----	----	124,290	50 °C Dry
5874	DD5P926	-207	10	5	----	----	173,669	50 °C Dry
5875	DD5P929	-207	10	5	----	----	482,504	50 °C Dry
5876	DD5P924	-276	10	4	----	----	98,038	50 °C Dry
5877	DD5P931	-276	10	5	----	----	74,728	50 °C Dry
5878	DD5P925	-276	10	5	----	----	49,636	50 °C Dry
5879	DD5P923	-508	*	13	----	----	1	50 °C Dry
5880	DD5P922	-488	*	13	----	----	1	50 °C Dry
5881	DD5P927	-500	*	13	----	----	1	50 °C Dry
5900	DD5P963	-165	10	8	----	----	1,109,352	50 °C Dry
5882	DD5P928	-379	10	5	----	----	48,127	20 °C Dry
5883	DD5P932	-345	10	5	----	----	164,214	20 °C Dry
5884	DD5P933	-345	10	5	----	----	288,708	20 °C Dry
5885	DD5P945	-345	10	10	----	----	198,403	20 °C Dry
5898	DD5P940	-651	*	13	----	----	1	20 °C Dry
5886	DD5P944	-578	*	13	----	----	1	20 °C Dry
5887	DD5P937	-661	*	13	----	----	1	20 °C Dry
5892	DD5P936	-632	*	13	----	----	1	20 °C Dry
5888	DD5P957W	-523	*	13	----	----	1	20 °C Wet
5889	DD5P956W	-542	*	13	----	----	1	20 °C Wet
5890	DD5P955W	-539	*	13	----	----	1	20 °C Wet
5891	DD5P964W	-527	*	13	----	----	1	20 °C Wet
5893	DD5P963W	-276	10	5	----	----	333,063	20 °C Wet
5894	DD5P958W	-310	10	3	----	----	16,432	20 °C Wet
5895	DD5P959W	-276	10	5	----	----	836,080	20 °C Wet
5896	DD5P960W	-310	10	3	----	----	27,564	20 °C Wet
5897	DD5P961W	-310	10	3	----	----	22,185	20 °C Wet
5899	DD5P962W	-276	10	5	----	----	637,232	20 °C Wet
6046	DD5P963W	-241	10	8	----	----	2,680,397	20 °C Wet
6047	DD5P964W	-241	10	10	----	----	3,830,537	20 °C Wet
6048	DD5P965W	-241	10	10	----	----	2,878,393	20 °C Wet
6000	DD5P208D	-625	*	13	----	----	1	20 °C Dry
6001	DD5P209D	-651	*	13	----	----	1	20 °C Dry
6002	DD5P200D	-676	*	13	----	----	1	20 °C Dry
6003	DD5P201D	-658	*	13	----	----	1	20 °C Dry
6159	DD5P970D	-300	10	8	----	----	1,649,390	20 °C Dry
6160	DD5P971D	-300	10	8	----	----	1,134,606	20 °C Dry
6161	DD5P972D	-300	10	8	----	----	3,668,551	20 °C Dry
6162	DD5P966W	-138	10	8	----	----	1,033,796	50 °C Wet
6163	DD5P967W	-138	10	8	----	----	803,542	50 °C Wet
6164	DD5P968W	-138	10	8	----	----	1,613,405	50 °C Wet
6165	DD5P975D	-165	10	7	----	----	857,946	50 °C Dry
6166	DD5P976D	-165	10	7	----	----	1,342,208	50 °C Dry
6167	DD5P977D	-165	10	7	----	----	506,222	50 °C Dry

Material DD5P2 Static and Fatigue Tests (1900 hours)

Lay-up = $[0/\pm45/0]_S$, V_F = 0.350, Ave. thickness = 3.20 mm, S.D. = 0.09 mm, CoRezyn 75-AQ-010, Iso-Polyester. "Wet" coupons were soaked in distilled water at 50 °C for 1450 hours, and then stored in 18 °C distilled water until tested (1 to 78 days). The soaking time at 18° C added approximately 0.04% moisture pickup. These Iso-polyester "wet" coupons averaged 0.55% moisture content.

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6004	DD5P2209D	-633	*	13	----	----	1	20 °C Dry
6005	DD5P2300D	-605	*	13	----	----	1	20 °C Dry
6006	DD5P2315D	-605	*	13	----	----	1	20 °C Dry
6007	DD5P2308D	-600	*	13	----	----	1	20 °C Dry
6027	DD5P2309D	-414	10	4	----	----	42,269	20 °C Dry
6028	DD5P2304D	-414	10	4	----	----	114,581	20 °C Dry
6029	DD5P2310D	-414	10	5	----	----	98,665	20 °C Dry
6030	DD5P2305D	-379	10	5	----	----	1,606,325	20 °C Dry
6031	DD5P2303D	-379	10	7	----	----	268,662	20 °C Dry
6032	DD5P2311D	-379	10	5	----	----	113,712	20 °C Dry
6016	DD5P2400W	-552	*	13	----	----	1	20 °C Wet
6017	DD5P2401W	-592	*	13	----	----	1	20 °C Wet
6018	DD5P2402W	-624	*	13	----	----	1	20 °C Wet
6019	DD5P2403W	-574	*	13	----	----	1	20 °C Wet
6020	DD5P2404W	-414	10	2	----	----	4,640	20 °C Wet
6021	DD5P2405W	-414	10	2	----	----	23,953	20 °C Wet
6022	DD5P2406W	-345	10	4	----	----	403,790	20 °C Wet
6025	DD5P2407W	-345	10	8	----	----	305,627	20 °C Wet
6026	DD5P2408W	-414	10	8	----	----	290,137	20 °C Wet
6080	DD5P2455W	-345	10	7	----	----	341,327	20 °C Wet
6089	DD5P2515W	-567	*	13	----	----	1	50 °C Wet
6090	DD5P2525W	-524	*	13	----	----	1	50 °C Wet
6091	DD5P2535W	-561	*	13	----	----	1	50 °C Wet
6092	DD5P2545W	-545	*	13	----	----	1	50 °C Wet
6101	DD5P2320	-507	*	13	----	----	1	50 °C Dry
6102	DD5P2301	-531	*	13	----	----	1	50 °C Dry
6103	DD5P2302	-518	*	13	----	----	1	50 °C Dry
6104	DD5P2319	-547	*	13	----	----	1	50 °C Dry
6113	DD5P2500	-379	10	3	----	----	4,511	50 °C Wet
6114	DD5P2501	-345	10	6	----	----	342,487	50 °C Wet
6115	DD5P2502	-379	10	2	----	----	940	50 °C Wet
6116	DD5P2379	-379	10	2	----	----	1,169	50 °C Wet
6117	DD5P2504	-379	10	2	----	----	3,719	50 °C Wet
6118	DD5P2505	-362	10	5	----	----	8,886	50 °C Wet
6119	DD5P2506	-362	10	5	----	----	11,943	50 °C Wet
6120	DD5P2507	-362	10	4	----	----	3,212	50 °C Wet
6121	DD5P2508	-345	10	6	----	----	108,682	50 °C Wet
6122	DD5P2509	-345	10	5	----	----	50,688	50 °C Wet
6123	DD5P2510	-362	10	4	----	----	10,095	50 °C Wet
6124	DD5P2511	-328	10	7	----	----	50,204	50 °C Wet
6125	DD5P2512	-328	10	5	----	----	126,010	50 °C Wet

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6126	DD5P2513	-310	10	10	----	----	145,133	50 °C Wet
6127	DD5P2514	-310	10	8	----	----	131,655	50 °C Wet
6128	DD5P2515	-293	10	8	----	----	389,941	50 °C Wet
6129	DD5P2516	-276	10	8	----	----	118,715	50 °C Wet
6130	DD5P2517	-276	10	8	----	----	4,771,884	R 50°C Wet

MATERIAL DD5V Static and Fatigue Tests (1900 hours)

Lay-up = $[0/\pm45/0]_S$, V_F = 0.355, Ave. thickness = 3.15 mm, S.D. = 0.07 mm, Derakane 411C Vinyl ester. “Wet” coupons were soaked in distilled water at 50 °C for 1450 hours, and then stored in 18 °C distilled water until tested (1 to 78 days). The soaking time at 18° C added approximately 0.05% moisture pickup. For “Wet” coupons, the fatigue tests were performed with the gage section of the test coupon in a sealed plastic bag containing a water soaked cotton fabric. These vinyl ester “wet” coupons averaged 0.52% moisture content.

6008	DD5V306D	-573	*	13	----	----	1	20 °C Dry
6009	DD5V300D	-537	*	13	----	----	1	20 °C Dry
6010	DD5V309D	-563	*	13	----	----	1	20 °C Dry
6011	DD5V302D	-576	*	13	----	----	1	20 °C Dry
6060	DD5V337D	-310	10	8	----	----	5,861,932	20 °C Dry
6061	DD5V311D	-414	10	2	----	----	5,144	20 °C Dry
6062	DD5V333D	-379	10	4	----	----	155,965	20 °C Dry
6063	DD5V352D	-379	10	4	----	----	55,556	20 °C Dry
6064	DD5V349D	-379	10	4	----	----	68,683	20 °C Dry
6065	DD5V358D	-345	10	6	----	----	495,336	20 °C Dry
6066	DD5V332D	-345	10	6	----	----	318,116	20 °C Dry
6067	DD5V357D	-345	10	6	----	----	1,573,249	20 °C Dry
6049	DD5V400W	-310	10	7	----	----	2,214,422	20 °C Wet
6050	DD5V401W	-310	10	10	----	----	4,484,198	20 °C Wet
6051	DD5V402W	-345	10	5	----	----	3,189,655	20 °C Wet
6052	DD5V403W	-345	10	6	----	----	1,225,419	20 °C Wet
6053	DD5V433W	-345	10	6	----	----	699,399	20 °C Wet
6054	DD5V404W	-379	10	4	----	----	107,281	20 °C Wet
6055	DD5V405W	-379	10	5	----	----	631,735	20 °C Wet
6056	DD5V406W	-379	10	5	----	----	72,852	20 °C Wet
6057	DD5V407W	-414	10	2	----	----	7,754	20 °C Wet
6058	DD5V408W	-414	10	2	----	----	33,452	20 °C Wet
6059	DD5V409W	-414	10	2	----	----	2,625	20 °C Wet
6081	DD5VS1W	-583	*	13	----	----	1	20 °C Wet
6082	DD5VS2W	-583	*	13	----	----	1	20 °C Wet
6083	DD5VS3W	-567	*	13	----	----	1	20 °C Wet
6084	DD5VS4W	-552	*	13	----	----	1	20 °C Wet
6093	DD5V515W	-506	*	13	----	----	1	50 °C Wet
6094	DD5V525W	-550	*	13	----	----	1	50 °C Wet
6095	DD5V535W	-485	*	13	----	----	1	50 °C Wet
6096	DD5V545W	-486	*	13	----	----	1	50 °C Wet
6109	DD5V355	-526	*	13	----	----	1	50 °C Dry
6110	DD5V348	-348	*	13	----	----	1	50 °C Dry
6111	DD5V362	-513	*	13	----	----	1	50 °C Dry
6112	DD5V360	-461	*	13	----	----	1	50 °C Dry

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6149	DD5V550W	-345	10	1	----	----	11,488	50 °C Wet
6150	DD5V551W	-310	10	1	----	----	929,383	50 °C Wet
6151	DD5V552W	-345	10	1	----	----	58,219	50 °C Wet
6153	DD5V554W	-310	10	1	----	----	1,033,946	50 °C Wet
6154	DD5V555W	-345	10	1	----	----	75,412	50 °C Wet
6155	DD5V556W	-310	10	1	----	----	361,247	50 °C Wet
6156	DD5V557W	-379	10	1	----	----	8,974	50 °C Wet
6157	DD5V558W	-379	10	1	----	----	8,456	50 °C Wet
6158	DD5V557W	-379	10	1	----	----	3,746	50 °C Wet

MATERIAL DD5V2 Static and Fatigue Tests (1900 hours in water)

Lay-up = $[0/\pm45/0]_S$, V_F = 0.352, Ave. thickness = 3.17 mm, S.D. = 0.10 mm, Derakane 8084 Vinyl ester. “Wet” coupons were soaked in distilled water at 50 °C for 1450 hours, and then stored in 18 °C distilled water until tested (1 to 78 days). The soaking time at 18° C added approximately 0.05% moisture pickup. These vinyl ester “wet” coupons averaged 0.56% moisture content.

6012	DD5V2316D	-548	*	13	----	----	1	20 °C Dry
6013	DD5V2324D	-526	*	13	----	----	1	20 °C Dry
6014	DD5V2322D	-552	*	13	----	----	1	20 °C Dry
6015	DD5V2301D	-549	*	13	----	----	1	20 °C Dry
6033	DD5V2303D	-379	10	5	----	----	37,911	20 °C Dry
6034	DD5V2319D	-379	10	5	----	----	83,282	20 °C Dry
6035	DD5V2320D	-345	10	5	----	----	2,990,932	20 °C Dry
6036	DD5V2314D	-379	10	5	----	----	38,458	20 °C Dry
6037	DD5V2305D	-345	10	8	----	----	92,551	20 °C Dry
6038	DD5V2326D	-345	10	8	----	----	95,007	20 °C Dry
6039	DD5V2400W	-345	10	3	----	----	36,356	20 °C Wet
6040	DD5V2401W	-345	10	4	----	----	109,166	20 °C Wet
6041	DD5V2402W	-310	10	5	----	----	267,627	20 °C Wet
6042	DD5V2403W	-345	10	5	----	----	26,901	20 °C Wet
6043	DD5V2404W	-310	10	6	----	----	738,698	20 °C Wet
6045	DD5V2406W	-310	10	7	----	----	4,298,318	20 °C Wet
6085	DD5V2S1W	-559	*	13	----	----	1	20 °C Wet
6086	DD5V2S2W	-565	*	13	----	----	1	20 °C Wet
6087	DD5V2S3W	-562	*	13	----	----	1	20 °C Wet
6088	DD5V2S4W	-551	*	13	----	----	1	20 °C Wet
6097	DD5V2515W	-500	*	13	----	----	1	50 °C Wet
6098	DD5V2525W	-535	*	13	----	----	1	50 °C Wet
6099	DD5V2535W	-493	*	13	----	----	1	50 °C Wet
6100	DD5V2545W	-497	*	13	----	----	1	50 °C Wet
6105	DD5V2323	-537	*	13	----	----	1	50 °C Dry
6106	DD5V2309	-494	*	13	----	----	1	50 °C Dry
6107	DD5V2312	-504	*	13	----	----	1	50 °C Dry
6108	DD5V2311	-473	*	13	----	----	1	50 °C Dry
6135	DD5V2501W	-379	10	1	----	----	512	50 °C Wet
6136	DD5V2502W	-379	10	1	----	----	163	50 °C Wet
6137	DD5V2503W	-310	10	5	----	----	39,410	50 °C Wet
6138	DD5V2504W	-310	10	5	----	----	7,982	50 °C Wet

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6139	DD5V2505W	-276	10	5	----	----	754,430	50 °C Wet
6140	DD5V2506W	-276	10	5	----	----	876,228	50 °C Wet
6141	DD5V2507W	-276	10	8	----	----	416,277	50 °C Wet
6142	DD5V2508W	-310	10	2	----	----	118,792	50 °C Wet
6143	DD5V2509W	-310	10	2	----	----	166,097	50 °C Wet
6144	DD5V2510W	-379	10	1	----	----	203	50 °C Wet
6145	DD5V2511W	-259	10	8	----	----	5,983,320	50 °C Wet
6146	DD5V2512W	-379	10	1	----	----	798	20 °C Wet
6147	DD5V2513W	-379	10	1	----	----	28,466	20 °C Wet
6148	DD5V2514W	-379	10	1	----	----	19,548	20 °C Wet

MATERIALS DD5V3, DD5E3, DD5E4, DD11E3 AND DD11E4 Static Tests

Material DD5V3

Lay-up = $[0/\pm45/0]_S$, V_F = 0.36, Ave. thickness = 3.08 mm, S.D. = 0.09 mm, Vinyl Ester

Derakane 411C Vinyl ester. “Wet” coupons were soaked in distilled water at 50 °C for 1450 hours, and then stored in 18 °C distilled water until tested (1 to 78 days). For “Wet” coupons, the fatigue tests were performed with the gage section of the test coupon in a sealed plastic bag containing a water soaked cotton fabric. These vinyl ester “wet” coupons averaged 0.52% moisture content.

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
8820	DD5V3-305	-612	*	13	----	----	1	20C Dry
8821	DD5V3-306	-590	*	13	----	----	1	20C Dry
8822	DD5V3-304	-533	*	13	----	----	1	20C Dry
8823	DD5V3-302	-629	*	13	----	----	1	20C Dry
8824	DD5V3-303	-519	*	13	----	----	1	50C Dry
8825	DD5V3-301	-594	*	13	----	----	1	50C Dry
8826	DD5V3-307	-562	*	13	----	----	1	50C Dry
8827	DD5V3-300	-588	*	13	----	----	1	50C Dry
8828	DD5V3-354w	-591	*	13	----	----	1	20C Wet
8829	DD5V3-359w	-547	*	13	----	----	1	20C Wet
8830	DD5V3-356w	-546	*	13	----	----	1	20C Wet
8831	DD5V3-357w	-595	*	13	----	----	1	20C Wet
8832	DD5V3-350w	-567	*	13	----	----	1	50C Wet
8833	DD5V3-352w	-614	*	13	----	----	1	50C Wet
8834	DD5V3-362w	-605	*	13	----	----	1	50C Wet
8835	DD5V3-355w	-610	*	13	----	----	1	50C Wet

Material DD11E3

Lay-up = $[0/\pm45/0]_S$, V_F = 0.32, Ave. thickness = 3.07 mm, S.D. = 0.08 mm, Prime 20 Epoxy

8836	DD11E3-319	-314	*	13	----	----	1	20C Dry
8837	DD11E3-320	-281	*	13	----	----	1	20C Dry
8838	DD11E3-317	-288	*	13	----	----	1	20C Dry
8839	DD11E3-318	-269	*	13	----	----	1	20C Dry
8840	DD11E3-316	-215	*	13	----	----	1	50C Dry
8841	DD11E3-301	-213	*	13	----	----	1	50C Dry
8842	DD11E3-302	-208	*	13	----	----	1	50C Dry
8843	DD11E3-300	-225	*	13	----	----	1	50C Dry
8844	DD11E3-355w	-118	*	13	----	----	1	50C Wet
8845	DD11E3-354w	-118	*	13	----	----	1	50C Wet
8846	DD11E3-353w	-142	*	13	----	----	1	50C Wet
8847	DD11E3-352w	-135	*	13	----	----	1	50C Wet
8848	DD11E3-351w	-284	*	13	----	----	1	20C Wet
8849	DD11E3-350w	-214	*	13	----	----	1	20C Wet
8850	DD11E3-357w	-243	*	13	----	----	1	20C Wet
8851	DD11E3-356w	-217	*	13	----	----	1	20C Wet

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

Material DD5E3

Lay-up = $[0/\pm 45/0]_S$, V_F = 0.36, Ave. thickness = 3.14 mm, S.D. = 0.08 mm, Prime 20 Epoxy

8852	DD5E3-304	-642	*	13	----	----	1	20C Dry
8853	DD5E3-305	-608	*	13	----	----	1	20C Dry
8854	DD5E3-322	-645	*	13	----	----	1	20C Dry
8855	DD5E3-319	-595	*	13	----	----	1	20C Dry
8856	DD5E3-320	-561	*	13	----	----	1	50C Dry
8857	DD5E3-321	-563	*	13	----	----	1	50C Dry
8858	DD5E3-303	-537	*	13	----	----	1	50C Dry
8859	DD5E3-323	-516	*	13	----	----	1	50C Dry
8860	DD5E3-357w	-364	*	13	----	----	1	50C Wet
8861	DD5E3-356w	-383	*	13	----	----	1	50C Wet
8862	DD5E3-355w	-391	*	13	----	----	1	50C Wet
8863	DD5E3-354w	-337	*	13	----	----	1	50C Wet
8864	DD5E3-353w	-519	*	13	----	----	1	20C Wet
8865	DD5E3-352w	-503	*	13	----	----	1	20C Wet
8866	DD5E3-351w	-471	*	13	----	----	1	20C Wet
8867	DD5E3-350w	-483	*	13	----	----	1	20C Wet

Material DD11E4

Lay-up = $[0/\pm 45/0]_S$, V_F = 0.34, Ave. thickness = 2.84 mm, S.D. = 0.05 mm, Jeffco 1401-12 Epoxy

8868	DD11E4-309	-267	*	13	----	----	1	50C Dry
8869	DD11E4-308	-255	*	13	----	----	1	50C Dry
8870	DD11E4-307	-281	*	13	----	----	1	50C Dry
8871	DD11E4-306	-228	*	13	----	----	1	50C Dry
8872	DD11E4-305	-289	*	13	----	----	1	20C Dry
8873	DD11E4-304	-299	*	13	----	----	1	20C Dry
8874	DD11E4-302	-312	*	13	----	----	1	20C Dry
8875	DD11E4-303	-309	*	13	----	----	1	20C Dry
8876	DD11E4-360w	-201	*	13	----	----	1	50C Wet
8877	DD11E4-361w	-205	*	13	----	----	1	50C Wet
8878	DD11E4-362w	-181	*	13	----	----	1	50C Wet
8879	DD11E4-363w	-285	*	13	----	----	1	50C Wet
8880	DD11E4-364w	-348	*	13	----	----	1	20C Wet
8881	DD11E4-365w	-250	*	13	----	----	1	20C Wet
8882	DD11E4-366w	-298	*	13	----	----	1	20C Wet
8883	DD11E4-367w	-292	*	13	----	----	1	20C Wet

Material DD5E4

Lay-up = $[0/\pm 45/0]_S$, V_F = 0.35, Ave. thickness = 3.20 mm, S.D. = 0.08 mm, Jeffco 1401-12 Epoxy

8884	DD5E4-307	-560	*	13	----	----	1	20C Dry
8885	DD5E4-306	-659	*	13	----	----	1	20C Dry
8886	DD5E4-305	-649	*	13	----	----	1	20C Dry
8887	DD5E4-302	-625	*	13	----	----	1	20C Dry
8888	DD5E4-303	-556	*	13	----	----	1	50C Dry

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
8889	DD5E4-304	-570	*	13	----	----	1	50C Dry
8890	DD5E4-311	-539	*	13	----	----	1	50C Dry
8891	DD5E4-300	-546	*	13	----	----	1	50C Dry
8892	DD5E4-377w	-317	*	13	----	----	1	50C Wet
8893	DD5E4-376w	-401	*	13	----	----	1	50C Wet
8894	DD5E4-375w	-316	*	13	----	----	1	50C Wet
8895	DD5E4-374w	-290	*	13	----	----	1	50C Wet
8896	DD5E4-373w	-471	*	13	----	----	1	20C Wet
8897	DD5E4-372w	-548	*	13	----	----	1	20C Wet
8898	DD5E4-371w	-505	*	13	----	----	1	20C Wet
8899	DD5E4-370w	-521	*	13	----	----	1	20C Wet

25 mm wide coupons, 13 mm gage length, 13 mm/s ramp rate.

Resin system in $(0/\pm45/0)_S$ Lay-up	0° fabric	Moisture pick-up, %	20°C Dry	20°C Wet	60°C Dry	60°C Wet
Reichhold DION 9800 special (HDT=115C)	D155	0.28	591 (42)	570 (27)	566 (34)	599 (22)
SP Systems Prime 20, 7 hours 65°C (HDT=54C, Tg=68C)	D155	1.24	623 (25)	494 (21)	544 (22)	369 (24)
	A130	1.79	288 (19)	240 (33)	215 (7)	128 (12)
Jeffco 1401-12 resin, 4101-17 hardener, 14 hrs at 60C (HDT=???)	D155	1.55	623 (44)	512 (32)	553 (14)	331 (48)
	A130	1.72	302 (10)	297 (40)	258 (23)	218 (46)

Brackets indicate the sample standard deviation.

Reichhold coupons were conditioned in 65°C water for 728 hours. All other resin systems were conditioned in 65°C water for 193 hours and then 20°C water for an additional 535 hours.

Neat Resin Tests

Maximum stress column lists the maximum stress/yield stress. The listed yield stress was determined using the 0.2% strain offset method. Heat deflection temperature was measured using ASTM D648.

CoRezyn 63-AX-051 (Interplastics Corporation)

Heat deflection temperature (3 tests) - 53.6 °C, 55.3 °C, 55.1 °C

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
5842	poly1	59.6/47.4	*	0.1	3.01	2.4	1	11
5843	poly2	48.3/41.7	*	0.1	3.25	1.66	1	11
5844	poly3	54.3/46.5	*	0.1	3.29	1.93	1	11

Derakane 411C-50 (Dow Chemical)

Heat deflection temperature (3 tests) - 73.5 °C, 80.2 °C, 79.6 °C

5845	411C1	57.2/47.1	*	0.1	3.26	2.02	1	11
5846	411C2	58.8/53.2	*	0.1	3.16	2.14	1	11
5847	411C3	57.1/50.9	*	0.1	3.21	2.02	1	11

Derakane 8084 (Dow Chemical)

Heat deflection temperature (3 tests) - 72.6 °C, 74.7 °C, 75.2 °C

5848	80841	75.1/58.4	*	0.1	3.04	3.36	1	11
5849	80842	73.8/54.5	*	0.1	3.33	2.95	1	11
5850	80843	68.8/52.6	*	0.1	3.38	2.6	1	11

System 41 (System Three)

Heat deflection temperature (3 tests) - 59.4 °C, 52.9 °C, 53.3 °C

5851	sys31	51.1/51.1	*	0.1	3.59	1.54	1	11
5852	sys32	53.1/53.1	*	0.1	3.63	1.58	1	11
5853	sys33	53.6/53.6	*	0.1	3.49	1.67	1	11

SC-12 (Applied Poleramic Inc.)

Heat deflection temperature (3 tests) - 92.7 °C, 94.8 °C, 95.0 °C

5854	sc121	41.1	*	0.1	3.48	1.26	1	11
5855	sc122	48.5	*	0.1	3.43	1.55	1	11
5856	sc123	43.4	*	0.1	3.52	1.32	1	11

SC-14 (Applied Poleramic Inc.)

Heat deflection temperature (3 tests) - 80.5 °C, 82.7 °C, 84.3 °C

5857	sc141	72.1/50.1	*	0.1	2.83	3.68	1	11
5858	sc142	66.3/46.8	*	0.1	2.76	3.15	1	11
5859	sc143	66.3/48.6	*	0.1	2.82	3.09	1	11

Summary of Physical Properties of Matrix and Adhesive Materials [Manufacturer listed values]					
	CoRezyn® 75-AQ-010 Iso-Polyester	CoRezyn® 63-AX-051 Ortho-Polyester	Derakane® 411PC-100 Vinyl Ester	Derakane® 8084 Epoxy Vinyl Ester	Hysol EA9309.2NA Adhesive
Tensile Modulus, GPa	3.54, s=0.11 [5.6]	3.88, s = 0.4, [4.69]	3.21 s = 0.04	3.25 s = 0.15 [3.17]	2.36, s = 0.1, [2.34]
Tensile Strength, MPa	59.6, s=7.1 [75.9]	54.1, s = 4.6, [58]	57.7 s = 0.8	72.6 s = 2.7 [69-76]	44, s = 1.4, [38]
Tensile Elongation, %	2.09, s=0.3 [2.4]	1.8, s = 0.2, [1.6]	5.8 s = 1.3	3.10 s =0.6 [10-12]	3.7, s = 0.2, [4.8]
Flexural Modulus, GPa	[5.4]	[3.72]	3.17	[3.03]	---
Flexural Strength, MPa	[149]	[89]	122	[110 - 124]	---
Shear Modulus, GPa	(1.68)	1.15, s = 0.28	(0.96)	(0.98)	0.74, s = 0.35, [0.89]
Shear Strength, MPa	---	32.4, s = 2.1	---	---	37.0, s = 2.8
Compressive Strength, MPa	---	159, s = 10	---	---	108, s = 12, [53]
Density, g/cm^3	[1.05 - 1.09]	1.16, s = 0.01	1.18	1.08	1.27, s = 0.02
Nuxy	0.35, s = 0.01	0.35, s = 0.01	0.34 s = 0.01	0.343 s = 0.01	0.34, s = 0.01
Heat Distortion Temperature, °C	[101]	55 s = 1 [67]	78, s = 4	74, s = 1 [77-82]	[79]
Note: Ultimate strength values are variable (fracture mechanics)					

STRESS RUPTURE TESTING

Test numbers 7100 to 7255 (inclusive) involved stress rupture tensile testing of fiberglass materials. The tests were performed on an Instron 8562 screw driven testing machine. The machine was set up to place the test coupon under a specific load as quickly as possible, with no overshooting. Static ultimate tests were performed in approximately 0.3 seconds to obtain short-time strength values designated So. These ultimate strength tests were run at a constant displacement rate, 13 mm/sec for a 100 mm gage length, to failure The time in seconds at which the material failed was recorded. Testing temperature was 16 to 21°C with a relative humidity less than 30 percent.

MATERIAL CH25

Lay-up = $(\pm 45)_7$, V_F = 0.315, Ave. thickness = 3.21 mm, S.D. = 0.06 mm, CoRezyn 63-AX-051 Polyester

Test and Sample Number		Maximum Stress MPa	S/S_0	E GPa	Time to Failure seconds
7100	CH25-1	93.5	1.01	----	0.3*
7101	CH25-3	92.4	1.00	----	0.3*
7102	CH25-4	93.0	1.00	----	0.3*
7103	CH25-5	92.3	0.99	----	0.3*
7104	CH25-6	92.1	0.99	----	0.3*
7105	CH25-7	79.3	0.85	----	1,222
7106	CH25-8	79.3	0.85	9.39	4,077
7107	CH25-9	79.3	0.85	9.27	4,390
7108	CH25-10	79.3	0.85	9.33	308
7109	CH25-11	79.3	0.85	9.61	904
7110	CH25-12	75.8	0.82	9.10	4,226
7111	CH25-13	75.8	0.82	9.20	6,809
7112	CH25-14	75.8	0.82	9.02	8,595
7113	CH25-15	74.1	0.80	9.85	23,220
7114	CH25-16	74.1	0.80	9.67	7,515
7115	CH25-17	74.1	0.80	9.16	18,020
7116	CH25-18	68.9	0.74	10.26	615,900
7117	CH25-19	72.4	0.78	9.45	73,116
7118	CH25-20	72.4	0.78	9.41	88,734
7119	CH25-21	72.4	0.78	10.25	236,280

*The time listed is the total test time under ramp loading.

MATERIAL CH26

Lay-up = $[(\pm 45)_3/0/(\pm 45)_3]$, V_F = 0.330, Ave. thickness = 5.07 mm, S.D. = 0.10 mm, CoRezyn 63-AX-051 Polyester

7120	CH26-1	273	1.05	12.07	0.3*
7121	CH26-2	242	0.93	11.73	0.3*
7122	CH26-3	273	1.05	12.60	0.3*
7123	CH26-4	266	1.02	13.05	0.3*
7124	CH26-5	248	0.95	13.38	0.3*
7125	CH26-6	228	0.87	13.29	37
7126	CH26-7	207	0.79	12.20	51
7127	CH26-8	172	0.66	11.49	3,838
7128	CH26-9	190	0.73	12.98	592
7129	CH26-10	172	0.66	13.06	9,960

Test and Sample Number		Maximum Stress MPa	S/S_0	E GPa	Time to Failure seconds
7130	CH26-11	155	0.60	12.87	171,796
7131	CH26-12	155	0.60	12.24	702,840
7132	CH26-13	190	0.73	11.96	14
7133	CH26-14	190	0.73	11.94	1,029
7134	CH26-15	190	0.73	13.25	449
7135	CH26-16	172	0.66	13.37	17,580
7136	CH26-17	207	0.79	11.75	45

*The time listed is the total test time under ramp loading.

MATERIAL CH27

Lay-up = $[(\pm45)_2/0/\pm45/0/(\pm45)_2]$, V_F = 0.346, Ave. thickness = 3.23 mm, S.D. = 0.09 mm, CoRezyn 63-AX-051 Polyester

7138	CH27-1	417	1.00	14.57	0.3*
7139	CH27-2	421	1.01	15.30	0.3*
7140	CH27-3	412	0.99	14.66	0.3*
7141	CH27-4	418	1.00	14.79	0.3*
7142	CH27-5	379	0.91	13.36	12
7143	CH27-6	379	0.91	15.71	10
7144	CH27-7	362	0.87	15.63	12
7145	CH27-8	310	0.74	13.83	202
7146	CH27-9	310	0.74	14.30	258
7147	CH27-10	293	0.70	14.06	741
7148	CH27-11	293	0.70	14.04	672
7149	CH27-12	293	0.70	14.20	2,685
7150	CH27-13	276	0.66	13.29	1,127
7151	CH27-14	276	0.66	16.45	7,117
7152	CH27-15	276	0.66	15.73	5,971
7153	CH27-16	310	0.74	13.85	881
7154	CH27-17	328	0.79	14.47	88
7155	CH27-18	328	0.79	16.55	129
7156	CH27-19	328	0.79	12.96	45
7157	CH27-20	259	0.62	13.96	70,260
7158	CH27-21	259	0.62	13.92	15,840
7159	CH27-22	259	0.62	13.85	67,090
7160	CH27-23	241	0.58	13.87	358,200
7161	CH27-24	241	0.58	14.89	780,840

*The time listed is the total test time under ramp loading.

MATERIAL CH28

Lay-up = $[\pm45/0/\pm45/0/\pm45/0/\pm45]$, V_F = 0.376, Ave. thickness = 3.17 mm, S.D. = 0.12 mm, CoRezyn 63-AX-051 Polyester

7162	CH28-1	596	1.05	19.21	0.3*
7163	CH28-2	584	1.03	16.59	0.3*
7164	CH28-3	579	1.02	17.98	0.3*
7165	CH28-4	594	1.05	16.31	0.3*
7166	CH28-5	637	1.12	19.66	0.3*
7167	CH28-8	507	0.89	16.49	0.3*
7168	CH28-10	507	0.89	16.49	0.3*

Test and Sample	Maximum Number	S/S_0 Stress MPa	E	Time to GPa	Failure seconds
7169	CH28-9	507	0.89	17.22	0.3*
7170	CH28-6	591	1.04	18.80	0.3*
7171	CH28-7	507	0.89	20.96	91
7172	CH28-11	507	0.89	15.64	14
7173	CH28-12	448	0.79	19.31	4,815
7174	CH28-13	448	0.79	18.45	22,253
7175	CH28-14	448	0.79	17.32	33
7176	CH28-15	448	0.79	16.90	30
7177	CH28-16	448	0.79	18.59	374
7178	CH28-17	476	0.84	17.76	62
7179	CH28-18	476	0.84	18.17	101
7180	CH28-19	476	0.84	17.17	30
7181	CH28-20	476	0.84	17.70	22
7182	CH28-21	421	0.74	18.63	40
7183	CH28-22	421	0.74	20.47	1,415
7184	CH28-23	421	0.74	18.41	212,076
7185	CH28-24	421	0.74	20.53	78,372
7186	CH28-25	386	0.68	19.06	101,952
7187	CH28-26	386	0.68	14.87	7,560
7188	CH28-27	386	0.68	17.59	1,736,244

*The time listed is the total test time under ramp loading.

MATERIAL DD11

Lay-up = $[0/\pm45/0]_S$, V_F = 0.330, Ave. thickness = 3.08 mm, S.D. = 0.16 mm, CoRezyn 63-AX-051 Polyester

7189	DD11-1	606	1.08	20.82	0.3*
7190	DD11-2	516	0.92	17.36	0.3*
7191	DD11-3	595	1.06	20.69	0.3*
7192	DD11-4	497	0.89	16.25	0.3*
7193	DD11-5	580	1.04	19.31	0.3*
7194	DD11-24	580	1.04	20.28	0.3*
7195	DD11-25	606	1.08	20.46	0.3*
7196	DD11-26	611	1.09	18.19	0.3*
7197	DD11-6	461	0.82	19.59	747
7198	DD11-7	452	0.81	20.51	47
7199	DD11-8	492	0.88	22.25	289
7200	DD11-9	424	0.76	19.12	3,660
7201	DD11-10	391	0.70	19.92	3,784
7202	DD11-11	388	0.69	18.76	6,415
7203	DD11-13	319	0.57	18.13	112,715
7204	DD11-14	366	0.65	19.98	43500
7205	DD11-15	367	0.66	19.98	263,700
7206	DD11-16	450	0.80	19.58	14
7207	DD11-17	515	0.92	21.82	13
7208	DD11-18	476	0.85	2.08	53
7209	DD11-19	346	0.62	18.58	438,882
7210	DD11-20	351	0.63	17.77	91,500

Test and Sample Number		Maximum Stress MPa	S/S_0	E GPa	Time to Failure seconds
7211	DD11-21	396	0.71	19.58	158,610
7212	DD11-22	371	0.66	20.45	105,799
7213	DD11-27	444	0.79	18.17	121
7214	DD11-28	447	0.80	19.36	218

*The time listed is the total test time under ramp loading.

MATERIAL DD16

Lay-up = $[90/0/\pm45/0]_S$, V_F = 0.405, Ave. thickness = 3.62 mm, S.D. = 0.13 mm, CoRezyn 63-AX-051 Polyester.

7215	DD16A-1	683	1.00	22.29	0.3*
7216	DD16A-2	692	1.02	22.57	0.3*
7217	DD16A-3	664	0.98	21.76	0.3*
7218	DD16A-4	532	0.78	22.96	359
7219	DD16A-5	522	0.77	22.34	88
7220	DD16A-6	535	0.79	20.47	47
7221	DD16A-7	525	0.77	20.94	112
7222	DD16A-8	515	0.76	21.22	258
7223	DD16A-9	478	0.70	20.98	518
7224	DD16A-10	454	0.67	21.07	2,335
7225	DD16A-11	446	0.66	20.82	4,265
7226	DD16A-12	479	0.70	22.65	2,515
7227	DD16A-14	408	0.60	20.38	5,677
7228	DD16A-15	422	0.62	21.90	6,856
7229	DD16A-16	426	0.63	22.68	13,758
7230	DD16A-17	403	0.59	22.19	244,800

MATERIAL A130

Lay-up = $[0]_6$, V_F = 0.333, Ave. thickness = 3.00 mm, S.D. = 0.16 mm, CoRezyn 63-AX-051 Polyester

7231	A130-090-1	518		19.93	0.3*
7232	A130-090-2	537		19.73	0.3*
7233	A130-090-3	493		19.00	0.3*
7234	A130-090-4	459		21.63	114
7235	A130-090-5	431		19.36	43
7236	A130-090-6	427		19.85	186
7237	A130-090-7	349		18.18	2,905
7238	A130-090-8	338		18.23	1,861
7239	A130-090-9	401		20.83	6,091
7240	A130-090-10	373		19.81	6,932
7241	A130-090-11	384		20.76	9,250
7242	A130-090-12	341		18.51	22,271
7243	A130-090-13	362		19.20	3,622
7244	A130-090-14	378		20.79	34,052
7245	A130-090-15	374		22.26	20,394

*The time listed is the total test time under ramp loading.

MATERIAL ROV4 (0/90 ROVING)

Lay-up = $[0/90]_8$, V_F = 0.523, Ave. thickness = 3.74 mm, S.D. = 0.15 mm, CoRezyn 63-AX-051 Polyester

Test and	Sample Number	Maximum Stress MPa	S/S_0	E GPa	Time to Failure seconds
7246	ROV4-150	482	1.23	21.97	0.3*
7247	ROV4-151	477	1.21	25.14	0.3*
7248	ROV4-152	498	1.27	23.65	0.3*
7249	ROV4-153	414	1.05	28.09	8
7250	ROV4-154	345	0.88	24.28	5,144
7251	ROV4-155	342	0.87	23.75	1,599
7252	ROV4-156	345	0.88	23.03	1,422
7253	ROV4-157	310	0.79	27.01	27,600
7254	ROV4-158	310	0.79	27.90	107,119
7255	ROV4-159	310	0.79	24.56	7,128

*The time listed is the total test time under ramp loading.

Effect of In-Plane Fiber Waviness

Static Compressive Strength

One External Layer of Induced Waviness

Lay-up = (0*/±45/0/0/∓45/0), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. CoRezyn 63-AX-051 Polyester Resin Matrix. This includes the following plates/materials listed below: 0AS9, 64, 16, 24, 33, 1MS8, 74, 65, 32, 20, 71, 69, 31.

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
V_F = 53.0, Amplitude = 0 mm, Wavelength = 0 mm, Wave Severity = 0 mm/mm, Maximum Angle = 0 Degrees								
2696	0AS9-1	-482	*	13	----	----	1	
2697	0AS9-2	-530	*	13	----	----	1	
2698	0AS9-3	-538	*	13	----	----	1	
2699	0AS9-4	-538	*	13	----	----	1	
V_F = 49.7, Amplitude = 1.92 mm, Wavelength = 34.80 mm, Wave Severity = 0.055 mm/mm, Maximum Angle = 9.7 Degrees								
2700	64-1	-465	*	13	----	----	1	
2701	64-2	-464	*	13	----	----	1	
2702	64-3	-500	*	13	----	----	1	
3120	64-4	-469	*	13	----	----	1	
V_F = 52.3, Amplitude = 1.98 mm, Wavelength = 52.00 mm, Wave Severity = 0.038 mm/mm, Maximum Angle = 7.8 Degrees								
3121	16-1	-509	*	13	----	----	1	
3122	16-2	-492	*	13	----	----	1	
3123	16-3	-526	*	13	----	----	1	
3124	16-4	-493	*	13	----	----	1	
V_F = 51.6, Amplitude = 1.96 mm, Wavelength = 65.98 mm, Wave Severity = 0.030 mm/mm, Maximum Angle = 6.7 Degrees								
3125	24-1	-539	*	13	----	----	1	
3126	24-2	-533	*	13	----	----	1	
3127	24-3	-515	*	13	----	----	1	
3128	24-4	-517	*	13	----	----	1	
V_F =50.1 , Amplitude =2.26 mm, Wavelength = 98.12 mm, Wave Severity = 0.023 mm/mm, Maximum Angle= 4.6 Degrees								
3129	33-1	-514	*	13	----	----	1	
3130	33-2	-516	*	13	----	----	1	
3131	33-3	-486	*	13	----	----	1	
3132	33-4	-528	*	13	----	----	1	

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
V_F =48.6 , Amplitude = 4.06 mm, Wavelength = 37.65 mm, Wave Severity = 0.108 mm/mm, Maximum Angle= 18.4 Degrees								
3133	1MS8-1	-418	*	13	----	----	1	
3134	1MS8-2	-431	*	13	----	----	1	
3135	1MS8-3	-409	*	13	----	----	1	
3136	1MS8-4	-416	*	13	----	----	1	
V_F =47.9 , Amplitude =3.88 mm, Wavelength = 50.10 mm, Wave Severity = 0.077 mm/mm, Maximum Angle= 12.9 Degrees								
3137	74-1	-486	*	13	----	----	1	
3138	74-2	-416	*	13	----	----	1	
3139	74-3	-401	*	13	----	----	1	
3140	74-4	-485	*	13	----	----	1	
V_F = 47.8, Amplitude = 4.02 mm, Wavelength = 67.96 mm, Wave Severity = 0.059 mm/mm, Maximum Angle= 9.7 Degrees								
3141	65-1	-532	*	13	----	----	1	
3142	65-2	-491	*	13	----	----	1	
3143	65-3	-482	*	13	----	----	1	
3144	65-4	-478	*	13	----	----	1	
V_F = 51.3, Amplitude = 4.20 mm, Wavelength = 102.38 mm, Wave Severity = 0.041 mm/mm, Maximum Angle = 8.0 Degrees								
3145	32-1	-545	*	13	----	----	1	
3146	32-2	-479	*	13	----	----	1	
3147	32-3	-528	*	13	----	----	1	
3148	32-4	-490	*	13	----	----	1	
V_F = 51.1, Amplitude = 5.98 mm, Wavelength = 35.70 mm, Wave Severity = 0.168 mm/mm, Maximum Angle = 26.8 Degrees								
3149	20-1	-322	*	13	----	----	1	
3372	20-2	-400	*	13	----	----	1	
3414	20-3	-378	*	13	----	----	1	
3626	20-4	-392	*	13	----	----	1	
V_F = 48.1, Amplitude = 6.14 mm, Wavelength = 50.70 mm, Wave Severity = 0.121 mm/mm, Maximum Angle = 20.2 Degrees								
3627	71-1	-431	*	13	----	----	1	
3628	71-2	-418	*	13	----	----	1	
3629	71-3	-428	*	13	----	----	1	
3630	71-4	-428	*	13	----	----	1	

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

V_F = 48.7, Amplitude = 5.58 mm, Wavelength = 68.60 mm, Wave Severity = 0.081 mm/mm, Maximum Angle = 13.6 Degrees

3631	69-1	-412	*	13	----	----	1	
3632	69-2	-487	*	13	----	----	1	
3633	69-3	-451	*	13	----	----	1	
3634	69-4	-438	*	13	----	----	1	

V_F = 49.0, Amplitude = 6.04 mm, Wavelength = 97.92 mm, Wave Severity = 0.062 mm/mm, Maximum Angle = 10.3 Degrees

3635	31-1	-496	*	13	----	----	1	
3636	31-2	-515	*	13	----	----	1	
3637	31-3	-496	*	13	----	----	1	
3638	31-4	-498	*	13	----	----	1	

One Internal Layer of Induced Waviness

Lay-up = (0/±45/0*/0/∓45/0), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. CoRezyn 63-AX-051 Polyester Resin Matrix. This covers plate/material 67.

V_F = 47.2, Amplitude = 6.04 mm, Wavelength = 37.30 mm, Wave Severity = 0.162 mm/mm, Maximum Angle = 28.3 Degrees

3639	67-1	-431	*	13	----	----	1	
3640	67-2	-427	*	13	----	----	1	
3641	67-3	-401	*	13	----	----	1	
3642	67-4	-418	*	13	----	----	1	

Two Internal Layers of Induced Waviness

Lay-up = (0/±45/0*/0*/∓45/0), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. CoRezyn 63-AX-051 Polyester Resin Matrix. This includes the following materials listed below: 62, 60, 58.

V_F = 47.6, Amplitude = 1.98 mm, Wavelength = 34.16 mm, Wave Severity = 0.058 mm/mm, Maximum Angle = 9.8 Degrees

3643	62-1	-446	*	13	----	----	1	
3644	62-2	-457	*	13	----	----	1	
3645	62-3	-417	*	13	----	----	1	
3646	62-4	-428	*	13	----	----	1	

V_F = 46.6, Amplitude = 4.00 mm, Wavelength = 37.40 mm, Wave Severity = 0.107 mm/mm, Maximum Angle = 18.3 Degrees

3647	60-1	-378	*	13	----	----	1	
3648	60-2	-347	*	13	----	----	1	
3649	60-3	-319	*	13	----	----	1	

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
3661	60-4	-304	*	13	----	----	1	

V_F = 49.8, Amplitude = 5.96 mm, Wavelength = 39.10 mm, Wave Severity = 0.152 mm/mm, Maximum Angle = 26.1 Degrees

3692	58-1	-312	*	13	----	----	1
3693	58-2	-298	*	13	----	----	1
3695	58-3	-283	*	13	----	----	1
3848	58-4	-291	*	13	----	----	1

Three Layers of Induced Waviness

Lay-up = (0*/±45/0*/0*/∓45/0), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. CoRezyn 63-AX-051 Polyester Resin Matrix. This includes the following materials listed below: 63, 61, 59

V_F = 41.3, Amplitude = 2.02 mm, Wavelength = 35.73 mm, Wave Severity = 0.057 mm/mm, Maximum Angle = 9.4 Degrees

3848	63-1	-414	*	13	----	----	1
3849	63-2	-406	*	13	----	----	1
3870	63-3	-390	*	13	----	----	1
3871	63-4	-386	*	13	----	----	1

V_F = 42.5, Amplitude = 4.00 mm, Wavelength = 33.51 mm, Wave Severity = 0.119 mm/mm, Maximum Angle = 18.0 Degrees

3872	61-1	-295	*	13	----	----	1
3873	61-2	-297	*	13	----	----	1
3874	61-3	-311	*	13	----	----	1
3912	61-4	-298	*	13	----	----	1

V_F = 42.1, Amplitude = 5.99 mm, Wavelength = 38.60 mm, Wave Severity = 0.155 mm/mm, Maximum Angle = 25.4 Degrees

3991	59-1	-246	*	13	----	----	1
4113	59-2	-274	*	13	----	----	1
4114	59-3	-270	*	13	----	----	1
4115	59-4	-234	*	13	----	----	1

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

Four Layers of Induced Waviness

Lay-up = (0*/±45/0*/0*/∓45/0*), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. CoRezyn 63-AX-051 Polyester Resin Matrix. This includes the following materials listed below: 39, 40, 38, 44, 41, 43.

V_F = 38.7, Amplitude = 1.97 mm, Wavelength = 34.52 mm, Wave Severity = 0.057 mm/mm, Maximum Angle = 10.0 Degrees

4116	39-1	-344	*	13	----	----	1	
4117	39-2	-319	*	13	----	----	1	
4118	39-4	-320	*	13	----	----	1	
4119	39-5	-337	*	13	----	----	1	

V_F = 38.7, Amplitude = 4.01 mm, Wavelength = 37.20 mm, Wave Severity = 0.108 mm/mm, Maximum Angle = 18.4 Degrees

4269	40-1	-241	*	13	----	----	1	
4270	40-2	-229	*	13	----	----	1	
4271	40-3	-241	*	13	----	----	1	
4272	40-4	-230	*	13	----	----	1	

V_F = 34.8, Amplitude = 6.22 mm, Wavelength = 38.13 mm, Wave Severity = 0.163 mm/mm, Maximum Angle = 29.1 Degrees

4273	38-1	-178	*	13	----	----	1	
4274	38-2	-176	*	13	----	----	1	
4275	38-3	-182	*	13	----	----	1	
4276	38-4	-182	*	13	----	----	1	

V_F = 42.0, Amplitude = 2.22 mm, Wavelength = 102.0 mm, Wave Severity = 0.022 mm/mm, Maximum Angle = 4.9 Degrees

4277	44-1	-373	*	13	----	----	1	
4278	44-2	-488	*	13	----	----	1	
4279	44-3	-466	*	13	----	----	1	
4280	44-4	-459	*	13	----	----	1	

V_F = 39.8, Amplitude = 4.04 mm, Wavelength = 101.5 mm, Wave Severity = 0.040 mm/mm, Maximum Angle = 6.4 Degrees

4281	41-1	-410	*	13	----	----	1	
4282	41-2	-458	*	13	----	----	1	
4283	41-3	-377	*	13	----	----	1	
4335	41-4	-384	*	13	----	----	1	

V_F = 37.4, Amplitude = 6.29 mm, Wavelength = 101.0 mm, Wave Severity = 0.062 mm/mm, Maximum Angle = 11.9 Degrees

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4342	43-1	-349	*	13	----	----	1	
4343	43-2	-333	*	13	----	----	1	
4344	43-3	-330	*	13	----	----	1	
4345	43-4	-295	*	13	----	----	1	

Four Layers of Induced Waviness

Lay-up = (0*/±45/0*/0*/∓45/0*), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. Dow Derakane 8084 Vinyl Ester Resin Matrix. This includes the following materials listed below: 51C, 55, 53, 52, 48, 49, 50.

V_F = 53.5, Amplitude = 0 mm, Wavelength = 0 mm, Wave Severity = 0 mm/mm, Maximum Angle = 0 Degrees

4346	51C-1	-523	*	13	----	----	1	
4347	51C-2	-562	*	13	----	----	1	
4348	51C-3	-558	*	13	----	----	1	
4349	51C-4	-540	*	13	----	----	1	

V_F = 41.6, Amplitude = 2.04 mm, Wavelength = 37.05 mm, Wave Severity = 0.055 mm/mm, Maximum Angle = 9.1 Degrees

4350	55-1	-424	*	13	----	----	1	
4351	55-2	-389	*	13	----	----	1	
4352	55-3	-439	*	13	----	----	1	
4353	55-4	-427	*	13	----	----	1	

V_F = 39.2, Amplitude = 4.17 mm, Wavelength = 37.28 mm, Wave Severity = 0.112 mm/mm, Maximum Angle = 19.9 Degrees

4354	53-1	-271	*	13	----	----	1	
4355	53-2	-299	*	13	----	----	1	
4356	53-3	-268	*	13	----	----	1	
4357	53-4	-287	*	13	----	----	1	

V_F = 37.4, Amplitude = 6.11 mm, Wavelength = 37.03 mm, Wave Severity = 0.165 mm/mm, Maximum Angle = 26.8 Degrees

4358	52-1	-238	*	13	----	----	1	
4359	52-2	-232	*	13	----	----	1	
4360	52-3	-224	*	13	----	----	1	
4361	52-4	-238	*	13	----	----	1	

V_F = 37.9, Amplitude = 2.22 mm, Wavelength = 101.8 mm, Wave Severity = 0.022 mm/mm, Maximum Angle = 3.5 Degrees

4362	48-1	-539	*	13	----	----	1	
4363	48-2	-583	*	13	----	----	1	
4364	48-3	-568	*	13	----	----	1	
4545	48-4	-562	*	13	----	----	1	

V_F = 37.6, Amplitude = 4.08 mm, Wavelength = 102.3 mm, Wave Severity = 0.040 mm/mm, Maximum Angle = 4.9 Degrees

4566	49-1	-480	*	13	----	----	1
4799	49-2	-456	*	13	----	----	1
4863	49-3	-420	*	13	----	----	1
4865	49-4	-441	*	13	----	----	1

V_F = 40.4, Amplitude = 6.03 mm, Wavelength = 101.1 mm, Wave Severity = 0.060 mm/mm, Maximum Angle = 8.3 Degrees

4866	50-1	-396	*	13	----	----	1
4867	50-2	-423	*	13	----	----	1
4868	50-3	-423	*	13	----	----	1
4878	50-4	-387	*	13	----	----	1

Compression Fatigue Tests

Four Layers of Induced Waviness

Lay-up = (0*/±45/0*/0*/∓45/0*), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. CoRezyn 63-AX-051 Polyester Resin Matrix. This includes the following materials listed below: 40, 66, 68.

V_F = 38.7, Amplitude = 4.01 mm, Wavelength = 37.20 mm, Wave Severity = 0.108 mm/mm, Maximum Angle = Degrees

4889	40-1	-241	*	13	----	----	1
4890	40-2	-229	*	13	----	----	1
5270	40-3	-241	*	13	----	----	1
5635	40-4	-230	*	13	----	----	1

V_F = 42.5, Amplitude = 3.99 mm, Wavelength = 36.45 mm, Wave Severity = 0.109 mm/mm, Maximum Angle = Degrees

5902	66-1	-138	10	5	----	----	347549
5903	66-2	-138	10	5	----	----	192168
6023	66-3	-138	10	5	----	----	208206
6024	66-4	-103	10	5	----	----	4500000 R

V_F = 41.6, Amplitude = 4.10 mm, Wavelength = 38.28 mm, Wave Severity = 0.107 mm/mm, Maximum Angle = Degrees

6131	68-1	-	*	13	----	----	11606
6132	68-2	-	*	13	----	----	11660
6133	68-3	-	*	13	----	----	9151

Tensile Tests

Lay-up = (0*/±45/0*/0*/∓45/0*), All 0's = D155 fabric, 45's = DB120 fabric, 0* ply has induced waviness. CoRezyn 63-AX-051 Polyester Resin Matrix. This includes the following materials listed below: 72, 56, 73, 70.

V_F = 51.0, Amplitude = 0 mm, Wavelength = 0 mm, Wave Severity = 0 mm/mm, Maximum Angle = 0 Degrees

6134	72-1	941	*	13	----	----	1
6168	72-2	980	*	13	----	----	1
6832	72-3	990	*	13	----	----	1
6833	72-4	975	*	13	----	----	1

V_F = 55.3, Amplitude = 0 mm, Wavelength = straightened from 33.92 mm to 0 mm, Wave Severity = 0 mm/mm, Maximum Angle = 0 Degrees. Fibers from wavy coupons were straightened and then RTM. Test the effect of disturbing the fiber tows.

6834	56-1	977	*	13	----	----	1
6840	56-2	1006	*	13	----	----	1
6846	56-3	1017	*	13	----	----	1
6879	56-4	979	*	13	----	----	1

V_F = 44.5, Amplitude = 1.42 mm, Wavelength = 101.2 mm, Wave Severity = 0.014 mm/mm, Maximum Angle = 1.9 Degrees

7137	73-1	871	*	13	----	----	1
7256	73-2	826	*	13	----	----	1
7257	73-3	780	*	13	----	----	1
6557	73-4	839	*	13	----	----	1

V_F = 44.6, Amplitude = 3.91 mm, Wavelength = 36.63 mm, Wave Severity = 0.107 mm/mm, Maximum Angle = 16.2 Degrees

3652	70-1	486	*	13	----	----	1
3653	70-2	500	*	13	----	----	1
3938	70-3	547	*	13	----	----	1
3939	70-4	514	*	13	----	----	1

Off Axis Ply Tests

V_F = 37.7%, 3.05 mm
Lay-up = $(10/\pm45/10)_S$, 10 - D155 fabric, 45's- DB120 fabric, CoRezyn 63-AX-051 Polyester Resin

6760	10-1	-345	*	13	----	----	1
6761	10-2	-313	*	13	----	----	1
6762	10-3	-317	*	13	----	----	1
6763	10-4	-300	*	13	----	----	1
6776	10P1	219	*	13	23.5	0.93	1
6777	10P2	218	*	13	22.0	1.0	1
6778	10P3	231	*	13	23.4	0.99	1

Lay-up = $(30/\pm45/30)_S$, 30 - D155 fabric, 45's- DB120 fabric, CoRezyn 63-AX-051 Polyester Resin

6764	30-1	-156	*	13	----	----	1
6765	30-2	-164	*	13	----	----	1

6766	30-3	-159	*	13	----	----	1
6767	30-4	-161	*	13	----	----	1
6779	30P1	101	*	13	13.6	0.75	1
6780	30P2	98.2	*	13	12.3	0.80	1
6781	30P3	95.7	*	13	11.2	0.86	1

Lay-up = $(10/\pm45/10)_S$, 10 - D155 fabric, 45's- DB120 fabric, Dow Derakane 8084 Vinyl Ester Resin

6768	10D5	-434	*	13	----	----	1
6769	10D6	-419	*	13	----	----	1
6770	10D7	-383	*	13	----	----	1
6771	10D8	-397	*	13	----	----	1

Lay-up = $(30/\pm45/30)_S$, 30 - D155 fabric, 45's- DB120 fabric, Dow Derakane 8084 Vinyl Ester Resin

6772	30D5	-187	*	13	----	----	1
6773	30D6	-191	*	13	----	----	1
6774	30D7	-193	*	13	----	----	1
6775	30D8	-192	*	13	----	----	1

Strain Energy Release Rate Testing

Double cantilever beam (DCB) and end notched flexure (ENF) tests were performed for the calculation of G_{IC} and G_{IIC} respectively. The modified beam theory method was used for the calculation of G_{IC} and is detailed in Reference 19.

The distance of the initial crack front from the Teflon film (providing the initial crack) is listed in the “a” column. An “a” value of 0.0 mm indicates that this test was the initial test with no extension of the crack from the Teflon film. This initial DCB test also has a coupon label with the letter “a”. Subsequent tests (labeled b, c, d...) were then performed and show the effects of fiber bridging and other crack blunting mechanisms which develop as the crack extends (R-curve behavior). For the ENF tests, h is the half thickness of the test coupon (total thickness = 2h) and “C” is the distance the starter crack is from the nearest bending support.

Summary of Mode I and II Results for Tests 7260 to 7509 (tested at ambient conditions).

Resin	V_F, %	Crack interface	G_{IC} initial, J/m^2	G_{IC} (ave), J/m^2	G_{IIC}, J/m^2
Derakane 8084(V)	36	[0/0]	344 (7)	595 (133)	2638 (567)
Derakane 411C50 (V)	36	[0/0]	234	396	2557
System 41(E)	36	[0/0]	219 (22)	231 (38)	3776
SC-14 (E)	36	[0/0]	638 (58)	638 (157)	3223 (520)
Iso-polyester 75-AQ-010	36	[0/0]	200 (23)	321 (96)	1359 (459)
Ortho-polyester 63-AX-051 (P)	40	[0/0]	153 (10)	196 (99)	977 (229)
	40	[0/0]	----	490 (3)	1430 (35)
	40	[+45/-45]	----	780 (4)	2270 (53)
	36	[0/0]	138 (56)	379 (81)	1293 (259)
	26	[+45/-45]	140 (41)	1028 (97)	2001 (286)
	35	[45/45]	249[1] (75)	462 (107)	----
	35	[90/45]	273[2] (41)	420 (75)	942 (261)
	36	[0/0]	176[3]	-----	-----

NOTE: values in brackets indicate the standard deviation. 0° and 90° fabrics were D155 and 45° fabrics were DB120, both from Owens Corning Fabrics, except as noted.
[1] The average initiation G_{IC} from the starter strip was 236 J/m^2.
[2] The average initiation G_{IC} from the starter strip was 191 J/m^2.
[3] Using UC1018V unidirectional fabric.

Results for G_{IC} and G_{IIC} for different environmental conditioning
(water absorption and test temperature) tests 8609 to 8637.

Resin systems	Ortho-polyester	411	8084	SC14	iso-polyester
Conditioning	50°C distilled water for 1000 hours				50°C distilled water 889 hours
Test Temp	50°C				
moisture, %	1.81	0.42	0.53	2.18	0.25
Initial G_{IC} J/m^2	580	558	918	886	419
G_{IIC} J/m^2	773	2173	2523	841	1752
Conditioning	50°C distilled water for 2900 hours				
Test Temp	50°C				
moisture, %	2.16	0.54	0.69	2.9	----
Initial G_{IC} J/m^2	409	578	822	874	----
G_{IIC} J/m^2	1338	2785*	2174*	1717	----
Conditioning	50°C dry for 1000 hours				50°C dry for 889 hours
Test Temp	50°C				
Initial G_{IC} J/m^2	259	482	781	861	302.6
G_{IIC} J/m^2	1372	2481	2529	1654	2386
Conditioning	20°C dry				
Test Temp	20°C dry				
Initial G_{IC} J/m^2	159	396	595	638	200
G_{IIC} J/m^2	977	2557	2638	3223	1359
Conditioning	20°C dry				
Test Temp	-20 to -35°C				
Initial G_{IC} J/m^2	214	385	468	570	239
G_{IIC} J/m^2	1112	1967	2485	2202	1484
* Test coupon failed in tension instead of interlaminar fracture					

Mode I, G_{IC}

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
Ortho-polyester CoRezyn 63-AX-051, $[0]_6$, D155 fabric						
7260	DCB1011a	0.37	0.0	22.7	25.15	162
7261	DCB1011b	0.37	1.7	22.4	25.15	179
7262	DCB1011c	0.37	5.6	29.6	25.15	361
7263	DCB1011d	0.37	9.3	32.0	25.15	450
7264	DCB1011e	0.37	14.5	33.4	25.15	573
7265	DCB1012a	0.36	0.0	21.3	24.8	152
7266	DCB1013a	0.36	0.0	21.7	24.8	139
7267	DCB1014a	0.37	0.0	22.4	25.3	157
7268	DCB1014b	0.37	1.2	19.9	25.3	138
Ortho-polyester CoRezyn 63-AX-051 resin with the bonded fabric (Collins Craft UC1018V) with polyester veil (initial crack is between the Veil-Veil interface), $[0]_6$						
7269	DCB1111a	0.38	0.0	47.1	25.4	202
7270	DCB1111b	0.38	0.8	49.6	25.4	258
7271	DCB1111c	0.38	1.8	52.3	25.4	315
7272	DCB1111d	0.38	3.4	54.4	25.4	351
7273	DCB1111e	0.38	5.0	61.4	25.4	506
7274	DCB1112a	0.37	0.0	49.2	25.4	229
7275	DCB1112b	0.37	3.6	49.0	25.4	294
7276	DCB1112c	0.37	8.3	50.3	25.4	340
Ortho-polyester CoRezyn 63-AX-051 resin with the bonded fabric (Collins Craft UC1018GV) with glass veil (initial crack is between the Veil-Veil interface), $[0]_6$						
7277	DCB1121a	0.37	0.0	46.1	25.4	209
7278	DCB1121b	0.37	2.1	57.1	25.4	360
7279	DCB1121c	0.37	4.8	57.4	25.4	405
7280	DCB1121d	0.37	7.5	56.1	25.4	453
7281	DCB1122a	0.36	0.0	47.2	25.2	167
7282	DCB1122b	0.36	2.9	47.2	25.2	187
7283	DCB1122c	0.36	7.7	55.3	25.2	325
Ortho-polyester CoRezyn 63-AX-051 resin with the bonded fabric (Collins Craft UC1018GV) with glass veil (initial crack is between the glass-glass interface), $[0]_6$						
7284	DCB1131a	0.37	0.0	36.2	25.4	130
7285	DCB1131b	0.37	4.1	30.7	25.4	116
7286	DCB1131c	0.37	8.7	34.3	25.4	182
7287	DCB1132a	0.38	0.0	33.7	25.5	98.0
7288	DCB1132b	0.38	2.7	39.2	25.5	165
7289	DCB1132c	0.38	5.8	44.4	25.5	241
Polyester PET P460, $[0]_6$, D155 fabric						
7290	DCB1021a	0.34	0.0	20.3	25.4	111
7291	DCB1021b	0.34	2.8	27.2	25.4	220
7292	DCB1021c	0.34	3.3	33.9	25.4	357
7293	DCB1022a	0.36	0.0	28.1	25.6	232
7294	DCB1022b	0.36	1.6	29.9	25.6	297
7295	DCB1023a	0.36	0.0	20.0	25.2	116
7296	DCB1023b	0.36	1.3	21.6	25.2	133
7297	DCB1025a	0.33	0.0	84.4	25.3	139
7298	DCB1025b	0.33	1.7	78.0	25.3	239
7299	DCB1026a	0.31	0.0	100.4	25.2	121

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
7300	DCB1026b	0.31	9.2	117.2	25.2	205
7301	DCB1026c	0.31	13.4	91.2	25.2	261
Polyester Arotran Q6038, $[0]_6$, D155 fabric						
7302	DCB1061a	0.35	0.0	86.3	23.7	153
7303	DCB1061b	0.35	5.3	88.7	23.7	309
7304	DCB1061c	0.35	8.6	68.5	23.7	243
Vinyl ester Swancorp 980 (batch a), $[0]_6$, D155 fabric						
7305	DCB1031a	0.32	0.0	138.8	25.1	1308
7306	DCB1031b	0.32	2.8	169.5	25.1	1758
7307	DCB1031c	0.32	6.8	164.7	25.1	2001
7308	DCB1031d	0.32	11.9	163.1	25.1	2407
7309	DCB1032a	0.32	0.0	158.2	25.3	1635
7310	DCB1032b	0.32	2.5	169.9	25.3	1666
7311	DCB1032c	0.32	4.9	161.5	25.3	1937
7312	DCB1032d	0.32	8.7	157.0	25.3	1945
7313	DCB1032e	0.32	10.4	155.2	25.3	2356
7314	DCB1033a	0.32	0.0	183.6	25.3	1754
7315	DCB1033b	0.32	1.1	191.0	25.3	2030
7316	DCB1033c	0.32	5.9	190.4	25.3	2396
7317	DCB1034a	0.31	0.0	142.0	25.2	1066
7318	DCB1034b	0.31	1.7	172.5	25.2	1906
7319	DCB1032c	0.31	5.8	195.2	25.2	2593
Vinyl ester Swancorp 980 (batch b), $[0]_6$, D155 fabric						
7320	DCB9801a	0.36	0.0	85.8	25.5	670
7321	DCB9801b	0.36	4.9	85.8	25.5	846
7322	DCB9801c	0.36	13.2	68.9	25.5	762
7323	DCB9801d	0.36	25.9	64.5	25.5	935
7324	DCB9802a	0.37	0.0	70.7	25.5	641
7325	DCB9802b	0.37	5.7	63.6	25.5	723
7326	DCB9802c	0.37	15.8	57.4	25.5	759
7327	DCB9803a	0.37	0.0	99.6	25.9	1070
7328	DCB9803b	0.37	5.4	73.8	25.9	786
7329	DCB9803c	0.37	10.9	67.2	25.9	889
Vinyl ester Swancorp 901& 980 (batch b), $[0]_6$, D155 fabric						
7330	DCB1001a	0.33	0.0	63.6	25.5	552
7331	DCB1001b	0.33	7.3	63.6	25.5	694
7332	DCB1001c	0.33	13.7	51.6	25.5	667
7333	DCB1002a	0.33	0.0	62.3	25.4	560
7334	DCB1002b	0.33	6.7	56.1	25.4	597
7335	DCB1002c	0.33	16.8	48.1	25.4	605
7336	DCB1003a	0.34	0.0	69.4	25.5	595
7337	DCB1003b	0.34	5.3	68.1	25.5	733
7338	DCB1003c	0.34	13.2	60.0	25.5	709
Vinyl ester Derakane 8084, $[0]_6$, D155 fabric						
7339	DCB1091a	0.39	0.0	58.1	25.5	348
7340	DCB1091b	0.39	2.8	63.7	25.5	442
7341	DCB1091c	0.39	6.1	71.5	25.5	669
7342	DCB1091d	0.39	8.6	48.0	25.5	382
7343	DCB1091e	0.39	10.8	54.2	25.5	517
7344	DCB1092a	0.40	0.0	54.5	25.4	335

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
7345	DCB1092b	0.40	2.9	66.0	25.4	671
7346	DCB1092c	0.40	10.5	50.6	25.4	481
7347	DCB1093a	0.40	0.0	56.0	25.2	347
7348	DCB1093b	0.40	3.8	73.5	25.2	673
7349	DCB1093c	0.40	7.1	72.3	25.2	797
Vinyl ester Derakane 411C50, $[0]_6$, D155 fabric						
7350	DCB1101a	0.39	0.0	45.6	25.3	231
7351	DCB1101b	0.39	3.5	61.6	25.3	493
7352	DCB1101c	0.39	5.5	59.6	25.3	600
7353	DCB1101d	0.39	7.9	54.4	25.3	549
7354	DCB1101e	0.39	11.7	63.3	25.3	821
7355	DCB1102a	0.39	0.0	44.2	25.3	238
7356	DCB1102b	0.39	4.4	46.5	25.3	298
7357	DCB1102c	0.39	8.2	54.0	25.3	493
Vinyl ester Swancorp 901, $[0]_6$, D155 fabric						
7358	DCB9011a	0.37	0.0	49.8	25.5	193
7359	DCB9011b	0.37	8.5	61.8	25.5	414
7360	DCB9011c	0.37	20.3	44.9	25.5	312
7361	DCB9012a	0.37	0.0	50.3	25.5	230
7362	DCB9012b	0.37	2.0	52.1	25.5	293
7363	DCB9012c	0.37	4.4	56.1	25.5	376
7364	DCB9013a	0.36	0.0	39.6	25.5	200
7365	DCB9013b	0.36	2.2	48.9	25.5	311
7366	DCB9013c	0.36	4.5	40.9	25.5	276
Epoxy System 41, $[0]_6$, D155 fabric						
7367	DCB1041a	0.34	0.0	78.0	24.9	240
7368	DCB1041b	0.34	4.1	73.5	24.9	263
7369	DCB1041c	0.34	9.3	66.8	24.9	280
7370	DCB1041d	0.34	13.6	59.1	24.9	302
7371	DCB1041e	0.34	22.1	58.9	24.9	383
7372	DCB1042a	0.33	0.0	87.1	25.8	220
7373	DCB1042b	0.33	3.5	81.4	25.8	240
7374	DCB1042c	0.33	5.6	68.4	25.8	228
7375	DCB1043a	0.33	0.0	69.2	28	196
7376	DCB1043b	0.33	3.3	74.8	28	189
7377	DCB1043c	0.33	7.2	78.7	28	261
Epoxy SC14, $[0]_6$, D155 fabric						
7378	DCB1071a	0.36	0.0	109.9	24.7	703
7379	DCB1071b	0.36	3.0	83.8	24.7	589
7380	DCB1071c	0.36	9.9	83.6	24.7	742
7381	DCB1071d	0.36	15.2	60.9	24.7	607
7382	DCB1071e	0.36	19.6	55.0	24.7	626
7383	DCB1072a	0.37	0.0	96.8	24.7	591
7384	DCB1072b	0.37	1.2	78.4	24.7	511
7385	DCB1073c	0.36	6.7	87.3	24.7	743
7386	DCB1073d	0.36	14.9	63.4	24.7	491
7387	DCB1073a	0.36	0.0	88.2	25	621
7388	DCB1073b	0.36	5.9	84.5	25	814
7389	DCB1073c	0.36	9.6	64.4	25	642

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
Epoxy SC12, $[0]_6$, D155 fabric						
7390	DCB1081a	0.40	0.0	61.4	25.3	379
7391	DCB1081b	0.40	4.1	56.8	25.3	445
7392	DCB1081c	0.40	10.2	57.6	25.3	592
7393	DCB1081d	0.40	13.7	44.7	25.3	490
7394	DCB1081e	0.40	26.0	47.7	25.3	649
7395	DCB1082a	0.40	0.0	55.8	25.3	315
7396	DCB1082b	0.40	4.7	55.5	25.3	409
7397	DCB1082c	0.40	7.6	46.8	25.3	371
Polyurethane Poly 15-D65, $[0]_6$, D155 fabric						
7398	DCB1051a	0.31	0.0	190.2	25.7	2411
7399	DCB1051b	0.31	3.1	173.7	25.7	2752
7400	DCB1051c	0.31	7.7	145.2	25.7	2407
7401	DCB1051d	0.31	17.8	139.5	25.7	2480
7402	DCB1052a	0.30	0.0	205.0	25.6	2914
Ortho-polyester CoRezyn 63-AX-051, $[0]_{10}$						
7403	DCB502a	0.39	8.8	82.5	26.42	263
7404	DCB502b	0.39	24.5	65.2	26.42	288
7405	DCB502c	0.39	36.3	56.5	26.42	349
7406	DCB502d	0.39	46.1	54.3	26.42	450
7407	DCB502e	0.39	58.0	43.4	26.42	388
7408	DCB502f	0.39	67.5	45.6	26.42	528
7409	DCB503b	0.39	18.4	72.7	26.24	326
7410	DCB503c	0.39	31.2	54.3	26.24	298
7411	DCB503d	0.39	43.7	50.9	26.24	379
7412	DCB504a	0.40	8.1	97.6	26.25	458
7413	DCB504b	0.40	18.6	78.3	26.25	398
7414	DCB504c	0.40	30.5	59.8	26.25	350
7415	DCB504d	0.40	42.1	47.8	26.25	340
7416	DCB505b	0.39	13.5	137.4	26.42	286
7417	DCB505c	0.39	23.6	103.3	26.42	286
7418	DCB505d	0.39	32.5	78.1	26.42	360
7419	DCB505e	0.39	39.3	70.1	26.42	313
7420	DCB505f	0.39	49.9	70.9	26.42	452
7421	DCB506a	0.39	4.8	162.5	26.52	385
7422	DCB506b	0.39	11.9	160.1	26.52	406
7423	DCB506c	0.39	18.5	148.7	26.52	525
7424	DCB506d	0.39	24.9	123.7	26.52	521
7425	DCB511a	0.42	0.0	118.4	26.43	220
7426	DCB515a	0.46	0.0	37.1	25.55	130
7427	DCB516a	0.46	0.0	39.5	25.46	103
7428	DCB517a	0.46	0.0	35.5	25.55	99.1
Ortho-polyester CoRezyn 63-AX-051, $[\pm 45]_{10}$						
7429	DCB210a	0.29	0.0	99.7	26.71	160
7430	DCB210b	0.29	0.4	110	26.71	657
7431	DCB210c	0.29	0.8	115	26.71	1070
7432	DCB210d	0.29	1.9	70.7	26.71	879
7433	DCB211a	0.29	0.0	71.2	27.03	203
7434	DCB211b	0.29	0.2	85.0	27.03	273
7435	DCB211c	0.29	0.4	106	27.03	463

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
7436	DCB211d	0.29	0.7	114	27.03	771
7437	DCB211e	0.29	1.2	103	27.03	1074
7438	DCB211f	0.29	1.8	85.9	27.03	1137
7439	DCB211g	0.29	2.7	67.6	27.03	1051
7440	DCB211h	0.29	3.2	58.7	27.03	999
Ortho-polyester CoRezyn 63-AX-051, $[0/0/\pm45]_S$. Tests 7441 - 7443 had a higher fiber volume fraction.						
7441	DCB303a	0.30	0.0	25.5	26.87	106
7442	DCB306a	0.30	0.0	25.7	27.44	127
7443	DCB403a	0.38	0.0	22.1	28.52	106
Ortho-polyester CoRezyn 63-AX-051, $[(45),(90)_2,(45)]_4$						
7444	DCB600a	0.35	0.0	113	26.92	235
7445	DCB600b	0.35	0.5	123	26.92	296
7446	DCB600c	0.35	2.9	127	26.92	326
7447	DCB600d	0.35	3.7	137	26.92	399
7448	DCB600e	0.35	5.2	140	26.92	429
7449	DCB608a	0.35	0.0	108	26.92	225
7450	DCB608b	0.35	0.4	114	26.92	262
7451	DCB608c	0.35	1.6	122	26.92	328
7452	DCB608d	0.35	3.3	133	26.92	397
7453	DCB611a	0.35	0.0	115	26.92	247
7454	DCB611b	0.35	0.9	123	26.92	318
7455	DCB611c	0.35	3.3	132	26.92	376
7456	DCB611d	0.35	4.5	138	26.92	450
7457	DCB611e	0.35	6.2	151	26.92	565
Ortho-polyester CoRezyn 63-AX-051, $[(45)_9, 90, (45)_8]$						
7458	DCB705	0.35	5.0	87.3	25.4	424
7459	DCB751	0.35	0.0	62.7	25.4	181
7460	DCB751b	0.35	1.0	76.3	25.4	308
7461	DCB751c	0.35	3.2	79.6	25.4	348
7462	DCB751d	0.35	4.0	91.2	25.4	498
7463	DCB752	0.35	0.0	56.0	25.4	132
7464	DCB752b	0.35	2.1	81.1	25.4	311
7465	DCB752c	0.35	4.3	91.0	25.4	406
7466	DCB752d	0.35	6.1	92.5	25.4	435
7467	DCB750c	0.35	2.6	96.5	25.4	370
7468	DCB750d	0.35	6.8	99.1	25.4	432
7469	DCB780a	0.35	0.0	64.5	25.4	261
7470	DCB780b	0.35	1.6	66.5	25.4	300
7471	DCB780c	0.35	3.5	74.6	25.4	400
7472	DCB780d	0.35	5.8	83.0	25.4	506
7473	DCB780e	0.35	6.7	87.8	25.4	604
7474	DCB781a	0.35	2.6	81.8	25.4	390
7258	DCB781b	0.35	6.1	104	25.4	696

ENF, G_{IIC}

Test	Coupon	V_F	C, mm	load, N	h, mm	E, GPa	G_{IIC} J/m^2
Ortho-polyester CoRezyn 63-AX-051, $[0]_6$							
7475	ENF1012	0.40	37.7	382	1.69	33.15	1169
7476	ENF1013	0.39	23.3	507	1.72	32.56	724
7477	ENF1014	0.40	18.6	734	1.68	33.36	1037
Polyester PET-P460, $[0]_6$							
7478	ENF1021	0.40	21.8	818	1.7	32.92	1729
7479	ENF1022	0.39	35.5	538	1.73	32.42	1848
7480	ENF1023	0.39	38.6	463	1.73	32.31	1679
7481	ENF1025	0.35	39	552	1.89	29.41	2072
Polyester Arotran Q6038, $[0]_6$							
7482	ENF1061	0.33	10.2	836	1.97	28.04	305
Vinylester Swancorp 980 (batch a), $[0]_6$							
7483	ENF1031	0.35	18.9	1219	1.91	29.21	2358
7484	ENF1032	0.33	26.7	1005	1.95	28.4	3017
7485	ENF1033	0.33	31.3	983	1.96	28.29	3972
Vinylester Derakane 411C50, $[0]_6$							
7486	ENF1101	0.43	24.9	801	1.56	35.45	2620
7487	ENF1102	0.43	37	534	1.57	35.22	2495
Vinylester Derakane 8084, $[0]_6$							
7488	ENF1091	0.43	18.6	934	1.57	35.17	1992
7489	ENF1092	0.43	26.5	805	1.54	35.86	3054
7490	ENF1093	0.43	30.9	681	1.57	35.29	2867
Epoxy System 41, $[0]_6$							
7491	ENF1041	0.35	17.4	1383	1.89	29.39	2593
7492	ENF1043	0.35	29.5	1005	1.89	29.53	3776
Epoxy SC14, $[0]_6$							
7493	ENF1071	0.39	18.9	1174	1.72	32.64	2769
7494	ENF1072	0.39	29.1	814	1.72	32.63	3110
7495	ENF1073	0.39	31.9	832	1.71	32.65	3791
Epoxy SC12, $[0]_6$							
7496	ENF1081	0.43	24.1	787	1.57	35.27	2350
7497	ENF1082	0.43	29.8	690	1.57	35.17	2710
Polyurethane Poly 15-D65, $[0]_6$							
7498	ENF1051	0.32	23.3	1192	1.99	27.6	3145
Ortho-polyester 63-AX-051, (0/0) crack interface, $[0]_{10}$							
7499	ENF502	0.39	40.56	873	2.68	----	1170
7500	ENF504	0.41	24.77	1189	2.51	----	1265
7501	ENF507	0.42	31.37	848	2.46	----	1073
7502	ENF508	0.42	24.87	1310	2.44	----	1663
Ortho-polyester 63-AX-051, (+45/-45) crack interface							
7503	ENF202	0.28	25.40	3860	6.31	----	1786
7504	ENF203	0.28	12.70	4688	6.3	----	1745
7505	ENF204	0.28	28.09	4143	6.43	----	2343
7506	ENF205	0.28	28.73	3801	6.36	----	2130
Polyester 63-AX-051, (90/45) crack interface, $[(\pm 45)_9, 90, (\pm 45)_8]$							
7507	ENF831	0.35	1.6	873	24.1	----	762
7508	ENF828	0.35	0.9	854	24.1	----	822
7509	ENF827	0.35	0.7	1054	23.9	----	1241

Mode I, G_{IC} Environmentally Conditioned

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
Ortho-polyester 63-AX-051, (0/0) crack interface, $[0]_6$, dry conditioned tested at 50°C						
8609	DCB1Da	0.35	0.0	44.4	25.5	263
8501	DCB1Db	0.35	11.9	46.2	25.5	444
8502	DCB1Dc	0.35	22.4	36.7	25.5	466
8503	DCB2Da	0.38	0.0	52.4	25.3	346
8504	DCB2Db	0.38	9.3	56.9	25.3	565
8505	DCB2Dc	0.38	21.5	39.2	25.3	474
8506	DCB3Da	0.38	0.0	44.9	25.5	252
8507	DCB3Db	0.38	3.8	49.8	25.5	372
8508	DCB3Dc	0.38	8.6	45.6	25.5	384
8509	DCB4Da	0.37	0.0	37.8	25.2	175
8510	DCB4Db	0.37	4.2	58.2	25.2	471
8511	DCB4Dc	0.37	10.3	57.3	25.2	529
Derakane 411, (0/0) crack interface, $[0]_6$, dry conditioned tested at 50°C						
8512	DCB1Da	0.40	0.0	54.7	25.5	510
8513	DCB1Db	0.40	7.0	56.4	25.5	590
8514	DCB1Dc	0.40	15.1	39.9	25.5	584
8515	DCB2Da	0.39	0.0	53.8	25.2	411
8516	DCB2Db	0.39	2.3	47.1	25.2	411
8517	DCB2Dc	0.39	8.2	48.4	25.2	603
8518	DCB3Da	0.39	0.0	57.2	25.5	525
8519	DCB3Db	0.39	4.2	52.7	25.5	544
8520	DCB3Dc	0.39	8.5	49.6	25.5	596
8521	DCB4Da	0.40	0.0	56.4	25.3	686
8522	DCB4Db	0.40	10.8	39.2	25.3	517
8523	DCB4Dc	0.40	17.6	39.3	25.3	676
Derakane 8084, (0/0) crack interface, $[0]_6$, dry conditioned tested at 50°C						
8524	DCB1Da	0.36	0.0	79.1	25.5	870
8525	DCB1Db	0.36	7.0	61.3	25.5	771
8526	DCB1Dc	0.36	17.7	50.7	25.5	751
8527	DCB2Da	0.37	0.0	71.6	25.6	770
8528	DCB2Db	0.37	5.9	67.6	25.6	917
8529	DCB2Dc	0.37	12.5	51.1	25.6	796
8530	DCB3Da	0.38	0.0	82.7	25.6	667
8531	DCB3Db	0.38	5.2	77.3	25.6	740
8532	DCB3Dc	0.38	9.3	75.9	25.6	909
8533	DCB4Da	0.37	0.0	79.5	25.5	818
8534	DCB4Db	0.37	8.1	60.6	25.5	676
8535	DCB4Dc	0.37	25.3	43.3	25.5	726
Epoxy SC-14, (0/0) crack interface, $[0]_6$, dry conditioned tested at 50°C						
8536	DCB1Da	0.33	0.0	72.5	25.6	737
8537	DCB1Db	0.33	7.4	99.6	25.6	1487
8538	DCB1Dc	0.33	13.6	90.7	25.6	1736
8539	DCB2Da	0.33	0.0	88.9	25.6	1036
8540	DCB2Db	0.33	6.5	93.3	25.6	1401
8541	DCB2Dc	0.33	13.7	89.8	25.6	1660
8542	DCB3Da	0.34	0.0	81.7	25.6	887
8543	DCB3Db	0.34	8.9	89.7	25.6	1385

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
8544	DCB3Dc	0.34	16.0	79.9	25.6	1452
8545	DCB4Da	0.34	0.0	80.5	25.6	782
8546	DCB4Db	0.34	4.5	82.7	25.6	1269
8547	DCB4Dc	0.34	13.2	75.5	25.6	1338
Iso-polyester, (0/0) crack interface, $[0]_6$, dry conditioned tested at 50°C						
8548	DCB1Da	0.39	0.0	51.9	26.8	311
8549	DCB1Db	0.39	2.7	61.1	26.8	489
8550	DCB1Dc	0.39	9.2	48.7	26.8	437
8551	DCB2Da	0.42	0.0	46.9	26.8	339
8552	DCB2Db	0.42	4.2	46.6	26.8	430
8553	DCB2Dc	0.42	8.3	47.9	26.8	539
8554	DCB3Da	0.42	0.0	37.5	26.8	258
8555	DCB3Db	0.42	3.3	39.3	26.8	358
8556	DCB3Dc	0.42	7.6	37.0	26.8	340
Ortho-polyester, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C						
8557	DCB7Wa	0.35	0	53.8	25.5	580
8558	DCB7Wb	0.35	4.7	50.7	25.5	523
8559	DCB7Wc	0.35	12.2	38.0	25.5	570
Derakane 411, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C						
8560	DCB6Wa	0.37	0	59.6	25.5	558
8561	DCB6Wb	0.37	7.0	53.3	25.5	521
8562	DCB6Wc	0.37	11.4	44.4	25.5	587
Derakane 8084, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C						
8563	DCB5Wa	0.37	0	73.8	25.6	921
8564	DCB5Wb	0.37	8.4	63.6	25.6	946
8565	DCB5Wc	0.37	18.0	52.4	25.6	856
8566	DCB6Wa	0.37	0	66.2	25.6	915
8567	DCB6Wb	0.37	12.0	53.3	25.6	730
8568	DCB6Wc	0.37	29.4	44.3	25.6	791
Epoxy SC-14, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C						
8569	DCB5Wa	0.34	0.0	66.2	25.8	734
8570	DCB6Wa	0.33	0	78.2	25.9	1161
8571	DCB6Wb	0.33	10.4	64.4	25.9	1108
8572	DCB6Wc	0.33	16.1	58.9	25.9	1253
Ortho-polyester, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 2900 hours, tested at 50°C						
8573	DCB5Wa	0.37	0	39.1	25.5	309
8574	DCB5Wb	0.37	3.7	42.4	25.5	452
8575	DCB5Wc	0.37	8.0	43.7	25.5	584
8576	DCB6Wa	0.37	0	53.8	25.5	551
8577	DCB6Wb	0.37	12.4	46.6	25.5	500
8578	DCB6Wc	0.37	18.7	42.1	25.5	532
8579	DCB8Wa	0.37	0	40.9	25.2	366
8580	DCB8Wb	0.37	6.7	43.5	25.2	484
8581	DCB8Wc	0.37	15.5	35.6	25.2	483
Derakane 411, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 2900 hours, tested at 50°C						
8582	DCB7Wa	0.38	0	55.9	25.6	467
8583	DCB7Wb	0.38	3.9	56.5	25.6	599
8584	DCB7Wc	0.38	16.8	47.0	25.6	765
8585	DCB8Wa	0.37	0	61.0	25.6	688
8586	DCB8Wb	0.37	3.6	56.8	25.6	682

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
8587	DCB8Wc	0.37	9.0	52.6	25.6	787

Derakane 8084, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 2900 hours, tested at 50°C

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
8588	DCB7Wa	0.37	0	84.4	25.6	711
8589	DCB7Wb	0.37	4.2	80.0	25.6	802
8590	DCB7Wc	0.37	10.0	72.0	25.6	902
8591	DCB8Wa	0.37	0	91.4	25.5	932
8592	DCB8Wb	0.37	3.2	79.9	25.5	875
8593	DCB8Wc	0.37	12.0	69.1	25.5	1062

Epoxy SC-14, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 2900 hours, tested at 50°C

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
8594	DCB7Wa	0.34	0	76.2	25.5	932
8595	DCB7Wb	0.34	4.2	60.9	25.5	802
8596	DCB7Wc	0.34	8.0	63.2	25.5	889
8597	DCB8Wa	0.37	0	66.4	25.5	1198
8598	DCB8Wb	0.37	2.3	72.5	25.5	816
8599	DCB8Wc	0.37	5.1	78.4	25.5	1141

Iso-polyester, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 889 hours, tested at 50°C

Test	Coupon	V_F	a, mm	load, N	width, mm	G_{IC}, J/m^2
8600	DCBis1Wa	0.42	0	46.3	26.8	350
8601	DCBis1Wb	0.42	3.3	52.3	26.8	521
8602	DCBis1Wc	0.42	8.3	58.3	26.8	828
8603	DCBis2Wa	0.43	0	44.9	26.8	469
8604	DCBis2Wb	0.43	2.6	42.2	26.8	434
8605	DCBis2Wc	0.43	10.4	39.6	26.8	446
8606	DCBis3Wa	0.42	0	59.1	26.7	438
8607	DCBis3Wb	0.42	4.2	53.9	26.7	535
8608	DCBis3Wc	0.42	8.0	59.2	26.7	607

ENF, G_{IIC} Environmentally conditioned

Ortho-polyester, (0/0) crack interface, $[0]_6$, dry control tested at 50°C

Test	Coupon	V_F	C, mm	load, N	h, mm	E, GPa	G_{IIC} J/m^2
8610	ENF1D	0.38	22.2	841	3.53	31.9	1733
8611	ENF2D	0.41	20.2	801	3.30	33.8	1505
8612	ENF3D	0.41	14.2	988	3.28	34.2	1139
8613	ENF4D	0.39	15.9	907	3.43	32.7	1112

Derakane 411, (0/0) crack interface, $[0]_6$, dry control tested at 50°C

Test	Coupon	V_F	C, mm	load, N	h, mm	E, GPa	G_{IIC} J/m^2
8614	ENF1D	0.43	24.5	832	3.12	35.7	2665
8615	ENF2D	0.42	18.8	979	3.23	34.6	2047
8616	ENF3D	0.43	19.9	925	3.18	35.2	2077
8617	ENF4D	0.43	41.9	525	3.12	35.7	3136

Derakane 8084, (0/0) crack interface, $[0]_6$, dry control tested at 50°C

Test	Coupon	V_F	C, mm	load, N	h, mm	E, GPa	G_{IIC} J/m^2
8618	ENF1D	0.39	24.8	939	3.48	32.3	2761
8619	ENF2D	0.4	19.2	992	3.38	33.3	1938
8620	ENF3D	0.41	15.9	1161	3.33	33.7	1886
8621	ENF4D	0.4	50.8	498	3.35	33.5	3531

Epoxy SC-14, (0/0) crack interface, $[0]_6$, dry control tested at 50°C

Test	Coupon	V_F	C, mm	load, N	h, mm	E, GPa	G_{IIC} J/m^2
8622	ENF1D	0.35	37.7	587	3.76	29.6	2153
8623	ENF2D	0.35	24.9	805	3.76	29.7	1762
8624	ENF3D	0.35	22.1	836	3.73	29.8	1503

Test	Coupon	V_F	C, mm	load, N	h, mm	E, GPa	G_{IIC} J/m^2
8625	ENF4D	0.36	18.5	872	3.66	30.6	1197
Iso-polyester, (0/0) crack interface, $[0]_6$, dry control tested at 50°C							
8626	ENF501D	0.42	40.4	494	3.20	34.9	2176
8627	ENF502D	0.45	40.4	498	2.97	37.1	2595
7259	ENF503D	0.45	40.4	876	2.97	37.1	8074
Ortho-polyester, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C							
8628	ENF7W	0.38	22.8	547	3.53	31.9	773
Derakane 411, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C							
8629	ENF5W	0.39	24.2	841	3.43	32.7	2152
8630	ENF6W	0.4	25.6	787	3.38	33.2	2193
Derakane 8084, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C							
8631	ENF5W	0.4	21.4	939	3.40	32.9	2131
8632	ENF6W	0.4	30.1	770	3.35	33.4	2915
Epoxy SC14, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C							
8633	ENF5W	0.35	15.7	850	3.73	29.8	777
8634	ENF6W	0.35	22.0	663	3.78	29.5	904
Iso-polyester, (0/0) crack interface, $[0]_6$, wet conditioned in 50°C water for 1000 hours, tested at 50°C							
8635	ENF1W	0.45	40.4	383	2.95	37.4	1563
8636	ENF2W	0.46	40.4	418	2.90	37.8	1942
8637	ENF3W	0.45	40.4	818	2.97	37.1	7097

VARIABLE AMPLITUDE LOADING

These data are described in detail in References 17, 18 and 20.

Description of fatigue loading spectra and comments for the following tests.

For fatigue cycling, the applied loads are described below as the peak and valley of the waveform. The data input files utilize a percentage of maximum applied load with 1.0 = maximum load, 0.1 = 10 percent of the maximum load. Positive is tensile, negative is compressive. Other general programs used were: WR = Instron Waverunner software, and CA= constant amplitude (R-value) test. An * signifies static (one - cycle) tests, which were performed at a displacement ramp rate of 13 mm/s.

As an example, program COMP3 is described as: COMP3- [1.0, 0.1] X10 + [0.75, 0.075] X 10 if the desired maximum fatigue stress is 500 MPa, the load sequence (peak, valley) for one pass of the data file would be: [500, 50, 500, 50, 500, 50, 500, 50, 500, 50, 500, 50, 500, 50, 500, 50, 500, 50, 500, 50, 375, 37.5, 375, 37.5, 375, 37.5, 375, 37.5, 375, 37.5, 375, 37.5, 375, 37.5, 375, 37.5, 375, 37.5, 375, 37.5]. This file would then repeat from the start and continue to repeat until coupon failure. All the program types for tests 7510 through 8499 are described below.

REPEATED BLOCKS OF TWO LOAD AMPLITUDES

COMP1-	[1.0, 0.1] X10 + [0.75, 0.075] X 1000
COMP2-	[1.0, 0.1] X10 + [0.75, 0.075] X 100
COMP3-	[1.0, 0.1] X10 + [0.75, 0.075] X 10
COMP4-	[1.0, 0.1] X10 + [0.75, 0.075] X 10000
LOAD1-	[1.0, 0.1] X10 + [0.7917, 0.0792] X1000
LOAD2-	[1.0, 0.1] X10 + [0.5833, 0.0583] X1000
LOAD3-	[1.0, 0.1] X10 + [0.50, 0.05] X1000
LOAD4-	[1.0, 0.1] X10 + [0.7368, 0.0737] X1000
LOAD5-	[1.0, 0.1] X10 + [0.6316, 0.0632] X1000
LOAD6-	[1.0, 0.1] X10 + [0.8571, 0.0858] X1000
LOAD7-	[1.0, 0.5] X10 + [0.7917, 0.0792] X1000
LOAD8-	[1.0, 0.5] X10 + [0.5833, 0.2917] X1000
LOAD9-	[1.0, 0.5] X10 + [0.7368, 0.3684] X1000
LOAD10-	[1.0, 0.1] X1000
LOAD11-	[1.0, 0.5] X1000
LOAD12-	[1.0, 0.5] X10 + [0.5833, 0.2917] X100
LOAD13-	[1.0, 0.5] X10 + [0.5833, 0.2917] X1000
LOAD14-	[1.0, 0.5] X10 + [0.7368, 0.3684] X1000
LOAD15-	[1.0, 0.5] X10 + [0.7368, 0.3686] X100
LOAD16-	[1.0, 0.5] X10 + [0.5833, 0.2917] X10000
LOAD17-	[1.0, 0.5] X10 + [0.7368, 0.3684] X10000
LOAD18-	[1.0, 0.1] X10 + [0.5833, 0.0583] X1000
RAND1-	[0.7917, 0.0792] with [1, 0.1] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RAND2-	[0.5833, 0.0583] with [1, 0.1] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RAND3-	[0.50, 0.05] with [1, 0.1] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RAND4-	[0.7368, 0.037] with [1, 0.1] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RAND5-	[0.6315, 0.0632] with [1, 0.1] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.

RAND6-	[0.8571, 0.0857] with [1, 0.1] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RAND7-	[0.7917, 0.0792] with [1, 0.5] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RAND8-	[0.5833, 0.2917] with [1, 0.5] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RAND9-	[0.7368, 0.3684] with [1, 0.5] at (25, 88, 129, 136, 212, 346, 582, 860, 922 and 992 cycles), 1010 total cycles per pass.
RANDOM1-	[0.632, 0.0632] with [1, 0.1] at (24, 61, 166, 263, 358, 637, 826, 834, 905 and 909 cycles), 996 total cycles per pass.
RANDOM2-	[0.632, 0.0632] with [1, 0.1] at (24, 61, 166, 263, 358, 637, 826, 834, 905 and 909 cycles), 1011 total cycles per pass.
RANDOM3-	[1, 0.1] X10 + [0.632, 0.0632] X1000
REVERS-	[1.0, -1.0] X1000
R10IN100-	[1.0, 0.1] X10 + [0.6316, 0.0632] X1000
R10LD1-	[1.0, 0.1] X10 + [0.6316, 0.0632] X100
R10LD2-	[1.0, 0.1] X10 + [0.6316, 0.0632] X10
R1IN100-	[1.0, 0.1] X1 + [0.6316, 0.0632] X100
RVR1-	[1.0, -1.0] X10 + [0.6, -0.6] X 10
RVR2-	[1.0, -1.0] X10 + [0.6, -0.6] X 100
RVR3-	[1.0, -1.0] X10 + [0.6, -0.6] X 1000
RVR4-	[1.0, -1.0] X10 + [0.6, -0.6] X 10000

MODIFIED AND UNMODIFIED WISPERX SPECTRA.

Copies of WISPER and WISPERX data files were obtained over the Internet from NLR in the Netherlands. at http://www.nlr.nl/public/. Copies of the NLR papers on WISPER and WISPERX can also be downloaded from this site. WISPERX is included in its entirety in NLR TP 91476. Page 27 of NLR TP 91476 gives addresses and phone numbers for requesting copies of WISPER and WISPERX on magnetic media. Complete cycles to failure are reported. A segment is defined as the stress path from one stress point to the next (local maximum to local minimum, or visa versa). The number of segments divided by 2 equal the number of cycles to failure listed in the data.

UNMODIFIED WISPERX

The WISPERX file contains a data stream of peaks and valleys for a loading sequence between values of 1 to 64. Compression was defined as values 1 to 25 and tensile as 25 to 64, with a zero stress value defined as 25. The WISPERX file was recalculated to values between 0.0 and 1.0 by the expression y = (x-25)/(64-25), where each file entry was input as the variable x. The very first entry in the unmodified WISPERX file was 25; consequently, the first entry in the recalculated wisperx file was 0.0. That is, the first entry is a no-load condition. This new file would have a maximum entry of 1.0 and a minimum entry of -0.6154. This spectra has 12831 cycles (25662 segments).

The other four spectra were then created (modified) from this recalculated data file (wisperx).

Wispk (MOD2):

Consider the waveform to be a sequence of peaks and valleys. The first entry is zero, symbolizing a no-load starting point. Each following even numbered entry, (eg. 2nd, 4th, 6th values in the stream) would be peaks while the odd entries (3rd, 5th, 7th values) would be valleys. The peak and its following valley (eg, the 2nd and 3rd values in the stream) values were considered to define the max and min of a cycle. Wispk was constructed by reading each peak value from the recalculated WISPERX file and calculating a new valley value by multiplying the cycle's peak value by 0.1. This then gives the constant R-value of 0.1. The peak value and the new valley value were saved to a new file, Wispk. The old valley values were never used. This spectra has 12831 cycles (25662 segments).

Wismix (MOD3):

This was an attempt to provide a mix of only 0.1 and 0.5 R-values. This was created similar to that for the Wispk waveform. Each peak and valley value were read and used to calculate an R-value of the original WISPERX file (would be the same in the recalculated WISPERX file, wisperx). A comparison was made of the original R-value to R-values of 0.1 and 0.5. If the original were closer to 0.1 than to 0.5 the cycle was forced to an R-value of 0.1 by replacing the valley value by 0.1multiplied by the peak value. Conversely, if the original R-value were closer to 0.5 than to 0.1, the cycle was forced to an R-value of 0.5 by replacing the valley value by 0.5 multiplied by the peak value. This spectra has 12687 cycles (25374 segments).

MOD1 SPECTRA (WisxR01 and WisxR05)

WisxR01 (MOD1, R=0.1):

This waveform was created by reading the maximum and minimum for each cycle. The cycle was retained if it was tension-tension. Each remaining valley value was replaced with 0.1multiplied by the peak value. This waveform would be similar to Wispk, with the exception of the removal of the handful of cycles that were reversing cycles. Unfortunately, the single large event (largest peak value) is followed by a compressive minimum load. The method used to create this file then removed the largest event. This waveform is of constant R-value, 0.1. This spectra has 12687 cycles (25374 segments).

WisxR05 (MOD1, R=0.5):

Nearly the same process, as described in WisxR01, was used to create this waveform. The only exception is that the retained cycle's valley values were replaced with 0.5 multiplied by the peak value. This waveform is of constant R-value, 0.5. This spectra has 12687 cycles (25374 segments).

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
MATERIAL DD5P									
7510	6	1 cycle	766	*	13	----	----	1	WR
7511	7	1 cycle	813	*	13	----	----	1	WR
7512	8	1 cycle	824	*	13	----	----	1	WR
7513	85	1 cycle	716	*	13	----	----	1	WR
7514	105	1 cycle	741	*	13	----	----	1	WR
7515	2	constant amplitude	414	0.1	10	----	----	4717	WR
7516	3	constant amplitude	414	0.1	10	----	----	2711	WR
7517	4	constant amplitude	414	0.1	10	----	----	1812	WR
7518	9	constant amplitude	414	0.1	10	----	----	3711	WR
7519	32	constant amplitude	414	0.1	10	----	----	4221	WR
7520	70	constant amplitude	414	0.1	10	----	----	1743	WR
7521	71	constant amplitude	414	0.1	10	----	----	1767	WR
7522	72	constant amplitude	414	0.1	10	----	----	1017	WR
7523	75	constant amplitude	414	0.1	10	----	----	1515	WR
7524	84	constant amplitude	414	0.1	10	----	----	1697	WR
7525	103	constant amplitude	414	0.1	10	----	----	1496	WR
7526	106	constant amplitude	414	0.1	10	----	----	5660	WR
7527	97	2 block, 10H/10L	414 / 241	0.1	10	4024	4020	8044	WR
7528	99	2 block, 10H/10L	414 / 241	0.1	10	5956	5950	11906	WR
7529	48	2 block, 10H/56L	414 / 241	0.1	10	8610	44720	53330	WR
7530	38	2 block, 10H/56L	414 / 241	0.1	10	10100	52468	62568	WR
7531	73	2 block, 10H/56L	414 / 241	0.1	10	1130	5824	6954	WR
7532	74	2 block, 10H/56L	414 / 241	0.1	10	1980	10244	12224	WR
7533	76	2 block, 10H/56L	414 / 241	0.1	10	1190	6188	7378	WR
7534	40	2 block, 10H/112L	414 / 241	0.1	10	5040	56336	61376	WR
7535	44	2 block, 10H/112L	414 / 241	0.1	10	6440	72016	78456	WR
7536	90	2 block, 10H/112L	414 / 241	0.1	10	720	7952	8672	WR
7537	101	2 block, 10H/112L	414 / 241	0.1	10	5337	59696	65033	WR
7538	104	2 block, 10H/112L	414 / 241	0.1	10	2380	26544	28924	WR
7539	77	2 block, 10H/112L	414 / 241	0.1	10	1080	11984	13064	WR
7540	20	2 block, 5H/56L	414 / 241	0.1	10	7950	88928	96878	WR
7541	28	2 block, 10H/112L	414 / 241	0.1	10	7855	87808	95663	WR
7542	25	2 block, 5H/165L	414 / 241	0.1	10	6880	226061	232941	WR
7543	26	2 block, 5H/165L	414 / 241	0.1	10	6415	211530	217945	WR
7544	39	2 block, 10H/334L	414 / 241	0.1	10	4340	144622	148962	WR
7545	46	2 block, 10H/334L	414 / 241	0.1	10	3920	130594	134514	WR
7546	78	2 block, 10H/334L	414 / 241	0.1	10	1150	38076	39226	WR
7547	94	2 block, 10H/334L	414 / 241	0.1	10	782	26052	26834	WR
7548	23	2 block, 5H/1500L	414 / 241	0.1	10	2025	607500	609525	WR
7549	24	2 block, 5H/1500L	414 / 241	0.1	10	3090	925500	928590	WR
7550	27	2 block, 5H/500L	414 / 241	0.1	10	2850	285000	287850	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7551	36	2 block, 5H/500L	414 / 241	0.1	10	3270	327000	330270	WR
7552	37	2 block, 10H/667L	414 / 241	0.1	10	2860	189428	192288	WR
7553	41	2 block, 10H/667L	414 / 241	0.1	10	1727	114057	115784	WR
7554	82	2 block, 10H/667L	414 / 241	0.1	10	520	34017	34537	WR
7555	95	2 block, 10H/667L	414 / 241	0.1	10	903	60030	60933	WR
7556	42	2 block, 10H/1000L	414 / 241	0.1	10	3670	366000	369670	WR
7557	45	2 block, 10H/1000L	414 / 241	0.1	10	2780	277000	279780	WR
7558	79	2 block, 10H/1000L	414 / 241	0.1	10	470	46000	46470	WR
7559	89	2 block, 10H/1000L	414 / 241	0.1	10	293	28527	28820	WR
7560	100	2 block, 10H/1000L	414 / 241	0.1	10	2416	241000	243416	WR
7561	43	2 block, 10H/3000L	414 / 241	0.1	10	1960	588000	589960	WR
7562	47	2 block, 10H/3000L	414 / 241	0.1	10	1330	399000	400330	WR
7563	92	2 block, 10H/3000L	414 / 241	0.1	10	1102	330000	331102	WR
7564	96	2 block, 10H/3000L	414 / 241	0.1	10	710	213000	213710	WR
7565	22	2 block, 5H/4500L	414 / 241	0.1	10	1600	1435500	1437100	WR
7566	29	2 block, 5H/45000L	414 / 241	0.1	10	400	1800000	1800400	WR
7567	19	2 block, 10H/9000L	414 / 241	0.1	10	670	594000	594670	WR
7568	81	2 block, 10H/9000L	414 / 241	0.1	10	30	25918	25948	WR
7569	91	2 block, 10H/9000L	414 / 241	0.1	10	50	45000	45050	WR
7570	102	2 block, 10H/9000L	414 / 241	0.1	10	795	711000	711795	WR
7571	107	2 block, 10H/9000L	414 / 241	0.1	10	680	609298	609978	WR
7572	31	constant amplitude	241	0.1	10		4501339	4501339	WR
7573	83	constant amplitude	241	0.1	10		628444	628444	WR
7574	93	constant amplitude	241	0.1	10		1407916	1407916	WR
7575	98	constant amplitude	241	0.1	10		3403091	3403091	WR
7576	17	constant amplitude	241	0.1	10		3096821	3096821	WR
7577	18	constant amplitude	241	0.1	30		1709382	1709382	WR
7578	11	constant amplitude	500	0.1	10	877		877	WR
7579	13	constant amplitude	500	0.1	10	584		584	WR
7580	14	constant amplitude	690	0.1	10	28		28	WR
7581	33	constant amplitude	690	0.1	10	67		67	WR
7582	34	constant amplitude	500	0.1	10	1113		1113	WR
7583	35	constant amplitude	690	0.1	10	39		39	WR
7584	86	constant amplitude	500	0.1	10	463		463	WR
7585	87	constant amplitude	500	0.1	10	527		527	WR
MATERIAL DD11									
7586	114	1 cycle	508	*	13	1		1	WR
7587	115	1 cycle	577	*	13	1		1	WR
7588	108	constant amplitude	414	0.1	10	97		97	WR
7589	111	constant amplitude	414	0.1	10	226		226	WR
7590	123	constant amplitude	414	0.1	10	801		801	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7591	124	constant amplitude	414	0.1	10	392		392	WR
7592	119	constant amplitude	414	0.1	10	29		29	WR
7593	109	constant amplitude	241	0.1	10		217518	217518	WR
7594	110	constant amplitude	241	0.1	10		208911	208911	WR
7595	127	constant amplitude	241	0.1	10		107287	107287	WR
7596	116	constant amplitude	472	0.1	10	37		37	WR
7597	117	constant amplitude	341	0.1	10	2729		2729	WR
7598	118	constant amplitude	462	0.1	10	78		78	WR
7599	122	2 block, 10H/10L	414 / 241	0.1	10	368	360	728	WR
7600	120	2 block, 10H/112L	414 / 241	0.1	10	576	6384	6960	WR
7601	126	2 block, 10H/112L	414 / 241	0.1	10	237	2576	2813	WR
7602	112	2 block, 10H/334L	414 / 241	0.1	10	21	668	689	WR
7603	121	2 block, 10H/1000L	414 / 241	0.1	10	88	8000	8088	WR
7604	125	2 block, 10H/112L	386 / 225	0.1	10	1228	13664	14892	WR
7605	113	2 block, 10H/3000L	414 / 241	0.1	10	104	30000	30104	WR
MATERIAL DD16									
7606	128	1 cycle	493	*	13	----	----	1	WR
7607	141	1 cycle	524	*	13	----	----	1	WR
7608	173	1 cycle	493	*	13	----	----	1	WR
7609	268	1 cycle	473	*	13	----	----	1	WR
7610	269	1 cycle	468	*	13	----	----	1	WR
7611	270	1 cycle	465	*	13	----	----	1	WR
7612	271	1 cycle	489	*	13	----	----	1	WR
7613	272	1 cycle	473	*	13	----	----	1	WR
7614	273	1 cycle	646	*	13	----	----	1	WR
7615	274	1 cycle	680	*	13	----	----	1	WR
7616	296	1 cycle	489	*	13	----	----	1	WR
7617	306	1 cycle	673	*	13	----	----	1	WR
7618	329	1 cycle	542	*	13	----	----	1	WR
7619	349	1 cycle	558	*	13	----	----	1	WR
7620	283	1 cycle	649	*	13	----	----	1	WR
7621	383	1 cycle	652	*	13	----	----	1	WR
7622	410	1 cycle	638	*	13	----	----	1	WR
7623	430	1 cycle	598	*	13	----	----	1	WR
7624	479	1 cycle	657	*	13	----	----	1	WR
7625	474	1 cycle	629	*	13	----	----	1	WR
7626	635	1 cycle	670	*	13	----	----	1	WR
7627	652	1 cycle	619	*	13	----	----	1	WR
7628	653	1 cycle	676	*	13	----	----	1	WR
7629	655	1 cycle	688	*	13	----	----	1	WR
7630	666	1 cycle	670	*	13	----	----	1	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7631	671	1 cycle	687	*	13	----	----	1	WR
7632	726a	1 cycle	647	*	13	----	----	1	WR
7633	739	1 cycle	644	*	13	----	----	1	WR
7634	756	1 cycle	664	*	13	----	----	1	WR
7635	765	1 cycle	621	*	13	----	----	1	WR
7636	774	1 cycle	686	*	13	----	----	1	WR
7637	783	1 cycle	696	*	13	----	----	1	WR
7662	646	1 cycle	569	*	13	----	----	1	WR
7083	1463	1 cycle	671	*	13	----	----	1	CA
7638	812	1 cycle	-399	*	13	----	----	1	WR
7639	818	1 cycle	-396	*	13	----	----	1	WR
7640	824	1 cycle	-405	*	13	----	----	1	WR
7641	830	1 cycle	-368	*	13	----	----	1	WR
7642	831	1 cycle	-410	*	13	----	----	1	WR
7643	832	1 cycle	-368	*	13	----	----	1	WR
7644	833	1 cycle	-416	*	13	----	----	1	WR
7645	834	1 cycle	-379	*	13	----	----	1	WR
7646	835	1 cycle	-435	*	13	----	----	1	WR
7647	865	1 cycle	-427	*	13	----	----	1	WR
7648	866	1 cycle	-408	*	13	----	----	1	WR
7649	867	1 cycle	-406	*	13	----	----	1	WR
7650	868	1 cycle	-387	*	13	----	----	1	WR
7651	869	1 cycle	-419	*	13	----	----	1	WR
7652	880	1 cycle	-371	*	13	----	----	1	WR
7653	881	1 cycle	-404	*	13	----	----	1	WR
7654	882	1 cycle	-427	*	13	----	----	1	WR
7655	883	1 cycle	-397	*	13	----	----	1	WR
7656	884	1 cycle	-421	*	13	----	----	1	WR
7657	885	1 cycle	-394	*	13	----	----	1	WR
7658	886	1 cycle	-411	*	13	----	----	1	WR
7659	887	1 cycle	-374	*	13	----	----	1	WR
7660	888	1 cycle	-415	*	13	----	----	1	WR
7661	889	1 cycle	-413	*	13	----	----	1	WR
8900	949	1 cycle	-367	*	13	----	----	1	CA
7082	1450	1 cycle	-414	*	13	----	----	1	CA
7663	139	constant amplitude	330 / 33	0.1	10	----	----	2297	WR
7664	140	constant amplitude	323 / 32	0.1	10	----	----	1914	WR
7665	151	constant amplitude	205 / 21	0.1	10	----	----	274271	WR
7666	152	constant amplitude	202 / 20	0.1	10	----	----	294549	WR
7667	153	constant amplitude	201 / 20	0.1	10	----	----	382826	WR
7668	484	constant amplitude	327 /33	0.1	10	----	----	936	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7669	485	constant amplitude	206 /21	0.1	10	----	----	286613	WR
7670	486	constant amplitude	413 /41	0.1	10	----	----	1119	WR
7671	282	constant amplitude	413 /41	0.1	10	----	----	85	WR
7672	284	constant amplitude	242 /24	0.1	10	----	----	109547	WR
7673	297	constant amplitude	414 /41	0.1	10	----	----	491	WR
7674	298	constant amplitude	414 /41	0.1	10	----	----	356	WR
7675	302	constant amplitude	241 /24	0.1	10	----	----	54487	WR
7676	305	constant amplitude	207 /21	0.1	10	----	----	121190	WR
7677	308	constant amplitude	412 /41	0.1	10	----	----	91	WR
7678	309	constant amplitude	207 / 21	0.1	10	----	----	373306	WR
7679	313	constant amplitude	414 / 41	0.1	10	----	----	429	WR
7680	321	constant amplitude	328 / 33	0.1	10	----	----	2611	WR
7681	323	constant amplitude	242 / 24	0.1	10	----	----	16884	WR
7682	325	constant amplitude	327 / 33	0.1	10	----	----	8653	WR
7683	326	constant amplitude	241 / 24	0.1	10	----	----	104679	WR
7684	344	constant amplitude	183 / 18	0.1	10	----	runout	561088	WR
7685	363	constant amplitude	327 / 33	0.1	10	----	----	3139	WR
7686	376	constant amplitude	327 / 33	0.1	10	----	----	1706	WR
7687	378	constant amplitude	207 / 21	0.1	10	----	----	261287	WR
7688	391	constant amplitude	207 / 21	0.1	10	----	----	421272	WR
7689	433	constant amplitude	414 / 41	0.1	10	----	----	757	WR
7690	434	constant amplitude	331 / 33	0.1	10	----	----	3744	WR
7691	435	constant amplitude	241 / 24	0.1	10	----	----	181518	WR
7692	436	constant amplitude	206 / 21	0.1	10	----	----	1137595	WR
7693	554	constant amplitude	326 / 33	0.1	10	----	----	763	WR
7694	577	constant amplitude	410 / 41	0.1	10	----	----	310	WR
7695	578	constant amplitude	410 / 41	0.1	10	----	----	274	WR
7696	579	constant amplitude	410 / 41	0.1	10	----	----	283	WR
7697	580	constant amplitude	410 / 41	0.1	10	----	----	334	WR
7698	581	constant amplitude	324 /32	0.1	10	----	----	4375	WR
7699	582	constant amplitude	325 / 33	0.1	10	----	----	4190	WR
7700	583	constant amplitude	325 / 33	0.1	10	----	----	2620	WR
7701	584	constant amplitude	325 / 33	0.1	10	----	----	1306	WR
7702	585	constant amplitude	240 / 24	0.1	10	----	----	186268	WR
7703	586	constant amplitude	240 / 24	0.1	10	----	----	89527	WR
7704	587	constant amplitude	240 / 24	0.1	10	----	----	35109	WR
7705	588	constant amplitude	240 / 24	0.1	10	----	----	187293	WR
7706	589	constant amplitude	206 / 21	0.1	10	----	----	697446	WR
7707	590	constant amplitude	206 / 21	0.1	10	----	----	436185	WR
7708	591	constant amplitude	206 / 21	0.1	10	----	----	732874	WR
7709	592	constant amplitude	206 / 21	0.1	10	----	----	366748	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7710	607	constant amplitude	326 / 33	0.1	10	----	----	1690	WR
7711	609	constant amplitude	240 / 24	0.1	10	----	----	58826	WR
7712	611	constant amplitude	206 / 21	0.1	10	----	----	318890	WR
7713	129	constant amplitude	414 / 41	0.1	10	----	----	78	WR
7714	130	constant amplitude	414 / 41	0.1	10	----	----	149	WR
7715	131	constant amplitude	241 / 24	0.1	10	----	----	141377	WR
7716	138	constant amplitude	241 / 24	0.1	10	----	----	143456	WR
7717	147	constant amplitude	241 / 24	0.1	10	----	----	31943	WR
7718	148	constant amplitude	414 / 24	0.1	10	----	----	155	WR
7719	160	constant amplitude	207 / 21	0.1	10	----	----	495397	WR
7720	161	constant amplitude	328 / 33	0.1	10	----	----	1722	WR
7721	168	constant amplitude	328 / 33	0.1	10	----	----	744	WR
7722	169	constant amplitude	207 / 21	0.1	10	----	----	588371	WR
7723	171	constant amplitude	328 / 33	0.1	10	----	----	3152	WR
7724	172	constant amplitude	414 / 41	0.1	10	----	----	162	WR
7725	174	constant amplitude	207 / 21	0.1	10	----	----	37855	WR
7726	606	constant amplitude	414 / 41	0.1	10	----	----	286	load10
7727	608	constant amplitude	328 / 33	0.1	10	----	----	1794	load10
7728	610	constant amplitude	241 / 24	0.1	10	----	----	43618	load10
7729	605	constant amplitude	414 / 41	0.1	10	----	----	783	load10
7730	616	constant amplitude	328 / 33	0.1	10	----	----	1081	load10
7731	618	constant amplitude	328 / 33	0.1	10	----	----	769	load10
7732	620	constant amplitude	414 / 41	0.1	10	----	----	234	load10
7733	622	constant amplitude	414 / 41	0.1	10	----	----	290	load10
7734	624	constant amplitude	414 / 41	0.1	10	----	----	161	load10
7735	626	constant amplitude	207 / 41	0.1	10	----	----	496355	load10
7736	628	constant amplitude	207 / 21	0.1	10	----	----	129134	load10
7737	630	constant amplitude	241 / 54	0.1	10	----	----	57742	load10
7738	633	constant amplitude	241 / 24	0.1	10	----	----	43491	load10
7739	612	constant amplitude	207 / 21	0.1	10	----	----	418886	load10
7740	617	constant amplitude	328 / 33	0.1	10	----	----	2433	load10
7741	619	constant amplitude	328 / 33	0.1	10	----	----	2329	load10
7742	621	constant amplitude	414 / 41	0.1	10	----	----	180	load10
7743	623	constant amplitude	414 / 41	0.1	10	----	----	311	load10
7744	625	constant amplitude	207 / 21	0.1	10	----	----	41493	load10
7745	627	constant amplitude	207 / 21	0.1	10	----	----	598609	load10
7746	629	constant amplitude	207 / 21	0.1	10	----	----	78888	load10
7747	632	constant amplitude	241 / 24	0.1	10	----	----	37576	load10
7748	634	constant amplitude	241 / 24	0.1	10	----	----	163745	load10
7749	744	constant amplitude	414 / 41	0.1	10	----	----	642	load10
7750	745	constant amplitude	328 / 33	0.1	10	----	----	1290	load10

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7751	746	constant amplitude	241 / 24	0.1	10	----	----	31733	load10
7752	747	constant amplitude	207 / 21	0.1	10	----	----	544532	load10
7753	784	constant amplitude	414 / 41	0.1	10	----	----	343	load10
7754	788	constant amplitude	328 / 33	0.1	10	----	----	815	load10
7755	792	constant amplitude	241 / 24	0.1	10	----	----	115525	load10
8820	1467	constant amplitude	131 / 13	0.1	15	----	----	18875235	CA
8821	1470	constant amplitude	131 / 13	0.1	10	----	----	11498621	CA
8822	1476	constant amplitude	131 / 13	0.1	15	----	----	6512715	CA
8827	1457	constant amplitude	155 / 16	0.1	6	----	----	2845820	CA
8828	1466	constant amplitude	155 / 16	0.1	6	----	----	3772282	CA
7756	636	constant amplitude	241 / 121	0.5	10	----	----	464516	load11
7757	638	constant amplitude	241 / 121	0.5	10	----	----	460884	load11
7758	640	constant amplitude	241 / 121	0.5	10	----	----	98521	load11
7759	642	constant amplitude	328 / 164	0.5	10	----	----	5801	load11
7760	644	constant amplitude	328 / 164	0.5	10	----	----	24381	load11
7761	648	constant amplitude	414 / 207	0.5	10	----	----	438	load11
7762	650	constant amplitude	414 / 207	0.5	10	----	----	1169	load11
7763	641	constant amplitude	328 / 164	0.5	10	----	----	7421	load11
7764	643	constant amplitude	328 / 164	0.5	10	----	----	6548	load11
7765	645	constant amplitude	328 / 164	0.5	10	----	----	19568	load11
7766	647	constant amplitude	414 / 207	0.5	10	----	----	2609	load11
7767	649	constant amplitude	414 / 207	0.5	10	----	----	2507	load11
7768	651	constant amplitude	414 / 207	0.5	10	----	----	1475	load11
7769	672	constant amplitude	328 / 164	0.5	10	----	----	1400	load11
7770	673	constant amplitude	241 / 121	0.5	10	----	----	100193	load11
7771	717	constant amplitude	414 / 207	0.5	10	----	----	2886	load11
7772	718	constant amplitude	414 / 207	0.5	10	----	----	1412	load11
7773	719	constant amplitude	328 / 164	0.5	10	----	----	21037	load11
7774	720	constant amplitude	328 / 164	0.5	10	----	----	120101	load11
7775	721	constant amplitude	241 / 121	0.5	10	----	----	272818	load11
7776	722	constant amplitude	241 / 121	0.5	10	----	----	545546	load11
7777	785	constant amplitude	414 / 207	0.5	10	----	----	400	load11
7778	789	constant amplitude	328 / 164	0.5	10	----	----	11812	load11
7779	796	constant amplitude	-277 / -28	10	10	----	----	11608	load10
7780	797	constant amplitude	-277 / -28	10	10	----	----	2463	load10
7781	798	constant amplitude	-276 / -28	10	10	----	----	2727	load10
7782	799	constant amplitude	-280 / -28	10	10	----	----	5904	load10
7783	800	constant amplitude	-277 / -28	10	10	----	----	5123	load10
7784	801	constant amplitude	-242 / -28	10	10	----	----	379064	load10
7785	802	constant amplitude	-244 / -24	10	10	----	----	54873	load10
7786	803	constant amplitude	-243 / -24	10	10	----	----	11145	load10

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7787	804	constant amplitude	-243 / -24	10	10	----	----	11738	load10
7788	805	constant amplitude	-245 / -25	10	10	----	----	21240	load10
7789	806	constant amplitude	-259 / -26	10	10	----	----	5010	load10
7790	807	constant amplitude	-211 / -21	10	10	----	----	487946	load10
7791	808	constant amplitude	-214 / -21	10	10	----	----	993821	load10
7792	809	constant amplitude	-208 / -21	10	10	----	----	1859843	load10
7793	810	constant amplitude	-208 / -21	10	10	----	----	1747111	load10
7794	811	constant amplitude	-209 / -21	10	10	----	----	1464645	load10
7795	813	constant amplitude	-276 / -28	10	10	----	----	2469	load10
7796	814	constant amplitude	-276 / -28	10	10	----	----	4353	load10
7797	816	constant amplitude	-277 / -28	10	10	----	----	3850	load10
7798	817	constant amplitude	-277 / -28	10	10	----	----	15393	load10
7799	819	constant amplitude	-243 / -24	10	10	----	----	14172	load10
7800	820	constant amplitude	-243 / -24	10	10	----	----	36657	load10
7801	821	constant amplitude	-241 / -24	10	10	----	----	6704	load10
7802	822	constant amplitude	-242 / -24	10	10	----	----	9235	load10
7803	823	constant amplitude	-243 / -24	10	10	----	----	67973	load10
7804	825	constant amplitude	-208 / -21	10	10	----	----	1505733	load10
7805	826	constant amplitude	-208 / -21	10	10	----	----	1980344	load10
7806	827	constant amplitude	-210 / -21	10	10	----	----	1037244	load10
7807	828	constant amplitude	-215 / -21	10	10	----	----	1508674	load10
7808	829	constant amplitude	-208 / -21	10	10	----	----	842537	load10
7809	920	constant amplitude	-324 / -32	10	10	----	----	131	load10
7810	921	constant amplitude	-322 / -32	10	10	----	----	364	load10
7811	922	constant amplitude	-323 / -32	10	10	----	----	415	load10
7812	923	constant amplitude	-335 / -34	10	10	----	----	334	load10
7813	924	constant amplitude	-323 / -32	10	10	----	----	533	load10
7814	925	constant amplitude	-322 / -32	10	10	----	----	1019	load10
7815	926	constant amplitude	-322 / -32	10	10	----	----	327	load10
7816	927	constant amplitude	-333 / -33	10	10	----	----	322	load10
7817	928	constant amplitude	-323 / -32	10	10	----	----	433	load10
7818	929	constant amplitude	-325 / -33	10	10	----	----	104	load10
7819	855	constant amplitude	-278 / -28	10	10	----	----	4063	load10
7820	856	constant amplitude	-277 / -28	10	10	----	----	4410	load10
7821	857	constant amplitude	-275 / -28	10	10	----	----	1957	load10
7822	858	constant amplitude	-277 / -28	10	10	----	----	8288	load10
7823	859	constant amplitude	-276 / -28	10	10	----	----	10692	load10
7824	860	constant amplitude	-208 / -21	10	10	----	----	2021912	load10
7825	861	constant amplitude	-216 / -22	10	10	----	----	943072	load10
7826	862	constant amplitude	-208 / -21	10	10	----	----	205084	load10
7827	863	constant amplitude	-216 / -22	10	10	----	----	1884110	load10

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7828	864	constant amplitude	-207 / -21	10	10	----	----	235297	load10
8823	1455	constant amplitude	-179 / -18	10	12	----	----	5988139	CA
8824	1469	constant amplitude	-179 / -18	10	15	----	----	17223430	CA
7829	335	constant amplitude	413 / 207	0.5	10	----	----	4701	WR
7830	336	constant amplitude	327 / 163	0.5	10	----	----	32173	WR
7831	337	constant amplitude	241 / 120	0.5	10	----	----	1469317	WR
7832	343	constant amplitude	241 / 120	0.5	10	----	----	350682	WR
7833	346	constant amplitude	413 / 207	0.5	10	----	----	3836	WR
7834	347	constant amplitude	327 / 163	0.5	10	----	----	20006	WR
7835	408	constant amplitude	413 / 207	0.5	10	----	----	2290	WR
7836	409	constant amplitude	327 / 163	0.5	10	----	----	49288	WR
7837	412	constant amplitude	242 / 121	0.5	10	----	----	829489	WR
7838	416	constant amplitude	327 / 163	0.5	10	----	----	74500	WR
7839	417	constant amplitude	413 / 207	0.5	10	----	----	4100	WR
7840	418	constant amplitude	242 / 121	0.5	10	----	----	1559097	WR
7841	426	constant amplitude	248 / 124	0.5	10	----	----	808064	WR
7842	429	constant amplitude	327 / 163	0.5	10	----	----	33362	WR
7843	431	constant amplitude	412 / 206	0.5	10	----	----	2469	WR
7844	487	constant amplitude	326 / 163	0.5	10	----	----	21452	WR
7845	488	constant amplitude	241 / 120	0.5	10	----	----	156860	WR
7846	556	constant amplitude	326 / 163	0.5	10	----	----	15905	WR
7847	557	constant amplitude	326 / 163	0.5	10	----	----	38319	WR
7848	558	constant amplitude	327 / 163	0.5	10	----	----	8357	WR
7849	559	constant amplitude	326 / 163	0.5	10	----	----	31685	WR
7850	560	constant amplitude	326 / 163	0.5	10	----	----	21025	WR
7851	561	constant amplitude	326 / 163	0.5	10	----	----	48516	WR
7852	562	constant amplitude	326 / 163	0.5	10	----	----	24391	WR
7853	563	constant amplitude	241 / 120	0.5	10	----	----	1051280	WR
7854	564	constant amplitude	241 / 120	0.5	10	----	----	1988538	WR
7855	565	constant amplitude	241 / 120	0.5	10	----	----	1119777	WR
7856	566	constant amplitude	241 / 120	0.5	10	----	----	280171	WR
7857	568	constant amplitude	240 / 120	0.5	10	----	----	1749635	WR
7858	569	constant amplitude	241 / 121	0.5	10	----	----	763276	WR
7859	570	constant amplitude	241 / 121	0.5	10	----	----	2470072	WR
7860	571	constant amplitude	412 / 206	0.5	10	----	----	1652	WR
7861	572	constant amplitude	411 / 206	0.5	10	----	----	2513	WR
7862	573	constant amplitude	411 / 206	0.5	10	----	----	2519	WR
7863	576	constant amplitude	412 / 206	0.5	10	----	----	2755	WR
7864	793	constant amplitude	239 / 120	0.5	10	----	----	334060	WR
6872	1416	constant amplitude	517 / 259	0.5	1	----	----	184	CA
6873	1402	constant amplitude	517 / 259	0.5	1	----	----	51	CA

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
6874	1426	constant amplitude	483 / 241	0.5	1	----	----	222	CA
6970	1409	constant amplitude	483 / 241	0.5	1	----	----	269	CA
6971	1434	constant amplitude	483 / 241	0.5	1	----	----	198	CA
6972	1420	constant amplitude	207 / 103	0.5	10	----	----	892881	CA
6973	1412	constant amplitude	207 / 103	0.5	10	----	----	642097	CA
8901	1130	constant amplitude	172 / -172	-1	4	----	----	529682	RVR4
8902	1131	constant amplitude	172 / -172	-1	5	----	----	19978	RVR4
8903	1132	constant amplitude	172 / -172	-1	5	----	----	55248	RVR1
8904	1133	constant amplitude	106 / -106	-1	5	----	----	1756651	REVERS
8905	1134	constant amplitude	190 / -190	-1	5	----	----	23623	RVR1
7003	1439	constant amplitude	345 / -345	-1	1	----	----	47	CA
7004	1441	constant amplitude	345 / -345	-1	1	----	----	129	CA
7005	1338	constant amplitude	310 / -310	-1	1	----	----	432	CA
7006	1330	constant amplitude	310 / -310	-1	1	----	----	965	CA
7007	1036	constant amplitude	310 / -310	-1	1	----	----	68	CA
7008	1323	constant amplitude	310 / -310	-1	1	----	----	499	CA
7009	1319	constant amplitude	310 / -310	-1	1	----	----	144	CA
7010	1335	constant amplitude	276 / -276	-1	1	----	----	1168	CA
7011	1340	constant amplitude	276 / -276	-1	1	----	----	907	CA
7012	1332	constant amplitude	276 / -276	-1	1	----	----	736	CA
7013	1312	constant amplitude	276 / -276	-1	1	----	----	1640	CA
7014	1316	constant amplitude	276 / -276	-1	1	----	----	1476	CA
7015	1341	constant amplitude	241 / -241	-1	1	----	----	8666	CA
7016	1333	constant amplitude	241 / -241	-1	1	----	----	5264	CA
7017	1337	constant amplitude	241 / -241	-1	1	----	----	5234	CA
7018	1331	constant amplitude	241 / -241	-1	1	----	----	4566	CA
7019	1311	constant amplitude	241 / -241	-1	1	----	----	4673	CA
7020	1334	constant amplitude	179 / -179	-1	1	----	----	42885	CA
7021	1035	constant amplitude	179 / -179	-1	1	----	----	41052	CA
7022	1339	constant amplitude	179 / -179	-1	1	----	----	40255	CA
7023	1336	constant amplitude	179 / -179	-1	1	----	----	55702	CA
7024	1322	constant amplitude	148 / -148	-1	1	----	----	224458	CA
7025	1310	constant amplitude	148 / -148	-1	1	----	----	205884	CA
8816	1453	constant amplitude	100 / -100	-1	4	----	----	5609823	CA
8817	1468	constant amplitude	276 / -276	-1	0.1	----	----	2120	CA
8819	1438	constant amplitude	179 / -179	-1	0.1	----	----	31761	CA
8826	1471	constant amplitude	241 / -241	-1	0.1	----	----	4710	CA
8828	1473	constant amplitude	276 / -276	-1	0.1	----	----	573	CA
7026	1452	constant amplitude	148 / -148	-1	1	----	----	133387	CA
8825	1458	constant amplitude	100 / -100	-1	5	----	----	5268431	CA
7879	892	constant amplitude	-276 / -138	2	10	----	----	130733	load11

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7880	893	constant amplitude	-276 / -138	2	8	----	runout	62258	load11
7881	894	constant amplitude	-276 / -138	2	10	----	----	158396	load11
7882	895	constant amplitude	-276 / -138	2	10	----	----	1442932	load11
7883	896	constant amplitude	-276 / -138	2	10	----	----	162400	load11
7884	897	constant amplitude	-276 / -138	2	10	----	----	46304	load11
7885	898	constant amplitude	-276 / -138	2	10	----	----	192595	load11
7886	899	constant amplitude	-276 / -138	2	10	----	----	48990	load11
7887	905	constant amplitude	-276 / -138	2	10	----	----	1190152	load11
7888	906	constant amplitude	-241 / -121	2	10	----	runout	10000000	load11
7889	907	constant amplitude	-276 / -138	2	10	----	runout	4950838	load11
7890	908	constant amplitude	-276 / -138	2	10	----	runout	11829100	load11
7891	909	constant amplitude	-276 / -138	2	10	----	----	2738468	load11
7893	919	constant amplitude	-207 / -104	2	10	----	runout	4013900	load11
8500	901	constant amplitude	-241 / -120	2	8	----	----	2659182	load 11
7077	1446	constant amplitude	-345 / -172	2	1	----	----	42573	CA
7078	1464	constant amplitude	-345 / -172	2	1	----	----	21573	CA
7079	1443	constant amplitude	-345 / -172	2	1	----	----	26048	CA
7080	1475	constant amplitude	-345 / -172	2	1	----	----	41991	CA
7081	1474	constant amplitude	-345 / -172	2	1	----	----	5501	CA
8640	1079	constant amplitude	-276 / 138	-2	5	----	----	21788	WR
8641	1062	constant amplitude	-276 / 138	-2	5	----	----	17972	WR
8642	1085	constant amplitude	-276 / 138	-2	5	----	----	25640	WR
8643	1083	constant amplitude	-276 / 138	-2	5	----	----	24394	WR
8644	1072	constant amplitude	-276 / 138	-2	5	----	----	23111	WR
8645	1068	constant amplitude	-241 / 121	-2	5	----	----	159710	WR
8646	1078	constant amplitude	-241 / 121	-2	5	----	----	137447	WR
8647	1082	constant amplitude	-241 / 121	-2	5	----	----	165947	WR
8648	1070	constant amplitude	-241 / 121	-2	5	----	----	84977	WR
8649	1086	constant amplitude	-241 / 121	-2	5	----	----	127101	WR
8650	1064	constant amplitude	-207 / 103	-2	5	----	----	554277	WR
8651	1066	constant amplitude	-207 / 103	-2	5	----	----	262203	WR
8652	1076	constant amplitude	-207 / 103	-2	5	----	----	368220	WR
8653	1400	constant amplitude	-207 / 103	-2	5	----	----	711338	WR
8654	1071	constant amplitude	-207 / 103	-2	5	----	----	490579	WR
8737	1033	constant amplitude	-172 / 86	-2	4	----	----	3446107	CA
8738	1329	constant amplitude	-172 / 86	-2	4	----	----	2227927	CA
8739	1024	constant amplitude	-241 / 121	-2	2	----	----	38977	CA
8740	1318	constant amplitude	-241 / 121	-2	2	----	----	67004	CA
8741	1034	constant amplitude	-207 / 103	-2	3	----	----	384495	CA
8742	1315	constant amplitude	-207 / 103	-2	3	----	----	329984	CA
8743	1327	constant amplitude	-207 / 103	-2	3	----	----	192304	CA

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8744	1342	constant amplitude	-207 / 103	-2	5	----	----	599421	CA
8795	1317	constant amplitude	-207 / 103	-2	4	----	----	674584	CA
6974	1462	constant amplitude	-414 / 207	-2	1	----	----	37	CA
6975	1478	constant amplitude	-414 / 207	-2	1	----	----	80	CA
6976	1437	constant amplitude	-345 / 172	-2	1	----	----	1403	CA
6977	1449	constant amplitude	-345 / 172	-2	1	----	----	1876	CA
6978	1445	constant amplitude	-345 / 172	-2	1	----	----	530	CA
6979	1451	constant amplitude	-345 / 172	-2	1	----	----	823	CA
6980	1381	constant amplitude	-345 / 172	-2	1	----	----	2069	CA
6981	1479	constant amplitude	-172 / 86.2	-2	5	----	----	1630027	CA
8709	1303	constant amplitude	379 / 303	0.8	5	----	----	72754	WR
8710	1302	constant amplitude	379 / 303	0.8	5	----	----	24594	WR
8711	1301	constant amplitude	379 / 303	0.8	5	----	----	52850	WR
8712	1300	constant amplitude	379 / 303	0.8	5	----	----	73169	WR
8713	1069	constant amplitude	379 / 303	0.8	5	----	----	32085	WR
8714	1135	constant amplitude	328 / 262	0.8	5	----	----	117106	WR
8715	1080	constant amplitude	328 / 262	0.8	5	----	----	315997	WR
8716	1060	constant amplitude	328 / 262	0.8	5	----	----	98079	WR
8717	1081	constant amplitude	328 / 262	0.8	5	----	----	211964	WR
8718	1063	constant amplitude	328 / 262	0.8	5	----	----	87083	WR
8719	1075	constant amplitude	276 / 221	0.8	5	----	----	2114295	WR
8720	1077	constant amplitude	276 / 221	0.8	5	----	----	530891	WR
8721	1073	constant amplitude	276 / 221	0.8	5	----	----	1387190	WR
8722	1056	constant amplitude	276 / 221	0.8	5	----	----	273495	WR
8723	1065	constant amplitude	276 / 221	0.8	5	----	----	1052100	WR
8724	1306	constant amplitude	448 / 359	0.8	5	----	----	5013	WR
8725	1305	constant amplitude	448 / 359	0.8	5	----	----	7291	WR
8726	1304	constant amplitude	448 / 359	0.8	5	----	----	14203	WR
8727	1328	constant amplitude	448 / 359	0.8	5	----	----	6562	WR
8728	1314	constant amplitude	448 / 359	0.8	5	----	----	12782	WR
8746	1380	constant amplitude	517 / 465	0.9	8	----	----	96	CA
8774	1360	constant amplitude	500 / 400	0.8	1	----	----	1023	CA
8775	1361	constant amplitude	500 / 400	0.8	1	----	----	571	CA
8776	1366	constant amplitude	500 / 400	0.8	1	----	----	109	CA
8777	1352	constant amplitude	474 / 379	0.8	2	----	----	6400	CA
8778	1372	constant amplitude	474 / 379	0.8	2	----	----	991	CA
8779	1347	constant amplitude	474 / 379	0.8	2	----	----	4924	CA
8639	1378	constant amplitude	207 / 165	0.8	10	----	runout	30400000	CA
8736	1430	constant amplitude	241 / 193	0.8	10	----	----	8183853	CA
8747	1383	constant amplitude	517 / 465	0.9	2	----	----	121	CA
8748	1353	constant amplitude	517 / 465	0.9	2	----	----	1084	CA

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8749	1356	constant amplitude	517 / 465	0.9	2	----	----	132	CA
8750	1371	constant amplitude	517 / 465	0.9	2	----	----	40	CA
8751	1377	constant amplitude	483 / 434	0.9	8	----	----	7147	CA
8752	1379	constant amplitude	483 / 434	0.9	5	----	----	7003	CA
8753	1364	constant amplitude	483 / 434	0.9	5	----	----	1203	CA
8754	1374	constant amplitude	483 / 434	0.9	5	----	----	8831	CA
8755	1367	constant amplitude	483 / 434	0.9	8	----	----	14680	CA
8756	1359	constant amplitude	448 / 403	0.9	8	----	----	52960	CA
8757	1386	constant amplitude	448 / 403	0.9	10	----	----	157229	CA
8758	1385	constant amplitude	448 / 403	0.9	8	----	----	30502	CA
8759	1370	constant amplitude	448 / 403	0.9	8	----	----	13497	CA
8760	1355	constant amplitude	448 / 403	0.9	8	----	----	35815	CA
8761	1373	constant amplitude	379 / 341	0.9	10	----	----	671191	CA
8762	1357	constant amplitude	379 / 341	0.9	10	----	----	613322	CA
8763	1384	constant amplitude	379 / 341	0.9	10	----	----	558916	CA
8764	1348	constant amplitude	379 / 341	0.9	10	----	----	454082	CA
8765	1363	constant amplitude	379 / 341	0.9	10	----	----	234196	CA
8766	1346	constant amplitude	379 / 341	0.9	10	----	----	301526	CA
8767	1354	constant amplitude	345 / 310	0.9	10	----	----	1572555	CA
8772	1395	constant amplitude	345 / 310	0.9	10	----	----	5370234	CA
8773	1396	constant amplitude	345 / 310	0.9	10	----	----	2115248	CA
8768	1369	constant amplitude	-379 / -345	1.1	10	----	runout	2560000	CA
8769	1349	constant amplitude	-379 / -345	1.1	10	----	runout	1835000	CA
8770	1368	constant amplitude	-379 / -345	1.1	10	----	----	802554	CA
8771	1382	constant amplitude	-414 / -376	1.1	10	----	----	95	CA
8790	1392	constant amplitude	-379 / -345	1.1	10	----	----	8180513	CA
8638	1376	constant amplitude	-345 / -313	1.1	5	----	runout	1000000	CA
8780	1362	constant amplitude	345 / 241	0.7	5	----	----	38952	CA
8781	1390	constant amplitude	345 / 241	0.7	5	----	----	12916	CA
8782	1389	constant amplitude	345 / 241	0.7	4	----	----	11660	CA
8783	1350	constant amplitude	345 / 241	0.7	4	----	----	23795	CA
8784	1393	constant amplitude	345 / 241	0.7	4	----	----	20486	CA
8785	1387	constant amplitude	276 / 193	0.7	8	----	----	284155	CA
8786	1391	constant amplitude	276 / 193	0.7	10	----	----	233225	CA
8787	1358	constant amplitude	276 / 193	0.7	10	----	----	139848	CA
8788	1365	constant amplitude	276 / 193	0.7	10	----	----	295783	CA
8789	1365a	constant amplitude	276 / 193	0.7	10	----	----	221172	CA
8745	1388	constant amplitude	207 / 145	0.7	10	----	----	805419	CA
6813	1422	constant amplitude	517 / 362	0.7	1	----	----	439	CA
6814	1375	constant amplitude	517 / 362	0.7	1	----	----	296	CA
6815	1419	constant amplitude	517 / 362	0.7	1	----	----	833	CA

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
6816	1407	constant amplitude	483 / 338	0.7	1	----	----	370	CA
6817	1403	constant amplitude	483 / 338	0.7	1	----	----	689	CA
6818	1418	constant amplitude	448 / 314	0.7	1	----	----	4565	CA
6861	1417	constant amplitude	414 / 290	0.7	2	----	----	2119	CA
6862	1424	constant amplitude	414 / 290	0.7	2	----	----	2053	CA
6863	1425	constant amplitude	414 / 290	0.7	2	----	----	5418	CA
6864	1401	constant amplitude	414 / 290	0.7	2	----	----	8231	CA
6865	1429	constant amplitude	414 / 290	0.7	2	----	----	4459	CA
6866	1427	constant amplitude	207 / 145	0.7	8	----	----	3953754	CA
6867	1408	constant amplitude	-345 / -241	1.43	4	----	----	16738	CA
6868	1404	constant amplitude	-345 / -241	1.43	4	----	----	74420	CA
6869	1406	constant amplitude	-345 / -241	1.43	4	----	----	288974	CA
6870	1428	constant amplitude	-345 / -241	1.43	5	----	----	96477	CA
6871	1345	constant amplitude	-310 / -217	1.43	5	----	----	4000000	runout
6887	1432	constant amplitude	-310 / -217	1.43	10	----	----	30000000	runout
6982	1460	constant amplitude	414 / -207	-0.5	1	----	----	97	CA
6983	1442	constant amplitude	414 / -207	-0.5	1	----	----	173	CA
6984	1465	constant amplitude	345 / -172	-0.5	1	----	----	246	CA
6985	1440	constant amplitude	345 / -172	-0.5	1	----	----	399	CA
6986	1448	constant amplitude	345 / -172	-0.5	1	----	----	653	CA
6987	1454	constant amplitude	345 / -172	-0.5	1	----	----	221	CA
6988	1444	constant amplitude	345 / -172	-0.5	1	----	----	201	CA
6989	1436	constant amplitude	276 / -138	-0.5	1	----	----	1242	CA
6990	1400	constant amplitude	276 / -138	-0.5	1	----	----	1487	CA
6991	1405	constant amplitude	276 / -138	-0.5	1	----	----	3107	CA
6992	1421	constant amplitude	276 / -138	-0.5	1	----	----	984	CA
6993	1433	constant amplitude	276 / -138	-0.5	1	----	----	1747	CA
6994	1431	constant amplitude	207 / -103	-0.5	2	----	----	12820	CA
6995	1410	constant amplitude	207 / -103	-0.5	2	----	----	21667	CA
6996	1415	constant amplitude	207 / -103	-0.5	2	----	----	8069	CA
6997	1423	constant amplitude	207 / -103	-0.5	2	----	----	9950	CA
6998	1413	constant amplitude	207 / -103	-0.5	2	----	----	17384	CA
6999	1411	constant amplitude	138 / -69	-0.5	5	----	----	935087	CA
7000	1414	constant amplitude	138 / -69	-0.5	5	----	----	437781	CA
7001	1435	constant amplitude	138 / -69	-0.5	4	----	----	388817	CA
7002	1136	constant amplitude	138 / -69	-0.5	4	----	----	760124	CA
7894	132	2 block, 10H/1000L	414 / 241	0.1	10	72	7000	7072	WR
7895	133	2 block, 10H/334L	414 / 241	0.1	10	40	1002	1042	WR
7896	134	2 block, 10H/3000L	414 / 241	0.1	10	54	15000	15054	WR
7897	135	2 block, 10H/112L	414 / 241	0.1	10	230	2464	2694	WR
7898	136	2 block, 10H/9000L	414 / 241	0.1	10	13	9000	9013	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7899	137	2 block, 10H/10L	414 / 241	0.1	10	130	120	250	WR
7900	142	2 block, 10H/9000L	414 / 241	0.1	10	22	18000	18022	WR
7901	143	2 block, 10H/1000L	414 / 241	0.1	10	60	5000	5060	WR
7902	144	2 block, 10H/334L	414 / 241	0.1	10	117	3674	3791	WR
7903	145	2 block, 10H/112L	414 / 241	0.1	10	91	1008	1099	WR
7904	146	2 block, 10H/10L	414 / 241	0.1	10	286	280	566	WR
7905	149	2 block, 10H/52L	414 / 241	0.1	10	182	936	1118	WR
7906	150	2 block, 10H/52L	414 / 241	0.1	10	195	988	1183	WR
7907	154	2 block, 10H/1000L	328 / 207	0.1	10	432	43000	43432	WR
7908	155	2 block, 10H/112L	328 / 207	0.1	10	1077	11984	13061	WR
7909	156	2 block, 10H/9000L	328 / 207	0.1	10	120	92379	92499	WR
7910	157	2 block, 10H/3000L	328 / 207	0.1	10	554	162287	162841	WR
7911	158	2 block, 10H/10L	328 / 207	0.1	10	1840	1830	3670	WR
7912	159	2 block, 10H/334L	328 / 207	0.1	10	1062	35404	36466	WR
7913	162	2 block, 10H/1000L	328 / 207	0.1	10	1432	143000	144432	WR
7914	163	2 block, 10H/112L	328 / 207	0.1	10	2119	23632	25751	WR
7915	164	2 block, 10H/9000L	328 / 207	0.1	10	270	239206	239476	WR
7916	165	2 block, 10H/3000L	328 / 207	0.1	10	406	120000	120406	WR
7917	166	2 block, 10H/10L	328 / 207	0.1	10	4249	4240	8489	WR
7918	167	2 block, 10H/334L	328 / 207	0.1	10	932	31062	31994	WR
7919	170	2 block, 10H/10L	328 / 207	0.1	10	3552	3550	7102	WR
7920	175	2 block, 10H/667L	328 / 207	0.1	10	987	65366	66353	WR
7921	176	2 block, 10H/1000L	328 / 207	0.1	10	349	34000	34349	WR
7922	177	2 block, 10H/1000L	328 / 207	0.1	10	656	65000	65656	WR
7923	178	2 block, 10H/1000L	328 / 207	0.1	10	197	19000	19197	WR
7924	180	2 block, 20H/10L	328 / 207	0.1	10	2418	1200	3618	WR
7925	181	2 block, 10H/250L	328 / 207	0.1	10	2207	54750	56957	WR
7926	182	2 block, 10H/40L	328 / 207	0.1	10	2419	9640	12059	WR
7927	183	2 block, 10H/1000L	328 / 207	0.1	10	510	50906	51416	WR
7928	184	2 block, 10H/667L	328 / 207	0.1	10	359	23345	23704	WR
7929	186	2 block, 10H/33000L	328 / 207	0.1	10	106	330000	330106	WR
7930	187	2 block, 10H/33000L	328 / 207	0.1	10	42	165000	165042	WR
7931	188	2 block, 10H/50000L	328 / 207	0.1	10	30	139982	140012	WR
7932	189	2 block, 10H/60000L	328 / 207	0.1	10	50	295894	295944	WR
7933	190	2 block, 10H/20000L	328 / 207	0.1	10	150	297672	297822	WR
7934	191	2 block, 10H/50000L	328 / 207	0.1	10	30	101013	101043	WR
7935	192	2 block, 10H/33000L	328 / 207	0.1	10	50	158561	158611	WR
7936	193	2 block, 10H/60000L	328 / 207	0.1	10	20	91339	91359	WR
7937	194	2 block, 10H/1000L	328 / 241	0.1	10	140	13016	13156	WR
7938	195	2 block, 10H/3000L	328 / 241	0.1	10	150	44460	44610	WR
7939	196	2 block, 10H/5000L	328 / 241	0.1	10	40	17361	17401	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7940	198	2 block, 10H/500L	328 / 241	0.1	10	250	12114	12364	WR
7941	199	2 block, 10H/100L	328 / 241	0.1	10	364	3600	3964	WR
7942	200	2 block, 10H/10L	328 / 241	0.1	10	1357	1350	2707	WR
7943	201	2 block, 10H/500L	328 / 241	0.1	10	100	4774	4874	WR
7944	202	2 block, 10H/1000L	328 / 241	0.1	10	100	9359	9459	WR
7945	203	2 block, 10H/5000L	328 / 241	0.1	10	40	15564	15604	WR
7946	204	2 block, 10H/3000L	328 / 241	0.1	10	110	30522	30632	WR
7947	205	2 block, 0H/100L	241	0.1	10	----	----	15680	WR
7948	206	2 block, 10H/0L	328	0.1	10	----	----	1339	WR
7949	211	2 block, 10H/10L	414 / 241	0.1	10	98	90	188	WR
7950	212	2 block, 10H/10L	414 / 241	0.1	10	72	70	142	WR
7951	215	2 block, 10H/9000L	414 / 241	0.1	10	17	9000	9017	WR
7952	275	2 block, 10H/112L	414 / 241	0.1	10	274	3024	3298	WR
7953	300	2 block, 10H/9000L	414 / 241	0.1	10	40	27155	27195	WR
7954	304	2 block, 10H/112L	414 / 241	0.1	10	312	3472	3784	WR
7955	307	2 block, 10H/90L	414 / 241	0.1	10	44	360	404	WR
7956	209	2 block, 10H/10L	328 / 241	0.1	10	583	580	1163	WR
7957	210	2 block, 10H/10L	328 / 241	0.1	10	1815	1810	3625	WR
7958	217	2 block, 10H/3000L	328 / 241	0.1	10	60	17063	17123	WR
7959	213	2 block, 10H/0L	328	0.1	10	----	----	3306	WR
7960	214	2 block, 10H/0L	328	0.1	10	----	----	2078	WR
7961	207	2 block, 10H/10L	328 / 207	0.1	10	2163	2160	4323	WR
7962	208	2 block, 10H/10L	328 / 207	0.1	10	2326	2320	4646	WR
7963	216	2 block, 10H/9000L	328 / 207	0.1	10	85	72000	72085	WR
7964	218	2 block, 10H/3000L	328 / 207	0.1	10	110	31739	31849	WR
7965	219	2 block, 10H/5000L	328 / 207	0.1	10	80	39441	39521	WR
7966	229	2 block, 10H/60000L	328 / 207	0.1	10	20	61684	61704	WR
7967	230	2 block, 10H/50000L	328 / 207	0.1	10	70	319095	319165	WR
7968	232	2 block, 10H/9000L	328 / 207	0.1	10	100	81000	81100	WR
7969	233	2 block, 10H/50000L	328 / 207	0.1	10	50	202625	202675	WR
7970	234	2 block, 10H/9000L	328 / 207	0.1	10	210	180000	180210	WR
7971	235	2 block, 10H/33000L	328 / 207	0.1	10	30	82555	82585	WR
7972	246	2 block, 10H/10L	241 / 207	0.1	10	67370	67365	134735	WR
7973	247	2 block, 10H/9000L	241 / 207	0.1	10	600	535083	535683	WR
7974	248	2 block, 10H/33000L	241 / 207	0.1	10	100	307196	307296	WR
7975	249	2 block, 10H/60000L	241 / 207	0.1	10	30	137575	137605	WR
7976	250	2 block, 10H/9000L	241 / 207	0.1	10	580	518806	519386	WR
7977	251	2 block, 10H/60000L	241 / 207	0.1	10	40	198456	198496	WR
7978	252	2 block, 10H/10L	241 / 207	0.1	10	37306	37300	74606	WR
7979	253	2 block, 10H/9000L	241 / 207	0.1	10	410	366273	366683	WR
7980	254	2 block, 10H/33000L	241 / 207	0.1	10	90	274261	274351	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7981	255	2 block, 20H/10L	241 / 207	0.1	10	26342	13170	39512	WR
7982	256	2 block, 10H/10L	414 / 328	0.1	10	42	40	82	WR
7983	257	2 block, 10H/1000L	414 / 328	0.1	10	10	603	613	WR
7984	258	2 block, 10H/100L	414 / 328	0.1	10	20	145	165	WR
7985	259	2 block, 10H/100L	414 / 328	0.1	10	39	300	339	WR
7986	260	2 block, 10H/1000L	414 / 328	0.1	10	20	1268	1288	WR
7987	310	2 block, 10H/10L	414 / 328	0.1	10	141	140	281	WR
7988	311	2 block, 10H/90L	414 / 328	0.1	10	173	1530	1703	WR
7989	312	2 block, 10H/990L	414 / 328	0.1	10	10	517	527	WR
7990	261	2 block, 10H/10L	328 / 207	0.1	10	519	510	1029	WR
7991	263	2 block, 1H/100L	328 / 207	0.1	10	942	94100	95042	WR
7992	264	2 block, 1H/100L	328 / 207	0.1	10	90	8900	8990	WR
7993	265	2 block, 10H/10000L	328 / 207	0.1	10	120	110187	110307	WR
7994	267	2 block, 10H/1000L	328 / 207	0.1	10	340	33037	33377	WR
7995	279	2 block, 10H/5000L	328 / 241	0.1	10	150	71692	71842	WR
7996	280	2 block, 10H/1000L	328 / 241	0.1	10	80	7892	7972	WR
7997	350	2 block, 10H/10L	328 / 241	0.1	10	5749	5740	11489	WR
7998	351	2 block, 10H/90L	328 / 241	0.1	10	1899	17010	18909	WR
7999	281	2 block, 10H/100L	328 / 207	0.1	10	2543	25400	27943	WR
8000	276	2 block, 10H/1000L	328 / 207	0.1	10	359	35000	35359	WR
8001	287	2 block, 10H/1000L	328 / 207	0.1	10	408	40800	41208	random1
8002	288	2 block, 10H/1000L	328 / 207	0.1	10	288	28840	29128	random1
8003	289	2 block, 1H/100L	328 / 207	0.1	10	81	8100	8181	onecycle
8004	290	2 block, 10H/1000L	328 / 207	0.1	10	175	17448	17623	random1
8005	291	2 block, 10H/1000L	328 / 207	0.1	10	610	60710	61320	WR
8006	294	2 block, 10H/1000L	328 / 207	0.1	10	540	53027	53567	WR
8007	295	2 block, 10H/1000L	328 / 207	0.1	10	442	44166	44608	random1
8008	314	2 block, 10H/1000L	328 / 207	0.1	10	335	33528	33863	random2
8009	315	2 block, 10H/10L	328 / 207	0.1	10	2174	2170	4344	WR
8010	316	2 block, 10H/90L	328 / 207	0.1	10	1762	15840	17602	WR
8011	317	2 block, 10H/1000L	328 / 207	0.1	10	464	46400	46864	random2
8012	320	2 block, 1H/100L	328 / 207	0.1	10	301	30100	30401	onecycle
8013	322	2 block, 10H/1000L	328 / 207	0.1	10	441	44103	44544	random2
8014	324	2 block, 1H/100L	328 / 207	0.1	10	127	12700	12827	onecycle
8015	327	2 block, 10H/1000L	328 / 207	0.1	10	480	48211	48691	random2
8016	328	2 block, 10H/1000L	328 / 207	0.1	10	799	79000	79799	WR
8017	330	2 block, 10H/1000L	328 / 207	0.1	10	379	37932	38311	random2
8018	331	2 block, 10H/1000L	328 / 207	0.1	10	980	98000	98980	random3
8019	332	2 block, 1H/100L	328 / 207	0.1	10	278	27800	28078	onecycle
8020	333	2 block, 10H/1000L	328 / 207	0.1	10	510	51000	51510	random3
8021	334	2 block, 10H/1000L	328 / 207	0.1	10	591	59082	59673	random2

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8022	353	2 block, 10H/1000L	328 / 207	0.1	10	350	35002	35352	random3
8023	354	2 block, 10H/1000L	328 / 207	0.1	10	832	83248	84080	random2
8024	368	2 block, 10H/1000L	328 / 207	0.1	10	551	55063	55614	onecycle
8025	369	2 block, 10H/1000L	328 / 207	0.1	10	312	31000	31312	WR
8026	370	2 block, 1H/100L	328 / 207	0.1	10	584	58400	58984	onecycle
8027	371	2 block, 1H/100L	328 / 207	0.1	10	257	25700	25957	onecycle
8028	372	2 block, 10H/1000L	328 / 207	0.1	10	750	75006	75756	random3
8029	373	2 block, 10H/1000L	328 / 207	0.1	10	479	47874	48353	random3
8030	374	2 block, 10H/1000L	328 / 207	0.1	10	1470	146350	147820	WR
8031	375	2 block, 10H/1000L	328 / 207	0.1	10	561	56122	56683	random3
8032	377	2 block, 1H/100L	328 / 207	0.1	10	670	67000	67670	onecycle
8033	379	2 block, 1H/100L	328 / 207	0.1	10	606	60600	61206	onecycle
8034	380	2 block, 10H/1000L	328 / 207	0.1	10	699	69875	70574	random3
8035	381	2 block, 10H/1000L	328 / 207	0.1	10	630	63002	63632	random3
8036	382	2 block, 1H/100L	328 / 207	0.1	10	301	30100	30401	onecycle
8037	384	2 block, 1H/100L	328 / 207	0.1	10	681	68100	68781	onecycle
8038	385	2 block, 10H/1000L	328 / 207	0.1	10	364	36388	36752	random3
8039	386	2 block, 10H/1000L	328 / 207	0.1	10	454	45000	45454	WR
8040	387	2 block, 10H/1000L	328 / 207	0.1	10	460	46001	46461	random3
8041	388	2 block, 1H/100L	328 / 207	0.1	10	1698	169800	171498	onecycle
8042	389	2 block, 10H/1000L	328 / 207	0.1	10	510	51005	51515	random3
8043	390	2 block, 10H/1000L	328 / 207	0.1	10	869	86907	87776	random3
8044	392	2 block, 1H/100L	328 / 207	0.1	10	755	75500	76255	onecycle
8045	393	2 block, 1H/100L	328 / 207	0.1	10	407	40700	41107	onecycle
8046	394	2 block, 10H/1000L	328 / 207	0.1	10	720	71039	71759	WR
8047	395	2 block, 1H/100L	328 / 207	0.1	10	306	30600	30906	onecycle
8048	396	2 block, 10H/1000L	328 / 207	0.1	10	800	80004	80804	random3
8049	397	2 block, 10H/1000L	328 / 207	0.1	10	993	99000	99993	WR
8050	398	2 block, 10H/1000L	328 / 207	0.1	10	369	36860	37229	random3
8051	399	2 block, 1H/100L	328 / 207	0.1	10	598	59800	60398	WR
8052	411	2 block, 10H/1000L	328 / 207	0.1	1 0	460	46000	46460	random3
8053	432	2 block, 1H/100L	328 / 207	0.1	10	447	44600	45047	WR
8054	437	2 block, 10H/1000L	328 / 207	0.1	10	1282	128000	129282	WR
8055	277	2 block, 10H/1000L	241 / 207	0.1	10	1320	131237	132557	WR
8056	278	2 block, 10H/100L	241 / 207	0.1	10	34940	349366	384306	WR
8057	285	2 block, 10H/1000L	241 / 207	0.1	10	7060	706997	714057	WR
8058	299	2 block, 10H/990L	241 / 207	0.1	10	5970	590898	596868	WR
8059	301	2 block, 10H/90L	241 / 207	0.1	10	10170	91462	101632	WR
8060	303	2 block, 10H/49990L	241 / 207	0.1	10	60	264911	264971	WR
8061	318	2 block, 10H/90L	241 / 207	0.1	10	1610	14403	16013	WR
8062	319	2 block, 10H/990L	241 / 207	0.1	10	1980	195842	197822	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8063	339	2 block, 10H/1000L	328 / 207	0.5	10	1630	16200	17830	WR
8064	348	2 block, 10H/1000L	328 / 207	0.5	10	1790	179000	180790	WR
8065	352	2 block, 10H/1000L	328 / 207	0.5	10	1710	171000	172710	WR
8066	400	2 block, 10H/10L	414 / 328	0.5	10	1292	1290	2582	WR
8067	401	2 block, 10H/50L	414 / 328	0.5	10	879	4350	5229	WR
8068	402	2 block, 10H/100L	414 / 328	0.5	10	560	5576	6136	WR
8069	403	2 block, 10H/1000L	414 / 328	0.5	10	165	16000	16165	WR
8070	404	2 block, 10H/10L	414 / 328	0.5	10	2266	2260	4526	WR
8071	405	2 block, 10H/50L	414 / 328	0.5	10	2352	11750	14102	WR
8072	406	2 block, 10H/100L	414 / 328	0.5	10	872	8700	9572	WR
8073	407	2 block, 10H/1000L	414 / 328	0.5	10	240	23256	23496	WR
8074	413	2 block, 10H/10L	414 / 241	0.5	10	3233	3230	6463	WR
8075	414	2 block, 10H/1000L	414 / 241	0.5	10	267	26000	26267	WR
8076	415	2 block, 10H/10000L	414 / 241	0.5	10	175	170000	170175	WR
8077	419	2 block, 10H/10000L	414 / 241	0.5	10	91	90000	90091	WR
8078	420	2 block, 10H/1000L	414 / 241	0.5	10	258	25000	25258	WR
8079	421	2 block, 10H/10L	414 / 241	0.5	10	2800	2800	5600	WR
8080	422	2 block, 10H/10L	328 / 241	0.5	10	14325	14320	28645	WR
8081	423	2 block, 10H/100L	328 / 241	0.5	10	22439	224300	246739	WR
8082	424	2 block, 10H/1000L	328 / 241	0.5	10	1939	193000	194939	WR
8083	425	2 block, 10H/1000L	328 / 241	0.5	10	1481	148000	149481	WR
8084	427	2 block, 10H/100L	328 / 241	0.5	10	16397	163900	180297	WR
8085	428	2 block, 10H/10L	328 / 241	0.5	10	47833	47830	95663	WR
8086	345	2 block, 10H/90L	328 / 241	0.5	10	80180	721620	801800	WR
8087	438	2 block, 10H/1000L	328 / 207	0.1	10	432	43206	43638	rand2
8088	444	2 block, 10H/1000L	414 / 261	0.1	10	24	2383	2407	rand5
8089	445	2 block, 10H/1000L	328 / 207	0.1	10	156	15629	15785	rand5
8090	446	2 block, 10H/1000L	328 / 207	0.1	10	291	29134	29425	rand5
8091	447	2 block, 10H/1000L	328 / 207	0.1	10	810	81086	81896	rand5
8092	448	2 block, 10H/1000L	328 / 207	0.1	10	231	23134	23365	rand5
8093	449	2 block, 10H/1000L	328 / 207	0.1	10	331	33134	33465	rand5
8094	450	2 block, 10H/1000L	328 / 207	0.1	10	201	20127	20328	rand5
8095	451	2 block, 10H/1000L	328 / 207	0.1	10	136	13576	13712	rand5
8096	452	2 block, 10H/1000L	328 / 207	0.1	10	369	36851	37220	rand5
8097	453	2 block, 10H/1000L	328 / 207	0.1	10	125	12469	12594	rand5
8098	454	2 block, 10H/1000L	328 / 207	0.1	10	509	50912	51421	rand5
8099	455	2 block, 10H/1000L	328 / 207	0.1	10	289	28912	29201	rand5
8100	456	2 block, 10H/1000L	328 / 207	0.1	10	269	26851	27120	rand5
8101	457	2 block, 10H/1000L	328 / 207	0.1	10	122	12209	12331	rand5
8102	483	2 block, 10H/1000L	328 / 207	0.1	10	349	34949	35298	rand5
8103	526	2 block, 10H/1000L	328 / 207	0.1	10	470	46982	47452	rand5

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8104	529	2 block, 10H/1000L	328 / 207	0.1	10	119	11851	11970	rand5
8105	532	2 block, 10H/1000L	328 / 207	0.1	10	131	13134	13265	rand5
8106	535	2 block, 10H/1000L	328 / 207	0.1	10	105	10548	10653	rand5
8107	538	2 block, 10H/1000L	328 / 207	0.1	10	141	14087	14228	rand5
8108	541	2 block, 10H/1000L	328 / 207	0.1	10	122	12209	12331	rand5
8109	544	2 block, 10H/1000L	328 / 207	0.1	10	53	5342	5395	rand5
8110	547	2 block, 10H/1000L	328 / 207	0.1	10	463	46342	46805	rand5
8111	550	2 block, 10H/1000L	328 / 207	0.1	10	70	6982	7052	rand5
8112	553	2 block, 10H/1000L	328 / 207	0.1	10	206	20576	20782	rand5
8113	480	2 block, 1H/100L	328 / 207	0.1	10	469	46900	47369	onecycle
8114	481	2 block, 10H/1000L	328 / 207	0.1	10	528	52876	53404	random2
8115	482	2 block, 10H/1000L	328 / 207	0.1	10	320	32007	32327	random3
8116	524	2 block, 1H/100L	328 / 207	0.1	10	227	22674	22901	onecycle
8117	525	2 block, 10H/1000L	328 / 207	0.1	10	340	34008	34348	load5
8118	527	2 block, 1H/100L	328 / 207	0.1	10	393	39300	39693	onecycle
8119	528	2 block, 10H/1000L	328 / 207	0.1	10	192	19209	19401	load5
8120	530	2 block, 1H/100L	328 / 207	0.1	10	233	23300	23533	onecycle
8121	531	2 block, 10H/1000L	328 / 207	0.1	10	1150	115005	116155	load5
8122	533	2 block, 1H/100L	328 / 207	0.1	10	550	55019	55569	onecycle
8123	534	2 block, 10H/1000L	328 / 207	0.1	10	240	24008	24248	load5
8124	536	2 block, 1H/100L	328 / 207	0.1	10	261	26153	26414	onecycle
8125	537	2 block, 10H/1000L	328 / 207	0.1	10	220	22001	22221	load5
8126	539	2 block, 1H/100L	328 / 207	0.1	10	469	46900	47369	onecycle
8127	540	2 block, 10H/1000L	328 / 207	0.1	10	58	5834	5892	load5
8128	542	2 block, 1H/100L	328 / 207	0.1	10	239	23900	24139	onecycle
8129	543	2 block, 10H/1000L	328 / 207	0.1	10	260	25951	26211	load5
8130	545	2 block, 1H/100L	328 / 207	0.1	10	241	24060	24301	onecycle
8131	546	2 block, 10H/1000L	328 / 207	0.1	10	179	17908	18087	load5
8132	548	2 block, 1H/100L	328 / 207	0.1	10	198	19800	19998	onecycle
8133	549	2 block, 10H/1000L	328 / 207	0.1	10	310	31007	31317	load5
8134	551	2 block, 1H/100L	328 / 207	0.1	10	138	13767	13905	onecycle
8135	552	2 block, 10H/1000L	328 / 207	0.1	10	254	25393	25647	load5
8136	593	2 block, 10H/1000L	328 / 207	0.1	10	1020	102006	103026	load5
8137	595	2 block, 10H/1000L	328 / 207	0.1	10	410	41006	41416	load5
8138	597	2 block, 10H/1000L	328 / 207	0.1	10	1850	185004	186854	load5
8139	599	2 block, 10H/1000L	328 / 207	0.1	10	2120	212007	214127	load5
8140	601	2 block, 10H/1000L	328 / 207	0.1	10	490	49001	49491	load5
8141	603	2 block, 10H/1000L	328 / 207	0.1	10	500	50008	50508	load5
8142	594	2 block, 10H/1000L	328 / 207	0.1	10	379	37000	37379	WR
8143	596	2 block, 10H/1000L	328 / 207	0.1	10	310	30570	30880	WR
8144	598	2 block, 10H/1000L	328 / 207	0.1	10	324	32000	32324	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8145	600	2 block, 10H/1000L	328 / 207	0.1	10	853	85000	85853	WR
8146	602	2 block, 10H/1000L	328 / 207	0.1	10	310	30952	31262	WR
8147	604	2 block, 10H/1000L	328 / 207	0.1	10	390	38919	39309	WR
8148	657	2 block, 10H/90L	414 / 241	0.5	10	490	4411	4901	load12
8149	658	2 block, 10H/90L	414 / 241	0.5	10	1130	10178	11308	load12
8150	665	2 block, 10H/90L	328 / 241	0.5	10	3230	29073	32303	load15
8151	659	2 block, 10H/990L	414 / 241	0.5	10	310	30695	31005	load13
8152	660	2 block, 10H/990L	414 / 241	0.5	10	440	43565	44005	load13
8153	662	2 block, 10H/990L	328 / 241	0.5	10	2800	277206	280006	load14
8154	663	2 block, 10H/990L	328 / 241	0.5	10	3360	332645	336005	load14
8155	669	2 block, 10H/990L	414 / 241	0.5	10	70	6934	7004	load18
8156	667	2 block, 10H/9990L	414 / 241	0.5	10	120	119888	120008	load16
8157	668	2 block, 10H/9990L	414 / 241	0.5	10	41	41388	41429	load16
8158	670	2 block, 10H/9990L	414 / 241	0.5	10	70	69935	70005	load16
8159	674	2 block, 10H/9990L	328 / 241	0.5	10	350	349656	350006	load17
8160	675	2 block, 10H/9990L	328 / 241	0.5	10	160	160773	160933	load17
8161	836	2 block, 10H/1000L	-276 / -207	10	10	3030	303000	306030	comp1
8162	837	2 block, 10H/1000L	-276 / -207	10	10	2500	250000	252500	comp1
8163	838	2 block, 10H/1000L	-276 / -207	10	10	2200	220005	222205	comp1
8164	839	2 block, 10H/1000L	-276 / -207	10	10	4590	459006	463596	comp1
8165	840	2 block, 10H/100L	-276 / -207	10	10	2651	26508	29159	comp2
8166	841	2 block, 10H/100L	-276 / -207	10	10	8311	83107	91418	comp2
8167	842	2 block, 10H/100L	-276 / -207	10	10	9890	98903	108793	comp2
8168	843	2 block, 10H/100L	-276 / -207	10	10	10920	109206	120126	comp2
8169	844	2 block, 10H/10L	-276 / -207	10	10	1684	1684	3368	comp3
8170	845	2 block, 10H/10L	-276 / -207	10	10	11151	11151	22302	comp3
8171	846	2 block, 10H/10L	-276 / -207	10	10	4374	4374	8748	comp3
8172	847	2 block, 10H/10000L	-276 / -207	10	10	290	290007	290297	comp4
8173	848	2 block, 10H/10000L	-276 / -207	10	10	330	330003	330333	comp4
8174	849	2 block, 10H/10000L	-276 / -207	10	10	2030	2030002	2032032	comp4
8175	850	2 block, 10H/1000L	-276 / -207	10	10	630	63000	63630	comp1
8176	851	2 block, 10H/1000L	-276 / -207	10	10	7430	743010	750440	comp1
8177	852	2 block, 10H/1000L	-276 / -207	10	10	4780	478000	482780	comp1
8178	853	2 block, 10H/1000L	-276 / -207	10	10	400	40007	40407	comp1
8179	854	2 block, 10H/1000L	-276 / -207	10	10	680	68001	68681	comp1
8180	870	2 block, 10H/10L	-276 / -207	10	10	1171	1170	2341	comp3
8181	871	2 block, 10H/10L	-276 / -207	10	10	2675	2674	5349	comp3
8182	872	2 block, 10H/10L	-276 / -207	10	10	1685	1684	3369	comp3
8183	873	2 block, 10H/10L	-276 / -207	10	10	3362	3362	6724	comp3
8184	874	2 block, 10H/10L	-276 / -207	10	10	9812	9812	19624	comp3
8185	875	2 block, 10H/10000L	-276 / -207	10	10	990	990000	990990	comp4

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8186	876	2 block, 10H/10000L	-276 / -207	10	10	1398	1397653	1399051	comp4
8187	877	2 block, 10H/10000L	-276 / -207	10	10	153	155364	155517	comp4
8188	878	2 block, 10H/10000L	-276 / -207	10	10	728	727806	728534	comp4
8189	879	2 block, 10H/10000L	-276 / -207	10	10	640	640008	640648	comp4
8190	930	2 block, 10H/100L	-328 / -207	10	8	324	3200	3524	r10ld1
8191	931	2 block, 10H/100L	-328 / -207	10	8	1080	10800	11880	r10ld1
8192	932	2 block, 10H/100L	-328 / -207	10	8	670	6700	7370	r10ld1
8193	933	2 block, 10H/100L	-328 / -207	10	8	212	2100	2312	r10ld1
8194	934	2 block, 10H/100L	-328 / -207	10	8	1815	18100	19915	r10ld1
8195	935	2 block, 10H/100L	-328 / -207	10	8	427	4200	4627	r10ld1
8196	936	2 block, 10H/100L	-328 / -207	10	8	462	4600	5062	r10ld1
8197	937	2 block, 10H/100L	-328 / -207	10	8	877	8700	9577	r10ld1
8198	938	2 block, 10H/100L	-328 / -207	10	8	90	900	990	r10ld1
8199	939	2 block, 10H/100L	-328 / -207	10	8	505	5000	5505	r10ld1
8200	940	2 block, 10H/10L	-328 / -207	10	8	546	540	1086	r10ld2
8201	941	2 block, 10H/10L	-328 / -207	10	8	2053	2050	4103	r10ld2
8202	942	2 block, 10H/10L	-328 / -207	10	8	1235	1230	2465	r10ld2
8203	943	2 block, 10H/10L	-328 / -207	10	8	452	450	902	r10ld2
8204	944	2 block, 10H/10L	-328 / -207	10	8	1402	1400	2802	r10ld2
8205	945	2 block, 10H/10L	-328 / -207	10	8	334	330	664	r10ld2
8206	946	2 block, 10H/10L	-328 / -207	10	8	525	520	1045	r10ld2
8207	947	2 block, 10H/10L	-328 / -207	10	8	239	230	469	r10ld2
8208	948	2 block, 10H/10L	-328 / -207	10	8	690	690	1380	r10ld2
8209	950	2 block, 10H/10000L	-328 / -207	10	8	21	20000	20021	r10ld3
8210	951	2 block, 10H/10000L	-328 / -207	10	8	139	130000	130139	r10ld3
8211	952	2 block, 10H/10000L	-328 / -207	10	8	688	680000	680688	r10ld3
8212	953	2 block, 10H/10000L	-328 / -207	10	8	272	270000	270272	r10ld3
8213	956	2 block, 10H/10000L	-328 / -207	10	8	73	70000	70073	r10ld3
8214	957	2 block, 10H/10000L	-328 / -207	10	8	12	10000	10012	r10ld3
8215	958	2 block, 10H/10000L	-328 / -207	10	8	31	30000	30031	r10ld3
8216	959	2 block, 10H/10000L	-328 / -207	10	8	80	80004	80084	r10ld3
8217	960	2 block, 10H/1000L	-328 / -207	10	8	171	17000	17171	load5
8218	961	2 block, 10H/1000L	-328 / -207	10	8	128	12000	12128	load5
8219	962	2 block, 10H/1000L	-328 / -207	10	8	84	8000	8084	load5
8220	963	2 block, 10H/1000L	-328 / -207	10	8	244	24000	24244	load5
8221	964	2 block, 10H/1000L	-328 / -207	10	8	87	8000	8087	load5
8222	965	2 block, 10H/1000L	-328 / -207	10	8	254	25000	25254	load5
8223	966	2 block, 10H/1000L	-328 / -207	10	8	69	6000	6069	load5
8224	967	2 block, 10H/1000L	-328 / -207	10	8	81	8000	8081	load5
8225	968	2 block, 10H/1000L	-328 / -207	10	8	1220	122000	123220	load5
8226	969	2 block, 10H/1000L	-328 / -207	10	8	591	590000	590591	load5

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8227	1087	2 block, 10H/10L	172 / 103	-1	5	25430	25420	50850	WR
8228	1088	2 block, 10H/10L	172 / 103	-1	5	16536	16530	33066	WR
8229	1089	2 block, 10H/10L	172 / 103	-1	5	11467	11460	22927	WR
8230	1090	2 block, 10H/10L	172 / 103	-1	5	8779	8770	17549	WR
8231	1091	2 block, 10H/10L	172 / 103	-1	5	18018	18010	36028	WR
8232	1092	2 block, 10H/10L	172 / 103	-1	5	16674	16670	33344	WR
8233	1093	2 block, 10H/10L	172 / 103	-1	5	24781	24780	49561	WR
8234	1094	2 block, 10H/10L	172 / 103	-1	5	34040	34030	68070	WR
8235	1095	2 block, 10H/10L	172 / 103	-1	5	19245	19240	38485	WR
8236	1096	2 block, 10H/10L	172 / 103	-1	5	22190	22180	44370	WR
8237	1097	2 block, 10H/100L	172 / 103	-1	5	7581	75800	83381	WR
8238	1098	2 block, 10H/100L	172 / 103	-1	5	14380	143781	158161	WR
8239	1099	2 block, 10H/100L	172 / 103	-1	5	6405	64000	70405	WR
8240	1100	2 block, 10H/100L	172 / 103	-1	5	13142	131400	144542	WR
8241	1101	2 block, 10H/100L	172 / 103	-1	5	7191	71900	79091	WR
8242	1102	2 block, 10H/100L	172 / 103	-1	5	5291	52900	58191	WR
8243	1103	2 block, 10H/100L	172 / 103	-1	5	10150	101488	111638	WR
8244	1104	2 block, 10H/100L	172 / 103	-1	5	4283	42800	47083	WR
8245	1105	2 block, 10H/100L	172 / 103	-1	5	7100	70018	77118	WR
8246	1106	2 block, 10H/100L	172 / 103	-1	5	4003	40000	44003	WR
8247	1107	2 block, 10H/1000L	172 / 103	-1	5	1671	167000	168671	WR
8248	1108	2 block, 10H/1000L	172 / 103	-1	5	2470	246518	248988	WR
8249	1109	2 block, 10H/1000L	172 / 103	-1	5	2425	242000	244425	WR
8250	1110	2 block, 10H/1000L	172 / 103	-1	5	1641	164000	165641	WR
8251	1111	2 block, 10H/1000L	172 / 103	-1	5	2836	283000	285836	WR
8252	1112	2 block, 10H/1000L	172 / 103	-1	5	3848	384000	387848	WR
8253	1113	2 block, 10H/1000L	172 / 103	-1	5	2621	262000	264621	WR
8254	1114	2 block, 10H/1000L	172 / 103	-1	5	2600	259000	261600	WR
8255	1115	2 block, 10H/1000L	172 / 103	-1	5	2110	210319	212429	WR
8256	1116	2 block, 10H/1000L	172 / 103	-1	5	1050	104409	105459	WR
8257	1117	2 block, 10H/10000L	172 / 103	-1	5	860	853094	853954	WR
8258	1118	2 block, 10H/10000L	172 / 103	-1	5	430	423228	423658	WR
8259	1119	2 block, 10H/10000L	172 / 103	-1	5	960	950993	951953	WR
8260	1120	2 block, 10H/10000L	172 / 103	-1	5	760	750198	750958	WR
8261	1121	2 block, 10H/10000L	172 / 103	-1	5	770	762262	763032	WR
8262	1122	2 block, 10H/10000L	172 / 103	-1	5	550	542948	543498	WR
8263	1123	2 block, 10H/10000L	172 / 103	-1	5	750	749389	750139	WR
8264	1124	2 block, 10H/10000L	172 / 103	-1	5	690	683831	684521	WR
8265	1125	2 block, 10H/10000L	172 / 103	-1	5	470	464239	464709	WR
8266	1126	2 block, 10H/10000L	172 / 103	-1	5	700	600096	600796	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
3 Block Tests, Tests numbered 8267 through 8277									
8267	179	10H/100M/1000L	414/328/207	0.1	10	62	6000	6662	WR
8268	439	10H/10M/100L	414/328/241	0.1	10	394	390	4684	WR
8269	440	10M/10H/100L	328/414/241	0.1	10	820	811	9731	WR
8270	441	10H/100L/10M	414/241/328	0.1	10	219	2100	2529	WR
8271	442	10H/10M/100L	414/328/241	0.1	10	270	260	3130	WR
8272	443	100L/10M/10H	241/328/414	0.1	10	4200	420	5037	WR
8273	489	10H/10M/100L	414/328/241	0.1	10	113	110	1323	WR
8274	490	10M/10H/100L	328/414/241	0.1	10	180	174	2054	WR
8275	491	100L/10M/10H	241/328/414	0.1	10	160	1600	1920	WR
8276	492	10M/10H/100L	414/328/241	0.1	10	120	123	1443	WR
8277	493	100L/10M/10H	241/328/414	0.1	10	160	1634	1954	WR
Wisperx and Modified Spectrum Tests									
8278	654	Wisperx	410	SP	10	----	----	14090	Wisperx
8279	656	Wisperx	353	SP	10	----	----	13404	Wisperx
8280	676	Wisperx	410	SP	10	----	----	15090	Wisperx
8281	661	Wisperx	326	SP	10	----	----	160725	Wisperx
8906	1009	Wisperx	188	SP	10	----	----	7484384	Wisperx
8907	1010	Wisperx	184	SP	10	----	----	14977940	Runout
8908	1011	Wisperx	263	SP	10	----	----	824525	Wisperx
8909	1012	Wisperx	269	SP	10	----	----	1707027	Wisperx
8910	1013	Wisperx	253	SP	8	----	----	1519172	Wisperx
8911	1014	Wisperx	251	SP	8	----	----	1045051	Wisperx
8912	1015	Wisperx	252	SP	8	----	----	261291	Wisperx
8913	1017	Wisperx	283	SP	5	----	----	70139	Wisperx
8914	1018	Wisperx	269	SP	5	----	----	135228	Wisperx
8915	1019	Wisperx	354	SP	5	----	----	41142	Wisperx
8916	1020	Wisperx	352	SP	5	----	----	6944	Wisperx
8917	1021	Wisperx	353	SP	5	----	----	15792	Wisperx
8918	1022	Wisperx	293	SP	5	----	----	350506	Wisperx
8919	1023	Wisperx	282	SP	10	----	----	88602	Wisperx
8920	1024	Wisperx	283	SP	10	----	----	57179	Wisperx
8921	1025	Wisperx	351	SP	10	----	----	18584	Wisperx
8922	1026	Wisperx	351	SP	10	----	----	42339	Wisperx
8282	713	WisxR01	394	SP	10	----	----	893	WisxR01
8283	714	WisxR01	389	SP	10	----	----	504	WisxR01
8284	723	WisxR01	403	SP	10	----	----	1227	WisxR01
8285	740	WisxR01	395	SP	10	----	----	620	WisxR01
8286	741	WisxR01	396	SP	10	----	----	1120	WisxR01
8287	742	WisxR01	394	SP	10	----	----	818	WisxR01
8288	743	WisxR01	395	SP	10	----	----	624	WisxR01

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8289	786	WisxR01	405	SP	10	----	----	1713	WisxR01
8290	711	WisxR01	322	SP	10	----	----	3963	WisxR01
8291	712	WisxR01	321	SP	10	----	----	4457	WisxR01
8292	724	WisxR01	325	SP	10	----	----	4330	WisxR01
8293	726	WisxR01	322	SP	10	----	----	3973	WisxR01
8294	735	WisxR01	322	SP	10	----	----	1977	WisxR01
8295	736	WisxR01	321	SP	10	----	----	11721	WisxR01
8296	737	WisxR01	322	SP	10	----	----	6742	WisxR01
8297	738	WisxR01	322	SP	10	----	----	14445	WisxR01
8298	790	WisxR01	321	SP	10	----	----	12294	WisxR01
8299	709	WisxR01	237	SP	10	----	----	392963	WisxR01
8300	710	WisxR01	237	SP	10	----	----	77859	WisxR01
8301	716	WisxR01	238	SP	10	----	----	201697	WisxR01
8302	725	WisxR01	239	SP	10	----	----	128215	WisxR01
8303	727	WisxR01	237	SP	10	----	----	491135	WisxR01
8304	728	WisxR01	237	SP	10	----	----	116302	WisxR01
8305	729	WisxR01	237	SP	10	----	----	153229	WisxR01
8306	730	WisxR01	237	SP	10	----	----	165568	WisxR01
8307	794	WisxR01	236	SP	10	----	----	104636	WisxR01
8308	707	WisxR01	204	SP	10	----	----	2502591	WisxR01
8309	708	WisxR01	203	SP	10	----	----	1523103	WisxR01
8310	715	WisxR01	204	SP	10	----	----	1231745	WisxR01
8311	732	WisxR01	203	SP	10	----	----	609578	WisxR01
8312	733	WisxR01	203	SP	10	----	----	202727	WisxR01
8313	734	WisxR01	204	SP	10	----	----	2231997	WisxR01
8314	677	WisxR05	408	SP	10	----	----	1874	WisxR05
8315	678	WisxR05	409	SP	10	----	----	2812	WisxR05
8316	679	WisxR05	409	SP	10	----	----	6270	WisxR05
8317	680	WisxR05	408	SP	10	----	----	2768	WisxR05
8318	682	WisxR05	409	SP	10	----	----	2680	WisxR05
8319	683	WisxR05	408	SP	10	----	----	2102	WisxR05
8320	684	WisxR05	410	SP	10	----	----	1397	WisxR05
8321	685	WisxR05	399	SP	10	----	----	956	WisxR05
8322	686	WisxR05	410	SP	10	----	----	3915	WisxR05
8323	687	WisxR05	325	SP	10	----	----	40997	WisxR05
8324	688	WisxR05	324	SP	10	----	----	51690	WisxR05
8325	689	WisxR05	324	SP	10	----	----	28166	WisxR05
8326	690	WisxR05	324	SP	10	----	----	34678	WisxR05
8327	691	WisxR05	324	SP	10	----	----	42728	WisxR05
8328	692	WisxR05	324	SP	10	----	----	42077	WisxR05
8329	693	WisxR05	326	SP	10	----	----	204617	WisxR05

8330	694	WisxR05	325	SP	10	----	----	64030	WisxR05
8331	695	WisxR05	324	SP	10	----	----	61941	WisxR05
8332	696	WisxR05	324	SP	10	----	----	24102	WisxR05
8333	697	WisxR05	239	SP	10	----	----	1268170	WisxR05
8334	698	WisxR05	239	SP	10	----	----	851414	WisxR05
8335	700	WisxR05	240	SP	10	----	----	5040003	WisxR05
8336	701	WisxR05	240	SP	10	----	----	3466288	WisxR05
8337	702	WisxR05	240	SP	10	----	----	1620900	WisxR05
8338	703	WisxR05	239	SP	10	----	----	1002695	WisxR05
8339	704	WisxR05	240	SP	10	----	----	993446	WisxR05
8340	705	WisxR05	239	SP	10	----	----	1130037	WisxR05
8341	706	WisxR05	239	SP	10	----	----	2387020	WisxR05
8342	787	WisxR05	409	SP	10	----	----	1349	WisxR05
8343	791	WisxR05	323	SP	10	----	----	63945	WisxR05
8344	795	WisxR05	238	SP	10	----	----	862547	WisxR05
8345	748	Wisxmix	407	SP	10	----	----	2211	Wisxmix
8346	749	Wisxmix	407	SP	10	----	----	3313	Wisxmix
8347	750	Wisxmix	407	SP	10	----	----	1744	Wisxmix
8348	751	Wisxmix	408	SP	10	----	----	2260	Wisxmix
8349	752	Wisxmix	407	SP	10	----	----	2058	Wisxmix
8350	753	Wisxmix	407	SP	10	----	----	5679	Wisxmix
8351	754	Wisxmix	408	SP	10	----	----	3634	Wisxmix
8352	755	Wisxmix	407	SP	10	----	----	1705	Wisxmix
8353	757	Wisxmix	323	SP	10	----	----	8425	Wisxmix
8354	758	Wisxmix	323	SP	10	----	----	17202	Wisxmix
8355	759	Wisxmix	323	SP	10	----	----	17170	Wisxmix
8356	760	Wisxmix	323	SP	10	----	----	49795	Wisxmix
8357	761	Wisxmix	322	SP	10	----	----	15763	Wisxmix
8358	762	Wisxmix	322	SP	10	----	----	29281	Wisxmix
8359	763	Wisxmix	323	SP	10	----	----	9075	Wisxmix
8360	764	Wisxmix	323	SP	10	----	----	45756	Wisxmix
8361	766	Wisxmix	237	SP	10	----	----	259709	Wisxmix
8362	767	Wisxmix	237	SP	10	----	----	625695	Wisxmix
8363	768	Wisxmix	237	SP	10	----	----	157203	Wisxmix
8364	769	Wisxmix	237	SP	10	----	----	373607	Wisxmix
8365	770	Wisxmix	237	SP	10	----	----	477747	Wisxmix
8366	771	Wisxmix	237	SP	10	----	----	165811	Wisxmix
8367	772	Wisxmix	237	SP	10	----	----	534391	Wisxmix
8368	773	Wisxmix	237	SP	10	----	----	763579	Wisxmix
8369	775	Wisxmix	204	SP	10	----	----	2883840	Wisxmix
8370	776	Wisxmix	202	SP	10	----	----	1085994	Wisxmix
8371	777	Wisxmix	204	SP	10	----	----	1803131	Wisxmix
8372	778	Wisxmix	204	SP	10	----	----	1005992	Wisxmix
8373	779	Wisxmix	205	SP	10	----	----	496982	Wisxmix

8374	780	Wisxmix	203	SP	10	----	----	1701443	Wisxmix
8375	781	Wisxmix	204	SP	10	----	----	2392836	Wisxmix
8376	782	Wisxmix	203	SP	10	----	----	2079241	Wisxmix
8377	970	Wispk	403	SP	10	----	----	3844	Wispk
8378	971	Wispk	341	SP	10	----	----	1276	Wispk
8379	972	Wispk	343	SP	10	----	----	2325	Wispk
8380	973	Wispk	344	SP	10	----	----	2448	Wispk
8381	974	Wispk	407	SP	10	----	----	3130	Wispk
8382	975	Wispk	403	SP	10	----	----	4044	Wispk
8383	976	Wispk	403	SP	10	----	----	2806	Wispk
8384	977	Wispk	405	SP	10	----	----	5722	Wispk
8385	978	Wispk	406	SP	10	----	----	3233	Wispk
8386	979	Wispk	402	SP	10	----	----	3203	Wispk
8387	980	Wispk	298	SP	10	----	----	167885	Wispk
8388	981	Wispk	298	SP	10	----	----	155850	Wispk
8389	982	Wispk	297	SP	10	----	----	195616	Wispk
8390	983	Wispk	301	SP	10	----	----	86293	Wispk
8391	984	Wispk	297	SP	10	----	----	298800	Wispk
8392	985	Wispk	298	SP	10	----	----	169839	Wispk
8393	986	Wispk	297	SP	10	----	----	68426	Wispk
8394	987	Wispk	297	SP	10	----	----	231019	Wispk
8395	988	Wispk	297	SP	10	----	----	144430	Wispk
8396	989	Wispk	297	SP	10	----	----	80980	Wispk
8397	990	Wispk	254	SP	10	----	----	195751	Wispk
8398	991	Wispk	255	SP	10	----	----	598438	Wispk
8399	992	Wispk	256	SP	10	----	----	876955	Wispk
8400	993	Wispk	253	SP	10	----	----	1231928	Wispk
8401	995	Wispk	254	SP	10	----	----	312744	Wispk
8402	996	Wispk	259	SP	10	----	----	432307	Wispk
8403	997	Wispk	256	SP	10	----	----	912240	Wispk
8404	998	Wispk	255	SP	10	----	----	680774	Wispk
8405	999	Wispk	256	SP	10	----	----	248429	Wispk
8406	1000	Wispk	335	SP	10	----	----	14371	Wispk
8407	1001	Wispk	335	SP	10	----	----	26045	Wispk
8408	1002	Wispk	341	SP	10	----	----	18334	Wispk
8409	1003	Wispk	340	SP	10	----	----	24906	Wispk
8410	1004	Wispk	339	SP	10	----	----	6048	Wispk
8411	1005	Wispk	341	SP	10	----	----	13058	Wispk
8412	1006	Wispk	343	SP	10	----	----	24196	Wispk
8413	1007	Wispk	185	SP	10	----	----	14130978	Wispk
8414	1016	Wispk	185	SP	10	----	----	12289518	Wispk
Residual Strength Tests, DD16									
8415	236	constant amplitude	207	0.1	10	----	----	446342	WR
8416	237	constant amplitude	207	0.1	10	----	----	200016	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8417	237r	one cycle	417	13	*	----	----	1	WR
8418	238	constant amplitude	207	0.1	10	----	----	100009	WR
8419	238r	one cycle	452	13	*	----	----	1	WR
8420	239	constant amplitude	207	0.1	10	----	----	111838	WR
8421	240	constant amplitude	207	0.1	10	----	----	300010	WR
8422	240r	one cycle	451	13	*	----	----	1	WR
8423	241	constant amplitude	207	0.1	10	----	----	130521	WR
8424	242	constant amplitude	207	0.1	10	----	----	133659	WR
8425	243	constant amplitude	207	0.1	10	----	----	100010	WR
8426	243r	one cycle	403	13	*	----	----	1	WR
8427	244	constant amplitude	207	0.1	10	----	----	38964	WR
8428	245	constant amplitude	207	0.1		----	----	50008	WR
8429	245r	one cycle	450	13	*	----	----	1	WR
8430	459	constant amplitude	414	0.1	10	----	----	100	WR
8431	459r	one cycle	654	13	*	----	----	1	WR
8432	460	constant amplitude	414	0.1	10	----	----	478	WR
8433	461	constant amplitude	414	0.1	10	----	----	810	WR
8434	462	constant amplitude	414	0.1	10	----	----	100	WR
8435	462r	one cycle	661	13	*	----	----	1	WR
8436	463	constant amplitude	414	0.1	10	----	----	100	WR
8437	462r	one cycle	660	13	*	----	----	1	WR
8438	464	constant amplitude	328	0.1	10	----	----	1000	WR
8439	464r	one cycle	661	13	*	----	----	1	WR
8440	465	constant amplitude	328	0.1	10	----	----	7752	WR
8441	466	constant amplitude	328	0.1	10	----	----	1000	WR
8442	466r	one cycle	589	13	*	----	----	1	WR
8443	467	constant amplitude	328	0.1	10	----	----	9811	WR
8444	468	constant amplitude	328	0.1	10	----	----	1000	WR
8445	468r	one cycle	571	13	*	----	----	1	WR
8446	469	constant amplitude	241	0.1	10	----	----	10000	WR
8447	469r	one cycle	650	13	*	----	----	1	WR
8448	470	constant amplitude	241	0.1	10	----	----	100000	WR
8449	470r	one cycle	590	13	*	----	----	1	WR
8450	471	constant amplitude	241	0.1	10	----	----	100000	WR
8451	471r	one cycle	639	13	*	----	----	1	WR
8452	472	constant amplitude	241	0.1	10	----	----	10000	WR
8453	472r	one cycle	649	13	*	----	----	1	WR
8454	473	constant amplitude	241	0.1	10	----	----	10000	WR
8455	473r	one cycle	654	13	*	----	----	1	WR
8456	475	constant amplitude	328	0.1	10	----	----	10000	WR
8457	475r	one cycle	633	13	*	----	----	1	WR

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
8458	476	constant amplitude	241	0.1	10	----	----	100000	WR
8459	476r	one cycle	599	13	*	----	----	1	WR
8460	477	constant amplitude	414	0.1	10	----	----	1000	WR
8461	477r	one cycle	662	13	*	----	----	1	WR
8462	494	constant amplitude	328	0.5	10	----	----	9596	WR
8463	495	constant amplitude	328	0.5	10	----	----	9872	WR
8464	496	constant amplitude	328	0.5	10	----	----	12289	WR
8465	497	constant amplitude	328	0.5	10	----	----	8981	WR
8466	498	constant amplitude	328	0.5	10	----	----	8899	WR
8467	499	constant amplitude	328	0.5	10	----	----	32810	WR
8468	500	constant amplitude	328	0.5	10	----	----	20000	WR
8469	500r	one cycle	560	13	*	----	----	1	WR
8470	501	constant amplitude	328	0.5	10	----	----	10000	WR
8471	501r	one cycle	501	13	*	----	----	1	WR
8472	502	constant amplitude	328	0.5	10	----	----	12442	WR
8473	503	constant amplitude	328	0.5	10	----	----	5336	WR
8474	504	constant amplitude	328	0.5	10	----	----	10000	WR
8475	504r	one cycle	585	13	*	----	----	1	WR
8476	505	constant amplitude	328	0.5	10	----	----	9800	WR
8477	506	constant amplitude	328	0.5	10	----	----	11920	WR
8478	507	constant amplitude	328	0.5	10	----	----	3769	WR
8479	508	constant amplitude	328	0.5	10	----	----	8254	WR
8480	509	constant amplitude	328	0.5	10	----	----	20000	WR
8481	509r	one cycle	469	13	*	----	----	1	WR
8482	510	constant amplitude	328	0.5	10	----	----	10000	WR
8483	510r	one cycle	498	13	*	----	----	1	WR
8484	511	constant amplitude	328	0.5	10	----	----	18330	WR
8485	512	constant amplitude	328	0.5	10	----	----	8643	WR
8486	513	constant amplitude	328	0.5	10	----	----	10000	WR
8487	513r	one cycle	590	13	*	----	----	1	WR
8488	514	constant amplitude	328	0.5	10	----	----	11418	WR
8489	515	constant amplitude	328	0.5	10	----	----	10814	WR
8490	516	constant amplitude	328	0.5	10	----	----	7732	WR
8491	517	constant amplitude	328	0.5	10	----	----	13968	WR
8492	518	constant amplitude	328	0.5	10	----	----	8684	WR
8493	519	constant amplitude	328	0.5	10	----	----	10000	WR
8494	519r	one cycle	540	13	*	----	----	1	WR
8495	520	constant amplitude	328	0.5	10	----	----	7107	WR
8496	521	constant amplitude	328	0.5	10	----	----	7189	WR
8497	522	constant amplitude	328	0.5	10	----	----	10000	WR
8498	522r	one cycle	403	13	*	----	----	1	WR

8499	523	constant amplitude	328	0.5	10	----	----	13784	WR

GLASS PREPREG

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL M9.6/32%/1200/G UNI GLASS

Lay-up = $[0]_3$, V_F = 0.480, Ave. thickness = 2.21 mm, S.D. = 0.14 mm, 0° - M9.6/32%/1200/G, Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth was used. Burn off = 49.52% for 2.464 mm

6614	0-1	-500	*	13	----	----	1	25
6615	0-2	-514	*	13	----	----	1	25
6169	0-3	-559	*	13	----	----	1	25
6616	0-4	-446	*	13	----	----	1	25
6696	0-9	1180	*	0.02	44.0	2.2+	1	25
6697	0-10	1152	*	0.02	42.0	2.1+	1	25
Tests 6693 - 6695 were in the transverse direction $(90)_3$								
6693	90-1	31.8	*	0.02	9.24	0.33	1	25
6694	90-2	37.3	*	0.02	9.68	0.38	1	25
6695	90-3	39.7	*	0.02	10.4	0.36	1	25
6824	90-150	-183	*	13	----	----	1	25
6825	90-152	-158	*	13	----	----	1	25
6826	90-151	-180	*	13	----	----	1	25

MATERIAL M9.6/32%/1200/G UNI GLASS

Lay-up = $[(\pm 45_G)_{2S}]$, 0° - M9.6/32%/1200/G Hexcel Glass prepreg, V_F = 0.423, Ave. thickness = 7.69 mm, S.D. = 0.06 mm, Epoxy, Two hours at 100 °C, 560 mm Hg vacuum.(ASTM D3518 Shear modulus (G) tests). First cracking was at approximately 0.6%.

6711	TGPP-1	80.0	*	0.02	10.6	2.0	1	25 G = 3.29
6712	TGPP-2	81.4	*	0.02	10.7	1.62	1	25 G = 3.31
6713	TGPP-3	82.8	*	0.02	10.7	2.11	1	25 G = 3.33
6783	TGPP-200	----	*	0.02	11.4	----	1	50 G = 3.51

MATERIAL M9.6/35%/BB600/G ±45 GLASS

Lay-up = $[(\pm 45_G)_{2S}]$, M9.6/35%/BB600/G 45° Hexcel Glass prepreg, V_F = 0.46, Ave. thickness = 2.07 mm, S.D. = 0.06 mm, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No breather cloth was used. Burn off = 2.07 mm = 45.87%

6641	45B10	148	*	0.13	11.2	1.5	1	25
6642	45B9	170	*	13	12.7	1.5	1	25
6643	45B12	166	*	13	11.7	1.6	1	25
6644	45B7	155	*	13	11.5	1.5	1	25
6645	45B6	86.2	0.1	2	12.1	1.03	5,645	25
6646	45B17	86.2	0.1	1	11.7	1.08	4,082	25
6647	45B13	86.2	0.1	1	11.3	1.15	3,924	25
6648	45B1	69.0	0.1	2	11.9	0.69	65,765	25
N vs E data, 1=1.7299, 10=1.7166, 100=1.726, 500=1.72, 10000=1.5214, 59000=1.29								
6648	45B16	69.0	0.1	2	11.2	0.79	57,069	25
6650	45B15	69.0	0.1	2	11.4	0.80	41,228	25
6651	45B5	51.7	0.1	3	11.6	0.52	2,455,697	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6652	45B4	51.7	0.1	3	11.6	0.52	2,210,032	25
6637	45B30	-162	*	13	----	----	1	25
6638	45B26	-146	*	13	----	----	1	25
6639	45B27	-148	*	13	----	----	1	25
6640	45B23	-155	*	13	----	----	1	25

MATERIAL M9.6/35%/BB600/G ±45 GLASS

Lay-up = $[(\pm 45_G)_{2S}]$, M9.6/35%/BB600/G 45° Hexcel Glass prepreg, V_F = 0.593, Ave. thickness = 1.61 mm, S.D. = 0.04 mm, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. Breather cloth was used. Burn off = 1.52 mm = 62.85%

6625	45A17	51.7	0.1	3	15.6	0.40	1,010,766	25
6626	45A14	51.7	0.1	3	16.1	0.38	1,070,432	25
6627	45A13	69.0	0.1	2	17.1	0.53	36,495	25
6628	45A11	69.0	0.1	2	15.6	0.61	30,145	25
6629	45A1	141	*	13	16.1	0.90	1	25
6630	45A15	141	*	13	14.9	0.95	1	25
6613	45A12	145	*	13	16.0	0.91	1	25
6632	45A4	86.2	0.1	1	16.0	0.8	3,535	25
6633	45A8	86.2	0.1	1	15.6	0.8	2,654	25
6634	45A9	86.2	0.1	1	15.0	0.89	3,269	25
6635	45A10	69.0	0.1	1	16.3	0.57	36,494	25
6636	45A3	44.8	0.1	4	15.5	0.29	6,713,854	25
6621	45A24	-148	*	13	----	----	1	25
6622	45A26	-144	*	13	----	----	1	25
6623	45A20	-145	*	13	----	----	1	25
6624	45A30	-152	*	13	----	----	1	25

MATERIAL GGP1

Lay-up = [0/±45/0] ,V_F = 0.675, Ave. thickness = 1.80 mm, S.D. = 0.04 mm, 0° - M9.6/32%/1200/G, ±45° - M9.6/35%/BB600/G Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. Bleeder cloth was used.

6606	GGP1-101	-579	*	13	----	----	1	25
6607	GGP1-102	-640	*	13	----	----	1	25
6608	GGP1-103	-610	*	13	----	----	1	25
6609	GGP1-104	-638	*	13	----	----	1	25
6678	GGP1-100	1208	*	0.02	42.9	3.2	1	20 tab
6718	GGP1-106	1355	*	13	42.7	3.2	1	20 tab
6719	GGP1-107	1480	*	13	41.1	3.4	1	20 tab

MATERIAL GGP2

Lay-up = [0/±45/0] ,V_F = 0.506, Ave. thickness = 2.41 mm, S.D. = 0.05 mm, 0° - M9.6/32%/1200/G, ±45° - M9.6/35%/BB600/G Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. Same as GGP1 except that there was no bleeder cloth used. Burn off coupon = 69.73% for 1.745 mm

6610	GGP2-103	-723	*	13	----	----	1	25
6611	GGP2-102	-693	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6612	GGP2-101	-779	*	13	----	----	1	25
6613	GGP2-100	-721	*	13	----	----	1	25
6723	GGP2-107	973	*	13	35.1	2.78	1	20 tab
6724	GGP2-106	1016	*	13	32.7	3.1	1	20 tab
6725	GGP2-105	1017	*	13	34.1	3.0	1	20 tab
6899	GGP2-104	446	0.1	3	36.9	1.23	3,615,001	20
6907	GGP2-105	517	0.1	2	37.9	1.42	417,521	20
6908	GGP2-106	758	0.1	1	35.5	2.14	687	20
6909	GGP2-102	758	0.1	1	33.2	2.33	1,387	20
Tests 6720 - 6722 were in the transverse direction (90/±45/90)								
6720	GGP2-201T	56.3	*	13	12.8	0.44	1	25 tab
6721	GGP2-202T	54.3	*	13	11.0	0.49	1	25 tab
6722	GGP2-203T	58.5	*	13	11.5	0.50	1	25 tab
6756	GGP2-110T	-172	*	13	----	----	1	25
6757	GGP2-111T	-172	*	13	----	----	1	25
6758	GGP2-112T	-151	*	13	----	----	1	25
6759	GGP2-113T	-161	*	13	----	----	1	25

MATERIAL GGP4

Lay-up = [±45/0/±45], V_F = 0.533, Ave. thickness = 1.85 mm, S.D. = 0.06 mm,0° - M9.6/32%/1200/G, ±45° - M9.6/35%/BB600/G Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum, No bleeder cloth was used. Burn off = 54.36% for 1.81 mm

6546	GGP42	861	*	13	28.7	3.0	1	20 tab
6547	GGP41	414	0.1	2	26.0	1.76	27,222	20 tab
6548	GGP43	414	0.1	2	29.5	1.54	47,271	20 tab
6549	GGP44	345	0.1	3	30.2	1.27	102,640	20 tab
6550	GGP45	345	0.1	3	26.8	1.43	73,113	20 tab
6551	GGP46	414	0.1	2	27.2	1.67	18,735	20 tab
6552	GGP47	345	0.1	3	28.3	1.38	159,750	20 tab
6553	GGP48	763	*	13	25.4	3	1	20 tab
6554	GGP49	826	*	13	26.4	3.1	1	20 tab
6617	GGP430	-269	*	13	----	----	1	25
6618	GGP431	-275	*	13	----	----	1	25
6619	GGP432	-279	*	13	----	----	1	25
6620	GGP433	-287	*	13	----	----	1	25
6677	GGP47	661	*	0.01	32.0	2.6	1	25 tab
6881	GGP420	483	0.1	2	27.7	2.05	11,317	25
6882	GGP421	483	0.1	2	28.3	2.03	3,376	25
6883	GGP422	483	0.1	2	28.2	2.03	6,870	25
6884	GGP410	241	0.1	3	27.6	0.93	1,500,000	25 R
6885	GGP411	237	0.1	6	26.6	0.97	4,000,000	25 R
6886	GGP412	552	0.1	1	28.2	2.15	1,690	25
6921	GGP421	552	0.1	1	27.4	2.23	1,074	25

CARBON PREPREG

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL M9.1/40%/500/C UNI CARBON

Layup = [0] ,V_F = 0.516, Ave. thickness = 0.523 mm, S.D. = 0.014 mm, M9.1/40%/500/C Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth was used.

6698	0C-1	1641	*	0.02	124	1.25	1	25NU=0.36
6699	0C-10	1462	*	0.02	107	1.36	1	25
6700	0C-3	1855	*	0.02	114	1.54	1	25
6701	0C-7	2030	*	0.02	----	----	1	25
6702	0C-9	1838	*	0.02	----	----	1	25
6717	0C-4	1761	*	0.02	103	1.52	1	25

MATERIAL M9.1/40%/500/C UNI CARBON

Lay-up = $[0]_3$,V_F = 0.497, Ave. thickness = 1.63 mm, S.D. = 0.06 mm, M9.1/40%/500/C Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth was used.

6684	03-1	1925	*	0.02	105	1.54	1	25NU= 0.31
6685	03-2	1591	*	0.02	97.8	1.43	1	25NU=0.35
6726	03-4	1923	*	13	114	1.5	1	20 tab
6790	03-124	-718	*	13	----	----	1	25
6791	03-126	-768	*	13	----	----	1	25
6792	03-127	-762	*	13	----	----	1	25
6819	03-128	-728	*	13	----	----	1	25

Tests 6686 - 6689, 6820 - 6823 were in the transverse direction $(90)_3$

6686	03-T1	19.7	*	0.02	8.05	0.24	1	25
6687	03-T2	18.5	*	0.02	7.49	0.23	1	25
6688	03-T5	25.7	*	0.02	7.64	0.30	1	25
6689	03-T6	29.9	*	0.02	7.82	0.27	1	25
6820	03-T132	-105	*	13	----	----	1	25
6821	03-T131	-109	*	13	----	----	1	25
6822	03-130	-94.3	*	13	----	----	1	25
6823	03-T129	-107	*	13	----	----	1	25

MATERIAL M9.1/40%/500/C UNI CARBON

Lay-up = $[0]_4$,V_F = 0.501, Ave. thickness = 2.16 mm, S.D. = 0.05 mm, M9.1/40%/500/C Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth was used.

6683	04-1	1544	*	13	103	1.33	1	20 tab
6727	04-2	1785	*	13	116	1.45	1	20 tab
6728	04-3	1663	*	13	115	1.35	1	20 tab
6732	04-210	-742	*	13	----	----	1	25
6733	04-211	-841	*	13	----	----	1	25
6734	04-212	-731	*	13	----	----	1	25
6735	04-213	-837	*	13	----	----	1	25

Tests 6736- 6739 were in the transverse direction $(90)_4$

6736	904-203	-115	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6737	904-206	-132	*	13	----	----	1	25
6738	904-202	-147	*	13	----	----	1	25
6739	904-201	-144	*	13	----	----	1	25

MATERIAL M9.1/40%/500/C UNI CARBON

Lay-up = $[\pm45]_{2S}$, V_F = 0.490, Ave. thickness = 4.40 mm, S.D. = 0.02mm, M9.1/40%/500/C Hexcel prepreg, Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth was used. (ASTM D3518 Shear modulus (G) tests)

6786	45-203	106	*	13	13.6	2.14	1	25 G=3.75
6785	45-202	108	*	13	11.9	2.1	1	25 G=3.54
6782	45-201	109	*	13	15.5	0.86	1	25 G=4.05
6787	45-300	116	*	13	12.4	3.2	1	50 G=3.49

MATERIAL SE84LV/HSC

Lay-up = $[0_{3C}]$, C = SP Systems carbon prepreg SE84LV/HSC/450/400/37%, V_F = 0.54, Ave. thickness = 1.35 mm, S.D. = 0.12 mm, Epoxy. Three hours at 100 °C, 560 mm Hg vacuum, 103 kPa over pressure. No bleeder cloth. 61% carbon 0's/vol.

6888	102	1998	*	13	109	1.9	1	25
6889	103	1782	*	13	136	1.4	1	25
6890	101	2596	*	13	126	2.1	1	25

MATERIAL SE84LV/SC300C

Lay-up = $[0_{5C}]$, C = SP Systems carbon prepreg SE84LV/SC300C/300/400/37%, V_F = 0.53, Ave. thickness = 1.46 mm, S.D. = 0.17 mm, Epoxy. Three hours at 100 °C, 560 mm Hg vacuum, 103 kPa over pressure. No bleeder cloth. 61% carbon 0's/vol.

6891	101	1564	*	13	116	1.4	1	25
6892	103	1463	*	13	103	1.5	1	25
6893	104	2203	*	13	155	1.5	1	25

MATERIAL Fortafil prepreg

Lay-up = $[0_{9C}]$, C = Fortafil carbon prepreg 150 g/m^2 areal weight uni's, 38% resin, V_F = 0.53, Ave. thickness = 1.34 mm, S.D. = 0.03 mm, Epoxy. Three hours at 100 °C, 560 mm Hg vacuum, 103 kPa over pressure. No bleeder cloth.

6894	104	1773	*	13	114	1.6	1	25
6895	100	1629	*	13	118	1.4	1	25
6896	103	1706	*	13	119	1.5	1	25

CARBON AND GLASS HYBRIDS

MATERIAL DD23

Lay-up = $[0_2/\pm45/0/0_C]_S$, 0_C - AS4-6K Carbon (TPI STYLE 4416), 220 g/m^2 , 0 - D155, ±45 - DB120. V_F = 0.45, Ave. thickness = 3.65 mm, S.D. = 0.11 mm, Derakane 411C-50 vinyl ester.

TEST &	SAMPLE ID #	MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
4077	DD23105	649	*	13	27.8	----	1	25 tab
4078	DD23106	276	0.1	10	28.9	0.96	1,681,606	25 tab
4079	DD23111	622	*	13	28.1	----	1	25 tab
4080	DD23107	685	*	13	27.1	----	1	25 tab
4081	DD23104	414	0.1	2	26.3	1.65	2,803	25 tab
4082	DD23110	634	*	13	27.9	----	1	25 tab
4083	DD23102	414	0.1	2	25.1	1.68	451	25 tab
4084	DD23103	345	0.1	4	28.6	1.17	295,281	25 tab
4085	DD23109	345	0.1	5	25.8	1.14	197,270	25 tab
4086	DD23108	647	*	0.1	26.1	----	1	25 tab
4087	DD23112	310	0.1	5	28.1	1.12	526,418	25 tab
4088	DD23101	310	0.1	10	26.6	1.08	493,197	25 tab
4101	DD23122	379	0.1	4	27.1	1.47	14,350	25 tab
4102	DD23121	379	0.1	4	28.0	1.37	22,335	25 tab
4103	DD23120	345	0.1	4	28.9	1.17	119,009	25 tab
4104	DD23119	379	0.1	2	27.6	1.42	4,324	25 tab
4214	DD23143	-467	*	13	----	----	1	25
4215	DD23142	-498	*	13	----	----	1	25
4216	DD23141	-505	*	13	----	----	1	25
4217	DD23140	-504	*	13	----	----	1	25

MATERIAL CG

Lay-up = $[0_2/0_{2C}/0/0_{2C}/0_2]$,Glass = D155, C = AS4-6K Carbon (TPI STYLE 4416), 220g/m^2, V_F = 0.56, Ave. thickness = 2.66 mm, S.D. = 0.06 mm, Derakane 8084 vinyl ester.

4089	CG110	934	*	13	72.5	1.29	1	25 tab
4090	CG106	861	*	13	65.5	1.31	1	25 tab
4091	CG104	414	0.1	12	65.8	0.59	1,368,362	25 tab
4092	CG109	552	0.1	8	63.7	0.79	141,368	25 tab
4093	CG101	552	0.1	9	68.3	0.89	55,233	25 tab
4094	CG112	483	0.1	10	61.4	0.73	253,069	25 tab
4095	CG108	552	0.1	5	64.4	0.81	109,701	25 tab
4096	CG105	414	0.1	12	71.4	0.56	1,900,285	25 tab
4097	CG107	690	0.1	2	62.4	1.02	1,969	25 tab
4098	CG111	690	0.1	2	64.8	0.94	13,577	25 tab
4099	CG113	690	0.1	2	62.0	1.04	10,770	25 tab
4100	CG103	965	*	13	63.5	1.52	1	25 tab
6654	CG133	-490	*	13	----	----	1	25
6655	CG132	-568	*	13	----	----	1	25
6656	CG131	-463	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6657	CG130	-378	*	13	----	----	1	25

MATERIAL CA

Lay-up = $(0)_{12}$, AS4-6K Carbon (TPI STYLE 4416), 220g/m^2, V_F = 0.48, Ave. thickness = 2.82 mm, S.D. = 0.24 mm, Derakane 8084 vinyl ester.

4105	CA113	1504	*	13	112	1.34	1	18 tab
4106	CA109	1666	*	13	112	1.49	1	18 tab
4107	CA111	1364	*	13	118	1.15	1	18 tab
4108	CA110	1207	0.1	1	154	0.90	9	18 tab
4109	CA112	1034	0.1	5	112	0.82	28,497	18 tab
4110	CA108	862	0.1	12	112	0.70	1,030,350	18 tab
4111	CA106	862	0.1	12	118	0.68	77,101	18 R tab
4112	CA107	862	0.1	10	113	0.70	2,364,140	18 tab
6668	CA160	-558	*	13	----	----	1	25
6669	CA161	-564	*	13	----	----	1	25
6670	CA163	-570	*	13	----	----	1	25
6671	CA162	-619	*	13	----	----	1	25

MATERIAL JJ

Lay-up = $(\pm 45/0_{3C}/\mp 45)$, UNI21 Carbon (Zoltek), 595 g/m^2, V_F = 0.46, Ave. thickness = 3.19 mm, S.D. = 0.03 mm, Derakane 8084 vinyl ester. Fiber waviness was present in the laminate.

6170	JJ1100	----	*	13	64.1	----	1	20 tab
6171	JJ1102	725	*	13	53.6	1.3	1	20 tab
6172	JJ1103	1016	*	13	55.7	1.7	1	20 tab
6173	JJ1104	950	*	13	62.5	1.5	1	20 tab
6174	JJ1105	690	0.1	1	72.2	1.04	214	20 tab
6175	JJ1109	552	0.1	5	59.9	0.85	2,300,000	20 tab R
6558	JJ1107	690	0.1	1	64.1	1.1	434	20 tab
6559	JJ1120	844	*	13	51.2	1.6	1	20 tab
6560	JJ1121	690	0.1	1	44.3	1.45	15	20 tab
6561	JJ1122	690	0.1	1	48.4	1.44	579	20 tab
6562	JJ1126	621	0.1	3	55.6	1.2	21,801	20 tab
6563	JJ1130	-388	*	13	----	----	1	25
6564	JJ1131	-469	*	13	----	----	1	25
6565	JJ1132	-456	*	13	----	----	1	25
6566	JJ1133	-329	*	13	----	----	1	25

MATERIAL UNI21

Lay-up = (0), UNI21 Carbon (Zoltek), 595 g/m^2, V_F = 0.316, Ave. thickness = 1.22 mm, S.D. = 0.003 mm, Derakane 8084 vinyl ester.

6240	UNI21-53	821	*	13	----	----	1	25 tab
6241	UNI21-54	572	*	13	----	----	1	25 tab
6242	UNI21-55	486	*	13	----	----	1	25 tab
6605	UNI21-163	-339	*	13	----	----	1	25
6658	UNI21-164	-362	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6659	UNI21-165	-373	*	13	----	----	1	25
6660	UNI21-166	-353	*	13	----	----	1	25
6661	UNI21-161	695	*	13	50.9	1.4	1	25 tab
6662	UNI21-160	703	*	13	52.5	1.3	1	25 tab
6663	UNI21-162	667	*	13	51.6	1.2	1	25 tab

fiber waviness is a problem with this fabric, producing random edge induced failures

MATERIAL UNI21

Lay-up = $(0)_4$, UNI21 Carbon (Zoltek), 712 g/m^2, V_F = 0.40, Ave. thickness = 3.84 mm, S.D. = 0.08 mm, Derakane 8084 vinyl ester.

6178	UNI21-114A	971	*	13	80.8	1.2	1	4 tab
6179	UNI21-114B	1128	*	13	83.9	1.34	1	13 tab
6180	UNI21-101B	1051	*	13	69.1	1.5	1	4 tab
6181	UNI21-100A	942	*	13	90.9	1.04	1	4 tab
6182	UNI21-113A	807	*	13	89.2	0.91	1	4 tab
6183	UNI21-113B	893	*	13	90.8	1.0	1	4 tab
6184	UNI21-166	-509	*	13	----	----	1	25
6185	UNI21-165	-599	*	13	----	----	1	25
6186	UNI21-164	-507	*	13	----	----	1	25
6187	UNI21-168	-551	*	13	----	----	1	25
6192	UNI21-156	-414	10	1	----	----	7	25
6193	UNI21-163	-345	10	4	----	----	78,890	25
6194	UNI21-148	-324	10	5	----	----	1,961,937	25
6195	UNI21-162	-345	10	1	----	----	39	25
6196	UNI21-161	-345	10	3	----	----	52,667	25
6197	UNI21-160	-345	10	4	----	----	240,249	25
6198	UNI21-156	-345	10	1	----	----	211	25
6237	UNI21-167	-345	10	2	----	----	9,254	25

Tests 6253 - 6260 were transverse tests tested in the $[90]_4$ direction

6253	UNI21-200T	17.1	*	13	6.2	0.28	1	25
6254	UNI21-201T	23.0	*	13	6.4	0.36	1	25
6255	UNI21-202T	22.1	*	13	6.7	0.33	1	25
6256	UNI21-203T	20.4	*	13	6.7	0.31	1	25
6257	UNI21-205T	-125	*	13	----	----	1	25
6258	UNI21-206T	-120	*	13	----	----	1	25
6259	UNI21-207T	-110	*	13	----	----	1	25
6260	UNI21-208T	-128	*	13	----	----	1	25

MATERIAL UNI25 (XP33FBUD25)

Lay-up = (0), UNI25 (XP33FBUD25) Carbon (Zoltek), same base material as the UNI21 material, just a tighter stitching pattern. 712 g/m^2, V_F = 0.45, Ave. thickness = 1.09 mm, S.D. = 0.003 mm, Derakane 8084 vinyl ester

6243	UNI25-53	1222	*	13	----	----	1	25 tab
6244	UNI25-54	1254	*	13	----	----	1	25 tab
6245	UNI25-55	965	0.1	3	----	----	3,000,000	25 tab R
6246	UNI25-56	1069	0.1	2	----	----	174,838	25 tab
6247	UNI25-57	1103	0.1	2	----	----	517	25 tab

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6248	UNI25-58	1069	0.1	2	----	----	23,261	25 tab
6249	UNI25-60	1069	0.1	2	----	----	1,490	25 tab
6250	UNI25-61	1162	*	13	----	----	1	25 tab
6251	UNI25-62	1034	0.1	2	----	----	22,094	25 tab
6252	UNI25-63	945	0.1	3	----	----	1,500,000	25 tab R

Test 6269 also generated a Poisson's ratio, $\upsilon_{LT} = 0.27$

6269	UNI25-52	1442	*	0.05	88.0	1.53	1	25 tab
6270	UNI25-65	1103	0.1	1	----	----	828	25 tab
6271	UNI25-66	1034	0.1	3	----	----	58,819	25 tab
6272	UNI25-67	1034	0.1	3	----	----	127,748	25 tab
6664	UNI25-160	-368	*	13	----	----	1	25
6665	UNI25-161	-333	*	13	----	----	1	25
6666	UNI25-162	-344	*	13	----	----	1	25
6667	UNI25-163	-337	*	13	----	----	1	25

MATERIAL UNI25A

Lay-up = $(0)_4$, UNI25 Carbon (Zoltek), same base material as the UNI21 material, just a tighter stitching. 712 g/m^2, $V_F = 0.45$, Ave. thickness = 4.11 mm, S.D. = 0.07 mm, Derakane 8084 vinyl ester

6188	UNI25A133	-508	*	13	----	----	1	25
6189	UNI25A132	-510	*	13	----	----	1	25
6190	UNI25A134	-543	*	13	----	----	1	25
6191	UNI25A135	-578	*	13	----	----	1	25
6199	UNI25A136	-345	10	3	----	----	24,407	25
6235	UNI25A137	-345	10	3	----	----	5,640	25
6236	UNI25A130	-345	10	3	----	----	11,766	25
6238	UNI25A143	-345	10	10	----	----	20,000,000	25 R
6239	UNI25A142	-379	10	5	----	----	1,334,553	25
6176	UNI25A145	-379	10	5	----	----	4,000,000	25 R

Tests 6261 - 6268 were transverse tests tested in the $[90]_4$ direction

6261	UNI25A200T	19.2	*	13	6.6	0.29	1	25
6262	UNI25A201T	21.0	*	13	6.9	0.31	1	25
6263	UNI25A202T	21.2	*	13	6.7	0.31	1	25
6264	UNI25A203T	20.7	*	13	6.8	0.31	1	25
6265	UNI25A208T	-104	*	13	----	----	1	25
6266	UNI25A207T	-90	*	13	----	----	1	25
6267	UNI25A206T	-103	*	13	----	----	1	25
6268	UNI25A205T	-104	*	13	----	----	1	25
6672	UNI25A180	832	*	13	86.2	1	1	13
6673	UNI25A181	858	*	13	86.2	1	1	13
6674	UNI25A182	996	*	13	86.1	1.2	1	13

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL CGB

Lay-up = ($0_{2C}/\mp45/0_{2C}$), Hexcel carbon prepreg 0°, M9.1/40%/500/C, 500 g/m^2, Hexcel glass prepreg ±45°, M9.6/35%/BB600/G, 610 g/m^2 , V_F = 0.50, Ave. thickness = 2.69 mm, S.D. = 0.08 mm. Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth.

6567	CGB101	1633	*	13	97.1	1.48	1	21 tab
6568	CGB102	1582	*	13	102	1.4	1	21 tab
6569	CGB103	1605	*	13	95.1	1.5	1	21 tab
6570	CGB137	-625	*	13	----	----	1	25
6571	CGB126	-648	*	13	----	----	1	25
6572	CGB139	-583	*	13	----	----	1	25
6573	CGB138	-593	*	13	----	----	1	25
6675	CGB107	1493	*	0.02	98.3	1.45	1	25 tab
6835	CCB131	-483	10	4	----	----	8,867	25
6836	CGB122	-483	10	4	----	----	6,482	25
6837	CGB129	-483	10	4	----	----	2,018	25
6838	CGB128	-448	10	6	----	----	611,283	25
6839	CGB121	-448	10	6	----	----	87,489	25

MATERIAL CGB2

Lay-up = ($0_C/\mp45/0_C$), Hexcel carbon prepreg 0°, M9.1/40%/500/C, 500 g/m^2, Hexcel glass prepreg ±45°, M9.6/35%/BB600/G, 610 g/m^2 , V_F = 0.52, Ave. thickness = 1.54 mm, S.D. = 0.04 mm. Epoxy. Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth.

6574	CGB2101	1374	*	13	68.4	2.0	1	21 tab
6575	CGB2102	1417	*	13	67.2	2.1	1	21 tab
6576	CGB2103	1419	*	13	66.6	2.1	1	21 tab
6577	CGB2139	-670	*	13	----	----	1	25
6578	CGB2124	-613	*	13	----	----	1	25
6579	CGB2126	-607	*	13	----	----	1	25
6580	CGB2125	-551	*	13	----	----	1	25
6676	CGB2104	1108	*	0.02	69.7	1.52	1	25 tab

MATERIAL CGB3

Lay-up = [$\pm45_G/0_{3C}/\mp45_G$],G= Hexcel glass prepreg M9.6/35%/BB600/G 45's, C = Hexcel carbon prepreg M9.1/40%/500/C, V_F = 0.496, Ave. thickness = 2.60 mm, S.D. = 0.03 mm, Two hours at 100 °C, 560 mm Hg vacuum. No bleeder cloth.

6690	CGB3100	1210	*	13	63.6	1.90	1	25 tab
6691	CGB3103	1246	*	13	70.7	1.76	1	25 tab
6692	CGB3101	1169	*	13	63.2	1.67	1	25 tab
6744	CGB3104	-499	*	13	----	----	1	25
6745	CGB3107	-616	*	13	----	----	1	25
6746	CGB3109	-534	*	13	----	----	1	25
6747	CGB3105	-502	*	13	----	----	1	25
6841	CGB3141	-448	10	6	----	----	1,005,000	25R
6842	CGB3140	-517	10	1	----	----	2,445	25
6843	CGB3137	-483	10	4	----	----	450,000	25R

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6897	CGB3205	1314	*	13	70.6	1.9	1	25
6898	CGB3204	1423	*	13	73.5	1.9	1	25
7027	CGB3206	1333	*	13	71.5	1.9	1	25
7028	CGB3207	-648	*	13	----	----	1	25
7029	CGB3208	-639	*	13	----	----	1	25
7030	CGB3210	-632	*	13	----	----	1	25
7031	CGB3218	-667	*	13	----	----	1	25

MATERIAL CGB4

Lay-up = $[\pm 45_G/0_{3C}/\pm 45_G]$,G= Hexcel glass prepreg M9.6/35%/BB600/G 45's, C = SP Systems carbon prepreg SE84LV/HSC/450/400/37%, V_F = 0.43, Ave. thickness = 4.05 mm, S.D. = 0.05 mm, Epoxy. Three hours at 100 °C, 560 mm Hg vacuum, 103 kPa over pressure. No bleeder cloth. 61% carbon 0's/vol.

7032	101	1317	*	13	81.8	1.6	1	13
7033	200	1614	*	13	83.0	2	1	13
7034	102	1205	*	13	82.3	1.5	1	13
7035	104	1261	*	13	81.7	1.6	1	13
7036	115	-705	*	13	----	----	1	25
7037	126	-873	*	13	----	----	1	25
7038	118	-873	*	13	----	----	1	25
7039	119	-859	*	13	----	----	1	25

MATERIAL CGB5

Lay-up = $[\pm 45_G/0_{5C}/\pm 45_G]$,G= Hexcel glass prepreg M9.6/35%/BB600/G 45's, C = SP Systems carbon prepreg SE84LV/SC300C/300/400/37%, V_F =0.49, Ave. thickness = 2.73 mm, S.D. = 0.06 mm, Epoxy. Three hours at 100 °C, 560 mm Hg vacuum, 103 kPa over pressure. No bleeder cloth. 63.5% carbon 0's/vol

7040	101	1063	*	13	67.2	1.6	1	13
7041	102	1167	*	13	73.5	1.6	1	13
7042	105	1160	*	13	69.1	1.7	1	13
7043	130	-662	*	13	----	----	1	25
7044	137	-688	*	13	----	----	1	25
7045	138	-675	*	13	----	----	1	25
7046	132	-650	*	13	----	----	1	25

MATERIAL CGB6

Lay-up = $[\pm 45_G/0_{6C}/\pm 45_G]$,G= DB120 glass fabric 45's, C = SP Systems carbon prepreg SE84LV/HSC450/450/400/37%, V_F = 0.646, Ave. thickness = 3.20 mm, S.D. = 0.09 mm, Epoxy. Three hours at 100 °C, 560 mm Hg vacuum, 276 kPa over pressure. No bleeder cloth (used dry DB120's).

7047	108	2000	*	13	106	1.9	1	13
7048	109	1939	*	13	100	2.0	1	13
7049	101	1905	*	13	98.9	2.0	1	13
7050	121	-825	*	13	----	----	1	25
7051	126	-1136	*	13	----	----	1	25
7052	127	-1014	*	13	----	----	1	25
7053	130	-1132	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL CGD4

Lay-up = ($\pm 45/0_{3C}/\mp 45$), Toray carbon fabric 0°, ACM-13-2 (300-48K-10C yarn) 596g/m^2, DB120 ±45°, 393 g/m^2, V_F = 0.51, Ave. thickness = 2.54 mm, S.D. = 0.17 mm. Derakane 8084 vinyl ester.

Tests 6847 - 6859 involved coupons taken from CGD4 plate 1.

6847	CGD4311	-573	*	13	----	----	1	25
6848	CGD4307	-628	*	13	----	----	1	25
6849	CGD4305	-489	*	13	----	----	1	25
6850	CGD4304	-442	*	13	----	----	1	25
6851	CGD4323	-414	10	3	----	----	47,832	25
6853	CGD4303	-414	10	3	----	----	2,540	25
6854	CGD4316	-414	10	3	----	----	9,518	25
6855	CGD4317	-393	10	6	----	----	1,138,917	25
6852	CGD4327	1081	*	13	83.9	1.3	1	25
6855	CGD4324	1179	*	13	80.5	1.5	1	25
6856	CGD4325	1104	*	13	82.6	1.4	1	25
6857	CGD4326	1018	*	0.1	81.7	1.27	1	25
6858	CGD4313	-393	10	8	----	----	656,841	25
6859	CGD4314	-393	10	8	----	----	6,000,000	25 R

Tests 6930 - 6946 involved coupons taken from CGD4 plate 2.

6930	CGD4401	-611	*	13	----	----	1	25
6931	CGD4408	-626	*	13	----	----	1	25
6932	CGD4406	-572	*	13	----	----	1	25
6933	CGD4403	-541	*	13	----	----	1	25
6934	CGD4402	-414	10	3	----	----	1,171,500	25
6935	CGD4404	-414	10	3	----	----	8,159	25
6936	CGD4405	-414	10	3	----	----	865,497	25
6937	CGD4407	-414	10	3	----	----	64,312	25
6938	CGD4409	-414	10	3	----	----	158,965	25
6939	CGD4410	-414	10	3	----	----	32,561	25
6940	CGD4412	-414	10	3	----	----	4,153	25
6941	CGD4413	-414	10	3	----	----	10,842	25
6942	CGD4414	-483	10	3	----	----	442	25
6943	CGD4415	-483	10	3	----	----	49	25
6944	CGD4416	-414	10	3	----	----	54,768	25
6945	CGD4417	-414	10	3	----	----	17,155	25
6946	CGD4419	-414	10	3	----	----	2,000,000	25 R

MATERIAL CGD4E

Lay-up = ($\pm 45/0_{3C}/\mp 45$), Toray carbon fabric 0°, ACM-13-2 (300-48K-10C yarn) 596g/m^2, DB120 ±45°, 393 g/m^2, V_F = 0.50, Ave. thickness = 2.61 mm, S.D. = 0.12 mm. SP Systems Prime 20 Epoxy resin.

6910	CGD4E104	1170	*	13	89.9	1.33	1	25
6911	CGD4E101	1145	*	13	85.2	1.39	1	25
6912	CGD4E102	1162	*	13	79.0	1.50	1	25
6913	CGD4E106	-707	*	13	----	-0.83	1	25
6914	CGD4E110	-734	*	13	----	-0.87	1	25
6915	CGD4E107	-722	*	13	----	-0.85	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
6916	CGD4E109	-665	*	13	----	-0.79	1	25
6917	CGD4E108	-590	*	13	----	-0.70	1	25
6918	CGD4E114	-552	10	1	----	----	669	25
6919	CGD4E122	-483	10	2	----	----	11,889	25
6920	CGD4E121	-483	10	4	----	----	311,905	25
6921	CGD4E111	-483	10	2	----	----	29,006	25
6922	CGD4E111	-483	10	6	----	----	3,000,000	25
6923	CGD4E115	-483	10	4	----	----	47,787	25
6924	CGD4E113	-483	10	4	----	----	110,770	25
6925	CGD4E120	-483	10	4	----	----	293,388	25
6926	CGD4E119	-483	10	4	----	----	61,019	25
6927	CGD4E118	-483	10	4	----	----	43,901	25
6928	CGD4E112	-483	10	4	----	----	22,128	25
6929	CGD4E116	-483	10	4	----	----	215,197	25
8687	CGD4E160	345	-1	2	----	----	3,417,374	25
8688	CGD4E161	414	-1	3	----	----	181,525	25
8689	CGD4E173	414	-1	3	----	----	151,105	25
8690	CGD4E170	414	-1	2	----	----	214,413	25
8691	CGD4E169	448	-1	2	----	----	47,595	25
8692	CGD4E172	448	-1	2	----	----	32,210	25
8693	CGD4E167	448	-1	2	----	----	80,004	25
8708	CGD4E162	345	-1	4	----	----	1,630,782	25
8729	CGD4E163	483	-1	1	----	----	323	25
8730	CGD4E164	483	-1	1	----	----	7,109	25
8731	CGD4E165	483	-1	1	----	----	19,798	25

MATERIAL CGD5E

Lay-up = ($\pm 45/0_{3C}/\mp 45$), Fortafil 652 carbon fabric 0°, 450 g/m^2, DB120 ±45°, 393 g/m^2 , V_F = 0.349, Ave. thickness = 3.03 mm, S.D. = 0.05 mm. SP Systems Prime 20 Epoxy resin.

7054	103	766	*	13	46.1	1.7	1	25
7055	102	724	*	13	48.8	1.5	1	25
7056	101	818	*	13	50.8	1.6	1	25
7057	104	748	*	13	49.8	1.5	1	25
7058	115	-606	*	13	----	----	1	25
7059	116	-547	*	13	----	----	1	25
7060	117	-532	*	13	----	----	1	25
7061	118	-573	*	13	----	----	1	25

MATERIAL CGD5E2

Lay-up = ($\pm 45/0_{3C}/\mp 45$), Fortafil 652 carbon fabric 0°, 450 g/m^2, DB120 ±45°, 393 g/m^2 , V_F = 0.508, Ave. thickness = 2.27 mm, S.D. = 0.05 mm. SP Systems Prime 20 Epoxy resin.

7062	103	1082	*	13	76.5	1.5	1	25
7063	106	1166	*	13	75.5	1.6	1	25
7064	104	1159	*	13	72.6	1.6	1	25
7065	120	-532	*	13	----	----	1	25
7066	122	-556	*	13	----	----	1	25
7067	123	-575	*	13	----	----	1	25
7068	121	-522	*	13	----	----	1	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

MATERIAL ACM-13-2

Lay-up = [(±45_C)$_{2S}$], C = Toray ACM-13-2 (300-48K-10C) carbon fabric, V_F = 0.46, Ave. thickness = 5.96 mm, S.D. = 0.27 mm, Derakane 8084 vinyl ester. (ASTM D3518 Shear modulus (G) tests)

6708	G-1	89.0	*	0.02	11.62	3.1	1	25 G = 3.25
6709	G-2	83.0	*	0.02	12.3	1.3	1	25 G = 3.45
6710	G-3	85.6	*	0.02	12.5	1.64	1	25 G = 3.33

MATERIAL UT70-60

Lay-up = [(±45_C)$_{2S}$], C = Toray UT70-60 (T700S-12K) carbon fabric, V_F = 0.35, Ave. thickness = 8.23 mm, S.D. = 0.03 mm, Derakane 8084 vinyl ester. (ASTM D3518 Shear modulus (G) tests)

6714	T700-1	64.4	*	0.02	10.9	1.25	1	25 G =3.05
6715	T700-2	68.6	*	0.02	10.2	1.61	1	25 G =2.74
6716	T700-3	66.9	*	0.02	9.77	1.87	1	25 G=2.69
6784	T700-200	-----	*	0.02	10.4	----	1	50 G=3.03

List of tests omitted from the database list due to testing irregularities, premature buckling, fiber orientation or gripping problems causing an invalid test.

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1	104A	185	0.5	----	----	----	1,400	50 tab
2	105A	130	0.1	10	----	----	155,201	50 tab
3	106A	333	0.1	0.5	----	----	210	50 tab
4	107A	288	0.1	1	----	----	873	50 tab
5	106B	338	*	----	----	----	----	50 tab
8	101B	361	0.1	0.5	----	----	1,860	50 tab
10	104B	408	0.1	0.1	----	----	40	50 tab
11	105B	420	0.1	0.1	----	----	160	50 tab
14	110B	356	0.1	0.1	----	----	480	50 tab
19	115B	399	0.1	0.1	18.3	----	180	50 tab
90	102A	454	*	0.02	----	----	1	50 tab
94	109J	188	*	--	22.6	0.82	1	25 tab
157	101A	423	*	0.02	----	----	1	50 tab
162	103A	347	*	----	----	----	1	50 tab
275	113R	155	0.1	15	----	----	1	50 tab
307	115X	345	0.1	5	25.1	1.42	1,441	25 tab
308	111X	345	0.1	5	23.6	1.46	2,114	25 tab
324	148X	-332	*	13	26.8	2.3	1	25 tab
325	146X	-378	*	13	25.9	1.73	1	25 tab
326	149X	-326	*	13	24.0	1.39	1	25 tab
875	190X	-365	*	13	----	----	1	25
876	191X	-317	*	13	----	----	1	25
338	155X	-241	10	10	30.9	0.74	2,000	25 tab
448	243AA	241	-1	2	18.9	----	17	25 tab
283	273AA	----	10	25	----	----	91,520	25 tab
698	165Y	-246	10	5	----	----	31	25 tab
700	174Y	-246	10	10	25.7	1.07	235	25 tab
703	171X	-345	10	2	----	----	137	25 tab
704	165X	-345	10	1	----	----	178	25 tab
874	177X	-310	10	2	----	----	14,129	25 tab
Material DD3 had random mat in between the 0° and ±45°, $(0/M/\pm45/M/0)_S$, V_F = 0.48, thickness = 2.92 mm, D155 and DB120 fabrics with an unknown mat specification.								
1054	DD3104	792	*	13	29.3	2.70	1	22
1055	DD3106	483	0.1	2	29.0	1.66	687	22
1056	DD3105	483	0.1	2	27.4	1.76	869	22
1057	DD3103	414	0.1	5	27.4	1.50	1,932	22
1058	DD3102	345	0.1	10	----	----	6,629	22
1059	DD3101	345	0.1	10	----	----	4,909	22
1130	DD7130	-448	*	25	----	----	1	25
1131	DD7126	-460	*	25	----	----	1	25
1132	DD7121	-463	*	25	----	----	1	25
1133	DD7120	-451	*	25	----	----	1	25
1134	DD6127	-310	10	5	----	----	84,387	25
1135	DD6119	-345	10	5	----	----	13,297	25
1136	DD6120	-345	10	5	----	----	10,844	25

TEST & SAMPLE ID #		MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes
1137	DD7123	-345	10	10	----	----	89,517	25
1138	DD7122	-345	10	10	----	----	73,744	25
1139	DD7125	-345	10	15	----	----	100,821	25
1141	DD6122	-310	10	25	----	----	110,395	25
1150	DD6134	-480	*	13	----	----	1	25
1151	DD6117	-461	*	13	----	----	1	25
1152	DD6126	-379	10	10	----	----	6,797	25
1162	DD7127	-379	10	10	----	----	1,735	25
1176	DD6142	-425	*	13	----	----	1	25
1177	DD7149	-577	*	13	----	----	1	25
1205	DD8107	483	0.1	5	15.0	----	--	22
1208	DD8110	414	0.1	5	----	----	30	22
1222	DD9115	483	0.1	5	33.4	----	17	22
1225	DD9105	276	0.1	5	33.2	----	8,873	22
Tests 1690-1692 exhibited buckling during the fatigue tests.								
1690	CH12147	-241	10	12	----	----	18,512	25
1691	CH12134	-241	10	5	----	----	16,872	25
1692	CH12142	-241	10	5	----	----	12,942	25
1845	CC201	-166	*	13	----	----	1	25
1846	CC202	-186	*	13	----	----	1	25
1847	CC203	-176	*	13	----	----	1	25
2020	D15507	-598	*	13	31.2	-1.94	1	ZERO tab
2021	D15508	-619	*	13	32.0	-1.72	1	ZERO tab
3938	DD19A107	-172	10	5	----	----	13,650	25 Z
3939	DD19A105	-172	10	4	----	----	652	25 Z
Material D155D, V_F = 0.29, has fiber wash and fiber misalignment								
2137	D155D201	680	*	13	25.2	2.8	1	25
2138	D155D205	746	*	13	29.0	2.7	1	25
2139	D155D211	763	*	13	29.3	----	1	25
2140	D155D210	414	0.1	1	26.1	1.65	--	25
2213	D155H105	552	0.1	4	35.9	1.54	8,460	25
2214	D155H104	552	0.1	2	28.4	----	277	25
2345	D155H115	834	*	13	36.7	----	1	25
2788	D155G308	-500	10	5	----	----	46,980	25
Material 10D155 with a gage length of 100 mm (too short)								
2567	10D155125	172	0.1	5	27.6	0.66	1,747	25
2568	10D155126	172	0.1	5	21.2	0.87	9,287	25
2769	D155G308	-500	10	5	----	----	46,980	25
2785	D092G129	-690	10	1	----	----	4	25
4181	DD25B101	310	0.1	2	16.7	2.12	1,620	22 tab
Test 6044 and 6152 main electrical power fail, uncontrolled shutdown coupon damaged								
6044	DD5V2405W	-310	10	6	----	----	133,858	20 °C Wet
6152	DD5V553W	-310	10	1	----	----	36,544	50 °C Wet
Test 6177 went to the tensile limit of the machine without gross failure								
6177	UNI21-116	1041+	*	13	78.3	1.3+	1	4 R

TEST & SAMPLE ID #	MAX. STRESS MPa	R	Q Hz	E GPa	e %	CYCLES TO FAIL	WIDTH (mm) and Notes

Test and coupon #		Comment	Maximum Stress, MPa	R value	Freq Hz	# High Cycles	# Low Cycles	Total Cycles	program
7892	910	constant amplitude	-276 / -138	2	10	----	----	4297	load11
The following R=-1 coupons had higher than normal gripping forces which shortened their fatigue life (Grip pressure induced failures)									
7865	1038	constant amplitude	183 / -183	-1	5	----	----	5556	revers
7866	1039	constant amplitude	145 / -145	-1	5	----	----	93249	revers
7867	1040	constant amplitude	147 / -147	-1	5	----	----	74482	revers
7868	1041	constant amplitude	111 / -111	-1	5	----	----	1313993	revers
7869	1042	constant amplitude	110 / -110	-1	5	----	----	902103	revers
7870	1043	constant amplitude	112 / -112	-1	5	----	----	1814761	revers
7871	1044	constant amplitude	178 / -178	-1	5	----	----	4861	revers
7872	1045	constant amplitude	148 / -148	-1	5	----	----	62837	revers
7873	1046	constant amplitude	111 / -111	-1	5	----	----	785091	revers
7874	1047	constant amplitude	146 / -146	-1	5	----	----	93636	revers
7875	1048	constant amplitude	156 / -156	-1	5	----	----	17397	revers
7876	1049	constant amplitude	114 / -114	-1	5	----	----	2108317	revers
7877	1050	constant amplitude	178 / -178	-1	5	----	----	6004	revers
7878	1051	constant amplitude	145 / -145	-1	5	----	----	57737	revers

END OF DATABASE