NASA CR-112219

CYCLIC DEBONDING OF ADHESIVE JOINTS: DATA REPORT

By D. J. Hoffman and R. R. June

February 1973

D6-60136-6

Prepared under contract NAS1-8858 by
BOEING COMMERCIAL AIRPLANE COMPANY
Seattle, Washington

for

Langley Research Center
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA CR-112219		

4. Title and Subtitle	5. Report Date
CYCLIC DEBONDING OF ADHESIVE JOINTS: DATA REPORT	February 1973
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
D. J. Hoffman and R. R. June	D6-60136-6
	10. Work Unit No.
9. Performing Organization Name and Address Boeing Commercial Airplane Company P.O. Box 3707 Seattle, Washington 98124	11. Contract or Grant No. NAS 1-8858
	13. Type of Report and Period Covered Contractor Report
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, D.C. 20546	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

Bonded lap joints were manufactured and tested under static and fatigue loading. Specimens were designed to fail in the bondline, and all fatigue tests included monitoring the crack growth to failure. NASA CR-2207, *Cyclic Debonding of Adhesive Joints: Summary Report* provides background information and a general summary of the data obtained. This report lists detailed crack length readings for the 106 fatigue specimens involved.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Debonding Adhesive Fatigue Bonded joints Filamentary composites Boron-epoxy	Unclassified–Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	~~117~~ 120	~~$~~ 8.00

*For sale by the National Technical Information Service, Springfield, Virginia 22151

FOREWORD

This report was prepared by the Boeing Commercial Airplane Company under NASA contract NAS1-8858 and covers work performed during the period June 1971, through October 1972, on Phase III of a three-phase contract.

The authors wish to acknowledge the contributions of the following Boeing structural test personnel:

W. C. Larson
T. E. Kane

CONTENTS

	Page
SUMMARY	1
SYMBOLS	3
EXPERIMENTAL TEST PROGRAM	5
TEST RESULTS	9
REFERENCES	117

CYCLIC DEBONDING OF ADHESIVE JOINTS: DATA REPORT

By D. J. Hoffman and R. R. June
Boeing Commercial Airplane Company

SUMMARY

This report presents detailed test results from an experimental investigation into the failure of adhesive bondlines and advanced-composite matrix materials subjected to fatigue loading. The data include 18 static control specimens and 106 fatigue specimens. Crack growth was monitored to failure for all of the fatigue tests. Additional information can be found in NASA CR-2207, *Cyclic Debonding of Adhesive Joints: Summary Report* (ref. 1).

SYMBOLS

The international system of units (SI) was adopted by the Eleventh General Conference on Weights and Measures, Paris, October 1960 (ref. 2).

Physical quantities defined in this paper are given in both the international system of units and the U. S. customary units. Conversion factors for the units used herein are given in table 1. Prefixes to indicate multiples of units are given in table 2.

a	crack length, millimeters (inches)
b	width of test section, millimeters (inches)
F	allowable stress, newtons per square meter (pounds per square inch)
K_t	stress concentration factor, nondimensional
ℓ	lap length, millimeters (inches)
N	number of load cycles, nondimensional
R	ratio of maximum applied stress to minimum applied stress, nondimensional
T	temperature, degrees Kelvin (Fahrenheit)
t	thickness, millimeters (inches)
ϵ	axial strain, %, nondimensional
σ	maximum applied fatigue stress, newtons per square meter (pounds per square inch)

Subscripts

a	adherend
ad	adhesive or matrix
sp	splice plate
t	tension
y	yield

TABLE 1.– CONVERSION FACTORS FOR U.S. CUSTOMARY UNITS

Physical quantity	SI unit	Conversion factor*	U.S. customary unit
Length	Meter, m	39.3700	Inch, in.
Mass	Kilogram, kg	2.2046	Pound-mass, lbm
Load	Newton, N	0.2248	Pound-force, lbf
Density	Kilogram/meter^3, kg/m^3	0.000036	Pound-mass/inch^3, lbm/in.^{3}
		0.0624	Pound-mass/foot^3, lbm/ft^3
Load intensity	Newton/meter, N/m	0.0057	Pound-force/inch, lbf/in.
Modulus, stress, pressure	Newton/meter^2, N/m^2	0.000145	Pound-force/inch^2, psi
Temperature	Degree Kelvin, °K	9/5(t_K)-460	Degree Fahrenheit, °F

*Multiply the value in SI units by the conversion factor to obtain the value in U.S. customary units.

TABLE 2.– PREFIXES FOR METRIC UNITS

milli, m	10^{-3}
kilo, k	10^3
mega, M	10^6
giga, G	10^9

EXPERIMENTAL TEST PROGRAM

The experimental test program plan is shown in table 3. Two static tests were required for each configuration plus three fatigue tests at each of three or four load levels. The static tests were included to verify specimen quality and to establish ultimate failure load and mode. In all fatigue tests crack growth was monitored to failure. Fatigue test loads were chosen to provide specimen lives in the range of 10^4 to 10^5 cycles.

The specimen used in all of the fatigue tests and half of the static tests is shown in figure 1. It consisted of a simple lap splice requiring complete load transfer from the adherend through the bondline to the splice plate. Some static specimens were tested in a 610 mm (24 in.) long full-dogbone configuration. The difference in configuration was not believed to have influenced test results.

TABLE 3.– EXPERIMENTAL TEST PROGRAM PLAN

Configuration	Adhesive material	Nominal adhesive thickness, t_{ad}, mm (in.)	Adherend material	Nominal adherend thickness, t_a, mm (in.)	Splice plate material	Nominal splice plate thickness, t_{sp}, mm (in.)	Test section width, b. mm (in.)	Number of static specimens required	Number of fatigue specimens required
1	AF-126	0.127 (0.005)	7075-T6	3.175 (0.125)	7075-T6	6.350 (0.250)	38.1 (1.50)	2	3 specimens at each of 4 load levels
2	AF-126	0.254 (0.010)	7075-T6	3.175 (0.125)	7075-T6	6.350 (0.250)	38.1 (1.50)	2	3 specimens at each of 4 load levels
3	AF-126	0.508 (0.020)	7075-T6	3.175 (0.125)	7075-T6	6.350 (0.250)	38.1 (1.50)	2	3 specimens at each of 4 load levels
4	AF-126	0.127 (0.005)	7075-T6	3.175 (0.125)	7075-T6	4.826 (0.190)	38.1 (1.50)	2	3 specimens at each of 3 load levels
5	AF-126	0.127 (0.005)	7075-T6	4.064 (0.160)	7075-T6	4.826 (0.190)	38.1 (1.50)	2	3 specimens at each of 3 load levels
6	AF-126	0.127 (0.005)	7075-T6	3.175 (0.125)	7075-T6	6.350 (0.250)	76.2 (3.00)	2	3 specimens at each of 4 load levels
7	BP907	0.076 (0.003)	7075-T6	3.175 (0.125)	7075-T6	6.350 (0.250)	38.1 (1.50)	2	3 specimens at each of 4 load levels
8	BP907	[a]0.000 (0.000)	Ti-6Al-4V	1.600 (0.063)	Boron-epoxy	[b]1.803 (0.071)	38.1 (1.50)	2	3 specimens at each of 4 load levels
9	BP907	0.076 (0.003)	Ti-6Al-4V	1.600 (0.063)	Boron-epoxy	[b]1.803 (0.071)	38.1 (1.50)	2	3 specimens at each of 4 load levels

[a]Co-cure situation where no adhesive is added as a bonding agent. Adhesion is achieved by matrix material in pre-preg tape.

[b]Based on 13 plies of uniaxial boron-epoxy with an estimated average thickness per ply of 0.1397 mm (0.0055 in.)

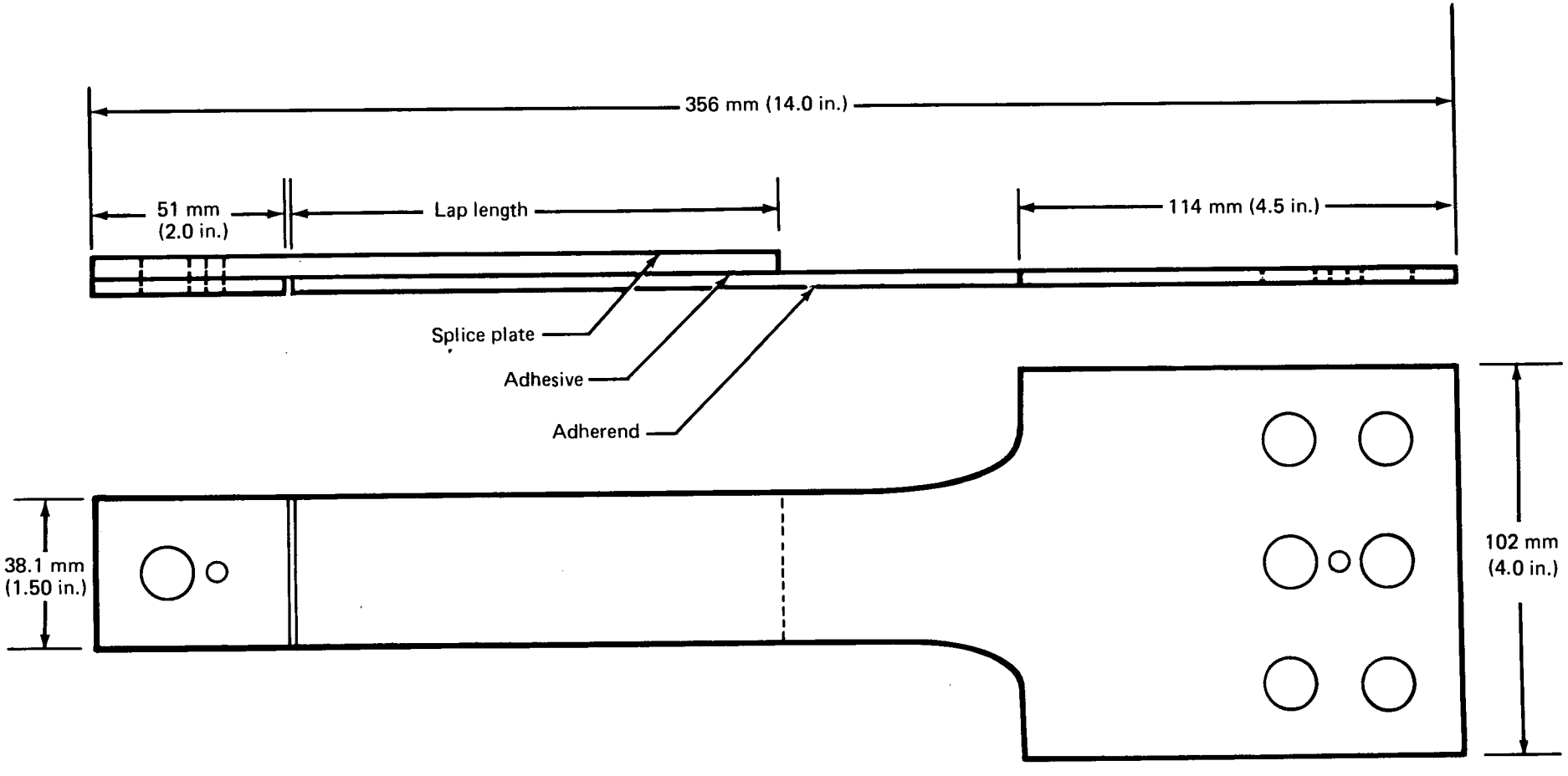
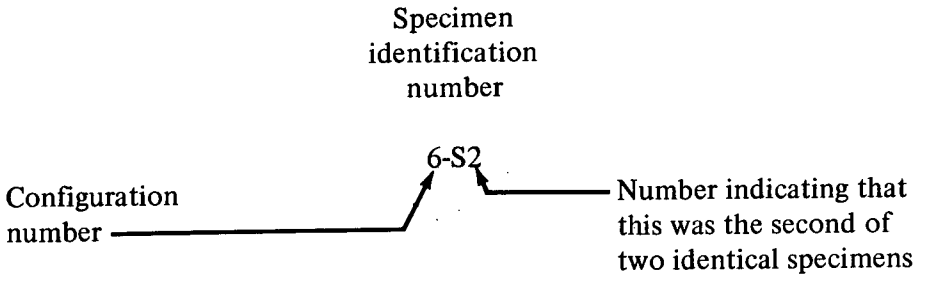


FIGURE 1.– MODIFIED TEST SPECIMEN DESIGN

TEST RESULTS

Static Tests

Static test results are summarized in table 4. The static specimens were identified by an alphanumeric character consisting of the configuration number followed by the letter "S" and a number to designate replicate specimens. For example:

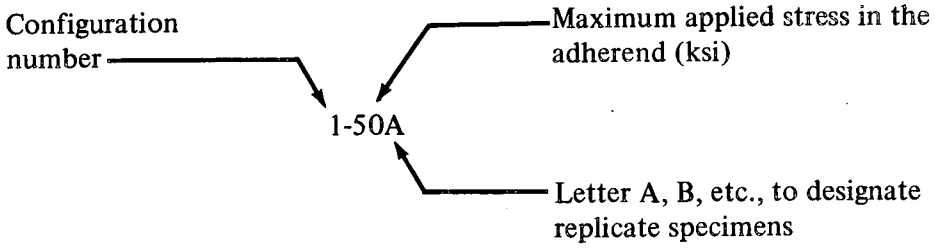


Results are summarized in terms of ultimate load and the maximum gross area tensile stress in the adherend (assuming no contribution for bending). With one exception, all static test specimens failed cohesively. After partial cohesive debonding, specimen 9-S2 failed in the boron-epoxy splice plate.

Fatigue Tests

The following pages contain individual test specimen logs for all 106 fatigue specimens. All of these specimens were tested with the configuration shown in figure 1, and all except five resulted in cohesive debond failure. These five specimens exhibited partial cohesive debonding but eventually resulted in adherend or splice plate failure.

The fatigue specimens were identified by an alphanumeric character as shown below:



The number of days between cure and test is shown on the log sheet for each specimen. Adherend, splice plate, and adhesive thickness readings represent averages for each configuration. The debond length readings represent an average of the readings taken on each edge of the specimen. The debond rate data shown on the logs were derived from a simple $\Delta a/\Delta N$ calculation.

TABLE 4.—STATIC TEST RESULTS

Configuration	Specimen identification number	Ultimate load		Ultimate stress in adherend	
		N	lb	MN/m^2	psi
1	1-S1*	62 942	14 150	518.94	75 266
	1-S2*	62 275	14 000	511.54	74 192
	Avg	62 609	14 075	515.24	74 729
2	2-S1*	67 390	15 150	530.77	76 982
	2-S2*	67 390	15 150	533.48	77 375
	Avg	67 390	15 150	532.12	77 178
3	3-S1*	67 835	15 250	534.54	77 529
	3-S2*	68 725	15 450	544.04	78 907
	Avg	68 280	15 350	539.29	78 218
4	4-S1	64 766	14 560	525.31	76 190
	4-S2	65 656	14 760	538 44	78 095
	Avg	65 211	14 660	531.88	77 142
5	5-S1*	78 955	17 750	533.72	77 410
	5-S2*	78 733	17 700	536.19	77 768
	Avg	78 845	17 725	534.95	77 589
6	6-S1*	124 772	28 050	517.24	75 020
	6-S2*	123 882	27 850	509.47	73 892
	Avg	124 328	27 950	513.36	74 456
7	7-S1	55 158	12 400	453.31	65 747
	7-S2	55 425	12 460	450.72	65 372
	Avg	55 291	12 430	452.02	65 560
8	8-S1	40 968	9 210	694.76	100 766
	8-S2	39 500	8 880	665.50	96 522
	Avg	40 234	9 045	680.13	98 644
9	9-S1	34 518	7 760	583.46	84 624
	9-S2	38 388	8 630	642.56	93 196
	Avg	36 453	8 195	613.01	88 910

*Specimens tested with 610 mm (24 in.) long full-dogbone configuration.

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-50A TESTED 150 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)	
0.0	0.00	0.00	0.000	0.000	
1.0	0.00	0.00	0.000	0.000	
2.0	0.00	0.00	0.000	0.000	
3.0	0.00	0.00	0.000	0.000	
4.0	0.00	0.00	0.000	0.000	
5.0	4.32	.17	4.318	.170	
6.0	5.33	.21	1.016	.040	
7.0	6.35	.25	1.016	.040	
9.5	7.37	.29	.406	.016	
10.0	9.91	.39	5.080	.200	[1]
11.0	16.51	.65	6.604	.260	
12.0	23.37	.92	6.858	.270	
13.0	28.70	1.13	5.334	.210	
14.0	34.54	1.36	5.842	.230	
15.0	39.62	1.56	5.080	.200	
17.0	49.28	1.94	4.826	.190	
19.0	59.18	2.33	4.953	.195	
21.0	66.80	2.63	3.810	.150	
22.0	70.87	2.79	4.064	.160	
23.0	75.95	2.99	5.080	.200	
24.0	82.04	3.23	6.096	.240	
25.0	83.82	3.30	1.778	.070	
26.0	86.36	3.40	2.540	.100	
27.0	90.17	3.55	3.810	.150	
28.0	92.71	3.65	2.540	.100	
29.0	94.23	3.71	1.524	.060	
30.0	100.08	3.94	5.842	.230	
30.5 [2]	127.00	5.00	53.848	2.120	

[1] Specimen configuration changed after 9500 cycles

[2] Adjusted life if all cycles had been run with modified configuration = 22,000 cycles

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-SOB TESTED 154 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	16.51	.65	8.255	.325
3.0	23.11	.91	6.604	.260
4.0	29.97	1.18	6.858	.270
5.0	35.05	1.38	5.080	.200
6.0	40.64	1.60	5.588	.220
7.0	45.47	1.79	4.826	.190
8.0	50.80	2.00	5.334	.210
10.0	60.96	2.40	5.080	.200
12.0	70.87	2.79	4.953	.195
13.0	74.68	2.94	3.810	.150
14.0	79.25	3.12	4.572	.180
15.0	82.04	3.23	2.794	.110
16.0	85.60	3.37	3.556	.140
17.0	89.41	3.52	3.810	.150
18.0	92.71	3.65	3.302	.130
19.0	96.01	3.78	3.302	.130
19.9	101.09	3.98	5.644	.222
20.5	101.85	4.01	1.270	.050
20.8	127.00	5.00	83.820	3.300

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-50C TESTED 244 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	21.34	.84	10.668	.420
3.0	33.27	1.31	11.938	.470
4.0	48.77	1.92	15.494	.610
5.0	65.79	2.59	17.018	.670
5.7	127.00	5.00	87.449	3.443

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-46A TESTED 163 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	6.60	.26	6.604	.260
2.0	11.43	.45	4.826	.190
4.0	19.30	.76	3.937	.155
6.0	25.65	1.01	3.175	.125
8.0	30.99	1.22	2.667	.105
10.0	37.08	1.46	3.048	.120
12.0	41.15	1.62	2.032	.080
14.0	46.48	1.83	2.667	.105
16.0	53.59	2.11	3.556	.140
18.0	57.15	2.25	1.778	.070
20.0	59.94	2.36	1.397	.055
22.0	62.99	2.48	1.524	.060
24.0	66.80	2.63	1.905	.075
26.0	70.36	2.77	1.778	.070
28.0	72.90	2.87	1.270	.050
30.0	76.96	3.03	2.032	.080
32.0	81.03	3.19	2.032	.080
34.0	83.82	3.30	1.397	.055
36.0	87.38	3.44	1.778	.070
38.0	90.42	3.56	1.524	.060
40.0	93.73	3.69	1.651	.065
41.5	127.00	5.00	22.183	.873

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-46B TESTED 164 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	9.40	.37	4.699	.185
4.0	18.80	.74	4.699	.185
6.0	27.18	1.07	4.191	.165
8.0	35.05	1.38	3.937	.155
10.0	43.69	1.72	4.318	.170
12.0	52.58	2.07	4.445	.175
14.0	60.71	2.39	4.064	.160
16.0	66.80	2.63	3.048	.120
18.0	70.61	2.78	1.905	.075
20.0	75.69	2.98	2.540	.100
22.0	79.76	3.14	2.032	.080
24.0	83.82	3.30	2.032	.080
25.0	84.84	3.34	1.016	.040
26.0	86.36	3.40	1.524	.060
27.0	87.88	3.46	1.524	.060
28.0	89.66	3.53	1.778	.070
29.0	91.19	3.59	1.524	.060
30.0	93.47	3.68	2.286	.090
31.0	95.00	3.74	1.524	.060
32.0	97.28	3.83	2.286	.090
33.0	100.08	3.94	2.794	.110
33.5	101.85	4.01	3.556	.140
33.9	127.00	5.00	62.865	2.475

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-46C TESTED 178 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	7.11	.28	7.112	.280
2.0	13.97	.55	6.858	.270
3.0	19.30	.76	5.334	.210
5.0	29.72	1.17	5.207	.205
7.0	40.39	1.59	5.334	.210
9.0	48.77	1.92	4.191	.165
11.0	58.93	2.32	5.080	.200
13.0	66.80	2.63	3.937	.155
15.0	72.39	2.85	2.794	.110
16.0	75.44	2.97	3.048	.120
17.0	77.72	3.06	2.286	.090
18.0	80.52	3.17	2.794	.110
19.0	83.82	3.30	3.302	.130
20.0	86.11	3.39	2.286	.090
21.0	88.90	3.50	2.794	.110
22.0	91.19	3.59	2.286	.090
23.0	93.47	3.68	2.286	.090
24.0	97.28	3.83	3.810	.150
25.0	100.08	3.94	2.794	.110
25.8	127.00	5.00	33.655	1.325

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-43A TESTED 244 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	8.64	.34	4.318	.170
4.0	19.05	.75	5.207	.205
6.0	24.89	.98	2.921	.115
8.0	31.50	1.24	3.302	.130
10.0	37.34	1.47	2.921	.115
12.0	42.16	1.66	2.413	.095
14.0	51.05	2.01	4.445	.175
17.0	61.98	2.44	3.641	.143
18.0	68.33	2.69	6.350	.250
19.0	84.58	3.33	16.256	.640
19.1	127.00	5.00	424.180	16.700

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-43B TESTED 245 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
3.0	11.43	.45	3.810	.150
4.0	15.24	.60	3.810	.150
6.0	21.34	.84	3.048	.120
8.0	26.42	1.04	2.540	.100
10.0	33.53	1.32	3.556	.140
12.0	38.10	1.50	2.286	.090
14.0	43.43	1.71	2.667	.105
16.0	48.77	1.92	2.667	.105
18.0	56.39	2.22	3.810	.150
20.0	64.52	2.54	4.064	.160
22.0	76.96	3.03	6.223	.245
22.4	127.00	5.00	125.095	4.925

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-43C TESTED 246 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	8.38	.33	4.191	.165
4.0	15.24	.60	3.429	.135
6.0	23.11	.91	3.937	.155
8.0	27.43	1.08	2.159	.085
11.0	38.10	1.50	3.556	.140
12.0	41.66	1.64	3.556	.140
14.0	49.53	1.95	3.937	.155
16.0	58.42	2.30	4.445	.175
17.0	63.50	2.50	5.080	.200
18.0	71.12	2.80	7.620	.300
19.0	76.45	3.01	5.334	.210
19.5	83.82	3.30	14.732	.580
19.6	127.00	5.00	431.800	17.000

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-43D TESTED 254 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	8.64	.34	4.318	.170
4.0	18.54	.73	4.953	.195
6.0	25.91	1.02	3.683	.145
7.0	28.70	1.13	2.794	.110
8.0	32.77	1.29	4.064	.160
10.0	41.91	1.65	4.572	.180
11.0	46.74	1.84	4.826	.190
12.0	51.82	2.04	5.080	.200
13.0	58.93	2.32	7.112	.280
14.0	67.56	2.66	8.636	.340
14.9	127.00	5.00	66.040	2.600

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-41A TESTED 155 DAYS AFTER CURE

ADHEREND T MM (IN)	SPLICE PLATE T MM (IN)	ADHESIVE	ADHESIVE T MM (IN)	STRESS (MAX GROSS) MN/SQM (KSI)
3.18 (.125)	6.58 (.259)	AF-126	.1016 (.004)	282.6 (41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.05	.12	3.048	.120
2.0	6.60	.26	3.556	.140
3.0	8.89	.35	2.286	.090
4.0	10.92	.43	2.032	.080
6.0	14.48	.57	1.778	.070
8.0	19.05	.75	2.286	.090
10.0	22.86	.90	1.905	.075
12.0	27.18	1.07	2.159	.085
14.0	30.48	1.20	1.651	.065
16.0	33.02	1.30	1.270	.050
20.0	38.86	1.53	1.461	.058
24.0	43.18	1.70	1.080	.043
28.0	48.01	1.89	1.206	.047
32.0	52.32	2.06	1.080	.043
36.0	56.90	2.24	1.143	.045
40.0	61.98	2.44	1.270	.050
44.0	67.06	2.64	1.270	.050
48.0	72.39	2.85	1.333	.052
49.5	74.42	2.93	1.355	.053 [1]

[1] Specimen failed in adherend radius area.

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-41B TESTED 178 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.58	(.259)	AF-126	.1016	(.004)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)	
0.0	0.00	0.00	0.000	0.000	
1.0	3.56	.14	3.556	.140	
2.0	6.60	.26	3.048	.120	
3.0	8.64	.34	2.032	.080	
4.0	10.92	.43	2.286	.090	
6.0	16.51	.65	2.794	.110	
8.0	21.08	.83	2.286	.090	
10.0	26.16	1.03	2.540	.100	
12.0	30.99	1.22	2.413	.095	
14.0	35.81	1.41	2.413	.095	
16.0	39.88	1.57	2.032	.080	
18.0	44.45	1.75	2.286	.090	
20.0	49.28	1.94	2.413	.095	
22.0	53.85	2.12	2.286	.090	
24.0	57.15	2.25	1.651	.065	
26.0	59.94	2.36	1.397	.055	
28.0	62.74	2.47	1.397	.055	
30.0	65.53	2.58	1.397	.055	
32.0	67.31	2.65	.889	.035	
34.0	69.34	2.73	1.016	.040	
36.0	71.12	2.80	.889	.035	
38.0	73.91	2.91	1.397	.055	
40.0	75.44	2.97	.762	.030	
42.0	77.72	3.06	1.143	.045	
44.0	79.50	3.13	.889	.035	
46.0	81.53	3.21	1.016	.040	
48.0	83.31	3.28	.889	.035	
50.0	84.84	3.34	.762	.030	
52.0	87.12	3.43	1.143	.045	
54.0	88.65	3.49	.762	.030	
56.0	90.42	3.56	.889	.035	
58.0	91.95	3.62	.762	.030	
60.0	94.23	3.71	1.143	.045	
62.0	95.76	3.77	.762	.030	
63.5	97.03	3.82	.847	.033	1

1 Specimen failed in adherend radius area

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 1-41C TESTED 181 DAYS AFTER CURE

ADHEREND T MM (IN)	SPLICE PLATE T MM (IN)	ADHESIVE	ADHESIVE T MM (IN)	STRESS(MAX GROSS) MN/SQM (KSI)
3.18 (.125)	6.58 (.259)	AF-126	.1016 (.004)	282.6 (41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.56	.14	3.556	.140
2.0	7.87	.31	4.318	.170
6.0	18.54	.73	2.667	.105
10.0	27.43	1.08	2.222	.087
14.0	37.59	1.48	2.540	.100
18.0	49.28	1.94	2.921	.115
22.0	59.44	2.34	2.540	.100
26.0	65.28	2.57	1.460	.057
30.0	72.90	2.87	1.905	.075
34.0	82.30	3.24	2.349	.092
38.0	91.44	3.60	2.286	.090
39.3	127.00	5.00	27.354	1.077

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-50A TESTED 154 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	6.35	.25	6.350	.250
2.0	8.89	.35	2.540	.100
4.0	17.02	.67	4.064	.160
6.0	23.11	.91	3.048	.120
8.0	27.94	1.10	2.413	.095
10.0	32.77	1.29	2.413	.095
12.0	38.35	1.51	2.794	.110
14.0	43.18	1.70	2.413	.095
16.0	48.77	1.92	2.794	.110
18.0	54.86	2.16	3.048	.120
20.0	61.47	2.42	3.302	.130
22.0	70.36	2.77	4.445	.175
24.0	77.22	3.04	3.429	.135
26.0	84.58	3.33	3.683	.145
28.0	96.01	3.78	5.715	.225
28.8	127.00	5.00	38.735	1.525

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-5GB TESTED 164 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.27	.05	1.270	.050
2.0	6.35	.25	5.080	.200
3.0	10.92	.43	4.572	.180
5.0	19.30	.76	4.191	.165
7.0	25.65	1.01	3.175	.125
9.0	33.53	1.32	3.937	.155
11.0	39.37	1.55	2.921	.115
13.0	45.72	1.80	3.175	.125
15.0	53.34	2.10	3.810	.150
17.0	62.74	2.47	4.699	.185
19.0	72.39	2.85	4.826	.190
21.0	81.79	3.22	4.699	.185
22.0	86.87	3.42	5.080	.200
23.0	93.22	3.67	6.350	.250
24.0	127.00	5.00	33.782	1.330

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-5DC TESTED 242 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	6.35	.25	6.350	.250
2.0	11.68	.46	5.334	.210
3.0	17.78	.70	6.096	.240
4.0	23.37	.92	5.588	.220
5.0	29.21	1.15	5.842	.230
6.0	34.04	1.34	4.826	.190
7.0	41.15	1.62	7.112	.280
8.0	46.74	1.84	5.588	.220
9.0	54.36	2.14	7.620	.300
10.0	65.02	2.56	10.668	.420
10.5	69.60	2.74	9.144	.360
11.0	78.74	3.10	18.288	.720
11.2	127.00	5.00	241.300	9.500

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-46A TESTED 161 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.05	.12	3.048	.120
2.0	5.84	.23	2.794	.110
4.0	10.41	.41	2.286	.090
6.0	14.48	.57	2.032	.080
8.0	19.56	.77	2.540	.100
10.0	22.86	.90	1.651	.065
14.0	30.48	1.20	1.905	.075
18.0	41.66	1.64	2.794	.110
22.0	49.02	1.93	1.841	.072
26.0	59.44	2.34	2.603	.102
30.0	72.90	2.87	3.365	.133
32.0	80.77	3.18	3.937	.155
33.0	84.58	3.33	3.810	.150
34.0	89.41	3.52	4.826	.190
34.5	90.93	3.58	3.048	.120
35.0	92.46	3.64	3.048	.120
35.7	127.00	5.00	49.349	1.943

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-46B TESTED 236 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS (MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	5.33	.21	5.334	.210
2.0	10.67	.42	5.334	.210
3.0	15.75	.62	5.080	.200
4.0	19.81	.78	4.064	.160
5.0	24.64	.97	4.826	.190
6.0	29.97	1.18	5.334	.210
7.0	35.31	1.39	5.334	.210
8.0	39.37	1.55	4.064	.160
9.0	43.43	1.71	4.064	.160
10.0	46.99	1.85	3.556	.140
11.0	52.07	2.05	5.080	.200
12.0	57.40	2.26	5.334	.210
13.0	62.74	2.47	5.334	.210
14.0	68.58	2.70	5.842	.230
15.0	79.76	3.14	11.176	.440
15.3	127.00	5.00	157.480	6.200

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-46C TESTED 237 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS (MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.56	.14	3.556	.140
2.0	8.13	.32	4.572	.180
3.0	12.70	.50	4.572	.180
4.0	16.76	.66	4.064	.160
5.0	19.30	.76	2.540	.100
6.0	23.37	.92	4.064	.160
8.0	30.48	1.20	3.556	.140
10.0	39.12	1.54	4.318	.170
12.0	49.28	1.94	5.080	.200
13.0	54.61	2.15	5.334	.210
14.0	59.94	2.36	5.334	.210
15.0	65.79	2.59	5.842	.230
16.0	73.66	2.90	7.874	.310
16.8	127.00	5.00	66.675	2.625

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-43A TESTED 290 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	6.10	.24	3.048	.120
6.0	14.99	.59	2.222	.087
10.0	24.38	.96	2.349	.093
16.0	58.17	2.29	5.630	.222
20.0	66.04	2.60	1.968	.077
22.0	70.36	2.77	2.159	.085
24.0	127.00	5.00	28.321	1.115

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-43B TESTED 291 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	7.37	.29	3.683	.145
6.0	18.03	.71	2.667	.105
10.0	29.21	1.15	2.794	.110
14.0	41.15	1.62	2.984	.117
18.0	54.61	2.15	3.365	.133
22.0	74.93	2.95	5.080	.200
24.0	86.36	3.40	5.715	.225
24.3	127.00	5.00	135.467	5.333

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-43C TESTED 291 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	7.37	.29	3.683	.145
6.0	20.57	.81	3.302	.130
10.0	29.97	1.18	2.349	.092
14.0	40.64	1.60	2.667	.105
18.0	52.32	2.06	2.921	.115
20.0	57.91	2.28	2.794	.110
22.0	64.52	2.54	3.302	.130
24.0	72.14	2.84	3.810	.150
26.0	86.11	3.39	6.985	.275
26.3	127.00	5.00	136.313	5.367

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-41A TESTED 240 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	2.54	.10	1.270	.050
4.0	8.38	.33	2.921	.115
6.0	11.94	.47	1.778	.070
8.0	17.02	.67	2.540	.100
10.0	19.30	.76	1.143	.045
12.0	22.35	.88	1.524	.060
14.0	26.42	1.04	2.032	.080
16.0	30.48	1.20	2.032	.080
18.0	34.54	1.36	2.032	.080
20.0	39.12	1.54	2.286	.090
22.0	42.16	1.66	1.524	.060
24.0	46.48	1.83	2.159	.085
26.0	49.78	1.96	1.651	.065
28.0	53.85	2.12	2.032	.080
30.0	59.44	2.34	2.794	.110
31.0	61.72	2.43	2.286	.090
33.0	68.07	2.68	3.175	.125
34.0	71.63	2.82	3.556	.140
35.0	74.93	2.95	3.302	.130
36.0	79.76	3.14	4.826	.190
36.5	127.00	5.00	94.488	3.720

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-41B TESTED 241 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	4.06	.16	2.032	.080
4.0	8.13	.32	2.032	.080
6.0	11.68	.46	1.778	.070
10.0	20.07	.79	2.095	.082
14.0	27.43	1.08	1.841	.072
18.0	34.54	1.36	1.778	.070
22.0	43.94	1.73	2.349	.092
26.0	56.90	2.24	3.238	.127
28.0	64.52	2.54	3.810	.150
29.0	68.58	2.70	4.064	.160
30.0	72.14	2.84	3.556	.140
31.0	78.23	3.08	6.096	.240
31.5	127.00	5.00	97.536	3.840

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 2-41C TESTED 242 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.55	(.258)	AF-126	.2540	(.010)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	3.30	.13	1.651	.065
4.0	5.59	.22	1.143	.045
6.0	8.13	.32	1.270	.050
8.0	10.67	.42	1.270	.050
10.0	12.95	.51	1.143	.045
14.0	17.27	.68	1.079	.042
18.0	21.84	.86	1.143	.045
22.0	27.94	1.10	1.524	.060
26.0	33.02	1.30	1.270	.050
30.0	38.35	1.51	1.334	.053
34.0	48.01	1.89	2.413	.095
36.0	50.55	1.99	1.270	.050
38.0	55.88	2.20	2.667	.105
40.0	61.98	2.44	3.048	.120
42.0	71.12	2.80	4.572	.180
44.0	84.07	3.31	6.477	.255
44.1	127.00	5.00	429.260	16.900

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-50A TESTED 169 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	7.11	.28	7.112	.280
2.0	14.22	.56	7.112	.280
3.0	20.57	.81	6.350	.250
4.0	25.91	1.02	5.334	.210
6.0	39.62	1.56	6.858	.270
7.0	48.01	1.89	8.382	.330
7.5	52.58	2.07	9.144	.360
8.0	56.13	2.21	7.112	.280
9.0	64.77	2.55	8.636	.340
10.0	75.18	2.96	10.414	.410
11.0	85.60	3.37	10.414	.410
11.5	90.42	3.56	9.652	.380
12.0	98.30	3.87	15.748	.620
12.2	127.00	5.00	143.510	5.650

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-50B TESTED 169 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	5.59	.22	5.588	.220
2.0	10.67	.42	5.080	.200
4.0	22.35	.88	5.842	.230
6.0	37.08	1.46	7.366	.290
7.0	44.45	1.75	7.366	.290
8.0	49.28	1.94	4.826	.190
9.0	54.61	2.15	5.334	.210
10.0	60.96	2.40	6.350	.250
11.0	68.33	2.69	7.366	.290
12.0	77.22	3.04	8.890	.350
13.0	127.00	5.00	49.784	1.960

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-50C TESTED 175 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	4.57	.18	4.572	.180
2.0	10.16	.40	5.588	.220
3.0	14.48	.57	4.318	.170
5.0	24.38	.96	4.953	.195
7.0	34.80	1.37	5.207	.205
8.0	40.13	1.58	5.334	.210
9.0	49.53	1.95	9.398	.370
10.0	56.90	2.24	7.366	.290
11.0	66.80	2.63	9.906	.390
12.0	75.69	2.98	8.890	.350
12.8	127.00	5.00	64.135	2.525

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-50D TESTED 240 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	9.40	.37	9.398	.370
2.0	17.02	.67	7.620	.300
3.0	25.40	1.00	8.382	.330
4.0	34.54	1.36	9.144	.360
5.0	44.70	1.76	10.160	.400
6.0	57.40	2.26	12.700	.500
7.0	75.18	2.96	17.780	.700
7.3	127.00	5.00	172.720	6.800

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-5GE TESTED 244 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	5.33	.21	5.334	.210
2.0	10.67	.42	5.334	.210
3.0	16.00	.63	5.334	.210
4.0	20.83	.82	4.826	.190
5.0	27.18	1.07	6.350	.250
6.0	36.07	1.42	8.890	.350
7.0	45.72	1.80	9.652	.380
8.0	61.72	2.43	16.002	.630
8.5	127.00	5.00	130.556	5.140

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-46A TESTED 165 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.78	.07	1.778	.070
2.0	7.11	.28	5.334	.210
3.0	9.14	.36	2.032	.080
4.0	12.70	.50	3.556	.140
5.0	18.29	.72	5.588	.220
7.0	27.69	1.09	4.699	.185
9.0	39.12	1.54	5.715	.225
11.0	51.82	2.04	6.350	.250
12.0	57.40	2.26	5.588	.220
13.0	61.98	2.44	4.572	.180
14.0	68.58	2.70	6.604	.260
15.0	71.63	2.82	3.048	.120
16.0	77.98	3.07	6.350	.250
17.0	84.84	3.34	6.858	.270
18.0	94.49	3.72	9.652	.380
18.4	127.00	5.00	81.280	3.200

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-46B TESTED 168 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS (MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.79	.11	2.794	.110
2.0	8.89	.35	6.096	.240
3.0	13.97	.55	5.080	.200
4.0	19.30	.76	5.334	.210
6.0	29.46	1.16	5.080	.200
8.0	41.40	1.63	5.969	.235
10.0	56.39	2.22	7.493	.295
11.0	61.98	2.44	5.588	.220
12.0	68.83	2.71	6.858	.270
13.0	74.68	2.94	5.842	.230
14.0	82.30	3.24	7.620	.300
15.0	92.96	3.66	10.668	.420
15.6	127.00	5.00	56.727	2.233

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-46C TESTED 170 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.03	.08	2.032	.080
2.0	6.60	.26	4.572	.180
4.0	14.48	.57	3.937	.155
6.0	21.84	.86	3.683	.145
8.0	31.24	1.23	4.699	.185
10.0	42.42	1.67	5.588	.220
11.0	47.75	1.88	5.334	.210
12.0	55.88	2.20	8.128	.320
13.0	64.52	2.54	8.636	.340
14.0	72.14	2.84	7.620	.300
15.0	78.99	3.11	6.858	.270
15.5	127.00	5.00	96.012	3.780

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-46D TESTED 176 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	5.08	.20	5.080	.200
2.0	9.14	.36	4.064	.160
4.0	16.00	.63	3.429	.135
6.0	22.86	.90	3.429	.135
8.0	30.73	1.21	3.937	.155
10.0	38.35	1.51	3.810	.150
12.0	47.75	1.88	4.699	.185
14.0	59.18	2.33	5.715	.225
15.0	63.50	2.50	4.318	.170
16.0	68.07	2.68	4.572	.180
17.0	73.66	2.90	5.588	.220
18.0	81.28	3.20	7.620	.300
18.7	127.00	5.00	65.314	2.571

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-41A TESTED 168 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	282.6	(41.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.02	.04	1.016	.040
2.0	2.03	.08	1.016	.040
6.0	11.94	.47	2.476	.098
10.0	23.11	.91	2.794	.110
14.0	35.81	1.41	3.175	.125
18.0	46.48	1.83	2.667	.105
22.0	54.10	2.13	1.905	.075
26.0	64.26	2.53	2.540	.100
30.0	76.45	3.01	3.048	.120
32.0	84.33	3.32	3.937	.155
34.0	94.49	3.72	5.080	.200
34.2	127.00	5.00	162.560	6.400

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-41B TESTED 171 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.02	.04	1.016	.040
3.0	7.37	.29	3.175	.125
5.0	11.43	.45	2.032	.080
8.0	19.05	.75	2.540	.100
12.0	27.94	1.10	2.222	.088
16.0	38.61	1.52	2.667	.105
20.0	56.13	2.21	4.381	.172
22.0	61.72	2.43	2.794	.110
24.0	67.82	2.67	3.048	.120
26.0	74.68	2.94	3.429	.135
28.0	83.82	3.30	4.572	.180
28.5	127.00	5.00	86.360	3.400

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-41C TESTED 223 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	3.56	.14	1.778	.070
4.0	10.41	.41	3.429	.135
6.0	15.24	.60	2.413	.095
8.0	21.08	.83	2.921	.115
10.0	26.92	1.06	2.921	.115
12.0	35.05	1.38	4.064	.160
14.0	42.16	1.66	3.556	.140
16.0	47.75	1.88	2.794	.110
18.0	54.61	2.15	3.429	.135
20.0	63.50	2.50	4.445	.175
22.0	69.85	2.75	3.175	.125
24.0	78.74	3.10	4.445	.175
26.0	92.46	3.64	6.858	.270
26.5	127.00	5.00	69.088	2.720

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-37A TESTED 172 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	255.1	(37.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.02	.04	.508	.020
8.0	10.41	.41	1.566	.062
14.0	19.05	.75	1.439	.057
20.0	29.72	1.17	1.778	.070
24.0	38.86	1.53	2.286	.090
28.0	43.43	1.71	1.143	.045
32.0	47.50	1.87	1.016	.040
36.0	52.58	2.07	1.270	.050
40.0	58.42	2.30	1.461	.058
44.0	64.01	2.52	1.397	.055
48.0	68.58	2.70	1.143	.045
52.0	76.45	3.01	1.969	.078
56.0	86.87	3.42	2.603	.102
57.5	127.00	5.00	26.755	1.053

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-37B TESTED 231 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	255.1	(37.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.27	.05	.635	.025
6.0	10.16	.40	2.222	.087
10.0	16.26	.64	1.524	.060
14.0	25.40	1.00	2.286	.090
18.0	34.54	1.36	2.286	.090
22.0	45.47	1.79	2.730	.107
24.0	49.28	1.94	1.905	.075
26.0	54.36	2.14	2.540	.100
28.0	58.17	2.29	1.905	.075
30.0	61.72	2.43	1.778	.070
33.0	68.33	2.69	2.201	.087
35.0	74.42	2.93	3.048	.120
36.0	76.96	3.03	2.540	.100
37.0	81.03	3.19	4.064	.160
38.0	86.36	3.40	5.334	.210
38.8	127.00	5.00	50.800	2.000

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 3-37C TESTED 232 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.33	(.131)	6.58	(.259)	AF-126	.4064	(.016)	255.1	(37.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	4.06	.16	2.032	.080
6.0	13.72	.54	2.413	.095
10.0	23.11	.91	2.349	.093
14.0	34.54	1.36	2.857	.112
18.0	49.78	1.96	3.810	.150
20.0	55.63	2.19	2.921	.115
22.0	61.47	2.42	2.921	.115
24.0	67.06	2.64	2.794	.110
26.0	73.15	2.88	3.048	.120
28.0	80.77	3.18	3.810	.150
29.0	85.60	3.37	4.826	.190
30.0	90.93	3.58	5.334	.210
30.3	127.00	5.00	120.227	4.733

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-46A TESTED 42 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.56	.14	3.556	.140
3.0	10.67	.42	3.556	.140
5.0	15.24	.60	2.286	.090
7.0	20.57	.81	2.667	.105
9.0	27.18	1.07	3.302	.130
11.0	33.02	1.30	2.921	.115
13.0	46.99	1.85	6.985	.275
14.0	55.37	2.18	8.382	.330
15.0	62.48	2.46	7.112	.280
15.8	127.00	5.00	80.645	3.175

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-46B TESTED 69 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.78	.07	1.778	.070
3.0	6.60	.26	2.413	.095
5.0	11.94	.47	2.667	.105
10.0	35.05	1.38	4.623	.182
13.0	52.07	2.05	5.673	.223
14.5	127.00	5.00	49.953	1.967

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-46C TESTED 69 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.79	.11	2.794	.110
3.0	9.65	.38	3.429	.135
6.0	19.81	.78	3.387	.133
9.0	36.07	1.42	5.419	.213
12.0	53.59	2.11	5.842	.230
13.0	62.48	2.46	8.890	.350
13.6	127.00	5.00	107.527	4.233

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-43A TESTED 41 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.05	.12	3.048	.120
3.0	7.37	.29	2.159	.085
5.0	10.92	.43	1.778	.070
7.0	14.22	.56	1.651	.065
10.0	18.54	.73	1.439	.057
15.0	32.00	1.26	2.692	.106
20.0	73.15	2.88	8.230	.324
20.3	127.00	5.00	179.493	7.067

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-43B TESTED 41 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.03	.08	2.032	.080
3.0	6.35	.25	2.159	.085
5.0	9.91	.39	1.778	.070
7.0	12.95	.51	1.524	.060
10.0	18.29	.72	1.778	.070
15.0	30.23	1.19	2.388	.094
18.0	45.21	1.78	4.995	.197
19.0	53.34	2.10	8.128	.320
20.0	59.94	2.36	6.604	.260
21.0	67.82	2.67	7.874	.310
21.5	127.00	5.00	118.364	4.660

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-43C TESTED 41 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	296.5	(43.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.03	.08	2.032	.080
3.0	7.11	.28	2.540	.100
5.0	11.18	.44	2.032	.080
7.0	16.00	.63	2.413	.095
10.0	22.61	.89	2.201	.087
15.0	38.10	1.50	3.099	.122
17.0	52.32	2.06	7.112	.280
18.0	58.17	2.29	5.842	.230
19.0	64.01	2.52	5.842	.230
20.0	127.00	5.00	62.992	2.480

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-40A TESTED 42 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	275.8	(40.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.78	.07	1.778	.070
4.0	5.59	.22	1.270	.050
10.0	12.95	.51	1.228	.048
15.0	18.29	.72	1.067	.042
20.0	25.15	.99	1.372	.054
25.0	34.54	1.36	1.880	.074
31.0	60.71	2.39	4.360	.172
32.8	127.00	5.00	36.830	1.450

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-40B TESTED 70 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	275.8	(40.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.78	.07	.889	.035
5.0	7.11	.28	1.778	.070
10.0	12.19	.48	1.016	.040
20.0	28.45	1.12	1.626	.064
25.0	41.66	1.64	2.642	.104
29.0	49.53	1.95	1.969	.078
32.0	62.74	2.47	4.403	.173
33.0	67.06	2.64	4.318	.170
34.0	127.00	5.00	59.944	2.360

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-40C TESTED 70 DAYS AFTER CURE

ADHEREND T MM (IN)	SPLICE PLATE T MM (IN)	ADHESIVE	ADHESIVE T MM (IN)	STRESS(MAX GROSS) MN/SQM (KSI)
3.20 (.126)	4.78 (.188)	AF-126	.1016 (.004)	275.8 (40.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	2.03	.08	1.016	.040
6.5	7.62	.30	1.242	.049
10.0	11.43	.45	1.089	.043
20.0	32.51	1.28	2.108	.083
24.0	43.94	1.73	2.857	.112
26.0	48.01	1.89	2.032	.080
28.0	52.32	2.06	2.159	.085
30.0	56.90	2.24	2.286	.090
32.0	66.04	2.60	4.572	.180
33.0	71.12	2.80	5.080	.200
34.0	127.00	5.00	55.880	2.200

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-37A TESTED 42 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	255.1	(37.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.78	.07	.889	.035
5.0	3.81	.15	.677	.027
10.0	7.37	.29	.711	.028
15.0	11.18	.44	.762	.030
20.0	14.73	.58	.711	.028
25.0	17.78	.70	.610	.024
30.0	21.84	.86	.813	.032
40.0	33.53	1.32	1.168	.046
50.0	50.29	1.98	1.676	.066
55.0	58.93	2.32	1.727	.068
59.0	127.00	5.00	17.018	.670

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-37B TESTED 70 DAYS AFTER CURE

ADHEREND T MM (IN)	SPLICE PLATE T MM (IN)	ADHESIVE	ADHESIVE T MM (IN)	STRESS(MAX GROSS) MN/SQM (KSI)
3.20 (.126)	4.78 (.188)	AF-126	.1016 (.004)	255.1 (37.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.27	.05	.635	.025
8.0	5.33	.21	.677	.027
23.0	17.02	.67	.779	.031
30.0	22.86	.90	.835	.033
40.0	36.58	1.44	1.372	.054
50.0	48.77	1.92	1.219	.048
55.0	58.42	2.30	1.930	.076
58.0	77.22	3.04	6.265	.247
58.5	127.00	5.00	99.568	3.920

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 4-37C TESTED 70 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	4.78	(.188)	AF-126	.1016	(.004)	255.1	(37.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)	
0.0	0.00	0.00	0.000	0.000	
2.0	1.27	.05	.635	.025	
6.0	3.81	.15	.635	.025	
10.0	6.60	.26	.698	.027	
20.0	13.97	.55	.737	.029	
30.0	23.37	.92	.940	.037	
40.0	39.37	1.55	1.600	.063	
43.0	43.18	1.70	1.270	.050	1

1 Specimen failed in adherend radius area

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-46A TESTED 182 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.03	.08	2.032	.080
2.0	5.08	.20	3.048	.120
3.0	7.87	.31	2.794	.110
4.0	12.45	.49	4.572	.180
5.0	18.29	.72	5.842	.230
6.0	23.11	.91	4.826	.190
7.0	28.70	1.13	5.588	.220
8.0	32.77	1.29	4.064	.160
10.0	47.75	1.88	7.493	.295
11.5	127.00	5.00	52.832	2.080

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-46B TESTED 187 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	6.60	.26	6.604	.260
2.0	12.95	.51	6.350	.250
3.0	22.35	.88	9.398	.370
4.0	28.96	1.14	6.604	.260
5.0	38.10	1.50	9.144	.360
6.0	48.01	1.89	9.906	.390
7.0	59.18	2.33	11.176	.440
7.5	70.36	2.77	22.352	.880
7.9	127.00	5.00	141.605	5.575

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN S-46C TESTED 259 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.56	.14	3.556	.140
2.0	6.86	.27	3.302	.130
3.0	13.72	.54	6.858	.270
4.0	20.57	.81	6.858	.270
5.0	28.19	1.11	7.620	.300
6.0	39.12	1.54	10.922	.430
7.0	53.85	2.12	14.732	.580
7.8	127.00	5.00	91.440	3.600

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-41A TESTED 172 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.30	.13	3.302	.130
2.0	6.86	.27	3.556	.140
4.0	13.46	.53	3.302	.130
6.0	23.11	.91	4.826	.190
8.0	30.48	1.20	3.683	.145
10.0	41.91	1.65	5.715	.225
12.0	62.23	2.45	10.160	.400
12.5	68.83	2.71	13.208	.520
13.0	127.00	5.00	116.332	4.580

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-41B TESTED 188 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.54	.10	2.540	.100
2.0	6.60	.26	4.064	.160
3.0	9.14	.36	2.540	.100
4.0	12.70	.50	3.556	.140
5.0	15.24	.60	2.540	.100
6.0	18.80	.74	3.556	.140
7.0	22.86	.90	4.064	.160
8.0	26.42	1.04	3.556	.140
10.0	33.53	1.32	3.556	.140
12.0	42.16	1.66	4.318	.170
13.0	46.74	1.84	4.572	.180
14.0	51.82	2.04	5.080	.200
15.0	56.39	2.22	4.572	.180
16.0	61.98	2.44	5.588	.220
17.0	71.63	2.82	9.652	.380
18.0	92.20	3.63	20.574	.810
18.2	127.00	5.00	173.990	6.850

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-41C TESTED 259 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	7.87	.31	3.937	.155
4.0	14.73	.58	3.429	.135
6.0	23.88	.94	4.572	.180
8.0	34.04	1.34	5.080	.200
10.0	49.28	1.94	7.620	.300
11.0	64.26	2.53	14.986	.590
11.4	127.00	5.00	156.845	6.175

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-36A TESTED 186 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	248.2	(36.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)	
0.0	0.00	0.00	0.000	0.000	
1.0	.25	.01	.254	.010	
3.0	1.78	.07	.762	.030	
5.0	4.32	.17	1.270	.050	
7.0	7.62	.30	1.651	.065	
9.0	9.91	.39	1.143	.045	
11.0	11.68	.46	.889	.035	
15.0	16.00	.63	1.079	.042	
19.0	21.08	.83	1.270	.050	
23.0	27.43	1.08	1.587	.063	
26.0	29.97	1.18	.847	.033	
30.0	34.80	1.37	1.206	.047	
34.0	39.62	1.56	1.207	.048	
38.0	46.23	1.82	1.651	.065	
42.0	55.88	2.20	2.413	.095	
42.5	57.40	2.26	3.048	.120	1

1 Specimen failed in splice plate

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-36B TESTED 257 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	248.2	(36.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	3.56	.14	1.778	.070
4.0	7.37	.29	1.905	.075
6.0	10.67	.42	1.651	.065
10.0	19.05	.75	2.095	.082
14.0	30.48	1.20	2.858	.113
16.0	34.80	1.37	2.159	.085
18.0	39.62	1.56	2.413	.095
20.0	47.75	1.88	4.064	.160
22.0	67.06	2.64	9.652	.380
22.8	127.00	5.00	74.930	2.950

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 5-36C TESTED 258 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS (MAX GROSS) MN/SQM	(KSI)
3.89	(.153)	4.74	(.187)	AF-126	.1016	(.004)	248.2	(36.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.52	.06	.762	.030
4.0	4.06	.16	1.270	.050
6.0	7.11	.28	1.524	.060
8.0	9.91	.39	1.397	.055
10.0	12.45	.49	1.270	.050
14.0	19.30	.76	1.714	.067
18.0	26.42	1.04	1.778	.070
22.0	34.29	1.35	1.969	.078
26.0	50.55	1.99	4.064	.160
27.0	57.15	2.25	6.604	.260
28.0	67.06	2.64	9.906	.390
28.5	127.00	5.00	119.888	4.720

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-5GA TESTED 171 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	5.84	.23	5.842	.230
2.0	15.49	.61	9.652	.380
3.0	23.88	.94	8.382	.330
4.0	33.02	1.30	9.144	.360
5.0	45.97	1.81	12.954	.510
5.8	127.00	5.00	101.282	3.987

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-50B TESTED 254 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	11.43	.45	5.715	.225
3.0	17.02	.67	5.588	.220
4.0	23.88	.94	6.858	.270
5.0	30.73	1.21	6.858	.270
6.0	36.32	1.43	5.588	.220
7.0	42.16	1.66	5.842	.230
8.0	47.50	1.87	5.334	.210
9.0	52.83	2.08	5.334	.210
10.0	57.66	2.27	4.826	.190
11.0	62.99	2.48	5.334	.210
12.0	67.82	2.67	4.826	.190
13.0	73.91	2.91	6.096	.240
14.0	83.57	3.29	9.652	.380
14.6	127.00	5.00	72.390	2.850

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-50C TESTED 255 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	9.65	.38	4.826	.190
3.0	15.75	.62	6.096	.240
4.0	20.57	.81	4.826	.190
5.0	26.92	1.06	6.350	.250
6.0	31.24	1.23	4.318	.170
7.0	35.31	1.39	4.064	.160
8.0	41.91	1.65	6.604	.260
9.0	46.74	1.84	4.826	.190
10.0	52.07	2.05	5.334	.210
11.0	57.15	2.25	5.080	.200
12.0	61.72	2.43	4.572	.180
13.0	67.82	2.67	6.096	.240
14.0	71.63	2.82	3.810	.150
15.0	76.45	3.01	4.826	.190
16.0	84.07	3.31	7.620	.300
16.8	127.00	5.00	53.658	2.113

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-46B TESTED 245 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.30	.13	3.302	.130
2.0	7.37	.29	4.064	.160
3.0	11.94	.47	4.572	.180
4.0	14.73	.58	2.794	.110
6.0	18.29	.72	1.778	.070
8.0	23.62	.93	2.667	.105
10.0	28.45	1.12	2.413	.095
12.0	32.00	1.26	1.778	.070
14.0	36.83	1.45	2.413	.095
16.0	41.66	1.64	2.413	.095
18.0	45.72	1.80	2.032	.080
20.0	51.05	2.01	2.667	.105
22.0	55.63	2.19	2.286	.090
24.0	59.44	2.34	1.905	.075
26.0	61.98	2.44	1.270	.050
28.0	66.04	2.60	2.032	.080
30.0	72.14	2.84	3.048	.120
31.0	74.68	2.94	2.540	.100
32.0	78.23	3.08	3.556	.140
33.0	83.82	3.30	5.588	.220
33.4	127.00	5.00	107.950	4.250

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-46A TESTED 177 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	3.56	.14	3.556	.140
2.0	9.14	.36	5.588	.220
3.0	14.22	.56	5.080	.200
4.0	19.05	.75	4.826	.190
6.0	28.70	1.13	4.826	.190
8.0	40.13	1.58	5.715	.225
9.0	48.77	1.92	8.636	.340
10.0	62.48	2.46	13.716	.540
10.3	127.00	5.00	215.053	8.467

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-46C TESTED 253 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	317.2	(46.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.79	.11	2.794	.110
3.0	9.91	.39	3.556	.140
5.0	17.53	.69	3.810	.150
6.0	20.57	.81	3.048	.120
8.0	29.21	1.15	4.318	.170
10.0	36.83	1.45	3.810	.150
12.0	42.67	1.68	2.921	.115
14.0	48.51	1.91	2.921	.115
16.0	56.13	2.21	3.810	.150
17.0	59.18	2.33	3.048	.120
18.0	62.48	2.46	3.302	.130
19.0	66.04	2.60	3.556	.140
20.0	70.61	2.78	4.572	.180
21.0	74.93	2.95	4.318	.170
22.0	80.26	3.16	5.334	.210
22.7	127.00	5.00	66.766	2.629

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-41A TESTED 238 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS (MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)	
0.0	0.00	0.00	0.000	0.000	
3.0	3.30	.13	1.101	.043	
5.0	6.35	.25	1.524	.060	
7.0	8.64	.34	1.143	.045	
9.0	11.43	.45	1.397	.055	
11.0	13.72	.54	1.143	.045	
14.0	17.53	.69	1.270	.050	
16.0	20.83	.82	1.651	.065	
18.0	23.62	.93	1.397	.055	
20.0	25.65	1.01	1.016	.040	
22.0	27.18	1.07	.762	.030	
24.0	29.46	1.16	1.143	.045	
26.0	30.23	1.19	.381	.015	
28.0	31.24	1.23	.508	.020	
30.0	34.04	1.34	1.397	.055	
33.0	35.81	1.41	.593	.023	
35.0	37.34	1.47	.762	.030	
37.0	39.37	1.55	1.016	.040	
39.0	41.15	1.62	.889	.035	
41.0	42.42	1.67	.635	.025	
45.0	44.96	1.77	.635	.025	
49.0	48.26	1.90	.825	.032	
53.0	50.29	1.98	.508	.020	
57.0	52.58	2.07	.571	.022	
61.0	55.63	2.19	.762	.030	
65.0	59.44	2.34	.953	.038	
69.0	62.99	2.48	.889	.035	
73.0	64.77	2.55	.444	.017	
77.0	67.82	2.67	.762	.030	
78.0	68.58	2.70	.762	.030	

 Specimen failed in adherend radius area

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-41B TESTED 273 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	2.54	.10	1.270	.050
4.0	6.35	.25	1.905	.075
8.0	15.49	.61	2.286	.090
12.0	23.88	.94	2.096	.083
16.0	31.24	1.23	1.841	.072
20.0	37.34	1.47	1.524	.060
24.0	45.21	1.78	1.969	.078
28.0	52.58	2.07	1.841	.072
32.0	59.18	2.33	1.651	.065
36.0	68.58	2.70	2.350	.093
38.0	73.15	2.88	2.286	.090
40.0	81.03	3.19	3.937	.155
40.5	127.00	5.00	91.948	3.620

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 6-41C TESTED 275 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.18	(.125)	6.55	(.258)	AF-126	.1016	(.004)	282.6	(41.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	4.83	.19	2.413	.095
4.0	9.65	.38	2.413	.095
8.0	19.81	.78	2.540	.100
12.0	26.42	1.04	1.651	.065
16.0	32.51	1.28	1.524	.060
20.0	39.62	1.56	1.778	.070
24.0	44.20	1.74	1.143	.045
28.0	50.04	1.97	1.460	.057
32.0	57.15	2.25	1.778	.070
36.0	64.52	2.54	1.842	.073
40.0	74.17	2.92	2.413	.095
42.0	81.79	3.22	3.810	.150
43.0	86.61	3.41	4.826	.190
43.2	127.00	5.00	201.930	7.950

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-35A TESTED 43 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	241.3	(35.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.78	.07	1.778	.070
3.0	8.89	.35	3.556	.140
5.0	16.00	.63	3.556	.140
7.0	23.88	.94	3.937	.155
9.0	32.77	1.29	4.445	.175
11.0	56.64	2.23	11.938	.470
11.5	62.23	2.45	11.176	.440
12.0	69.60	2.74	14.732	.580
12.2	127.00	5.00	287.020	11.300

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-35B TESTED 49 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	241.3	(35.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.54	.10	2.540	.100
3.0	6.60	.26	2.032	.080
5.0	11.43	.45	2.413	.095
8.0	19.30	.76	2.625	.103
10.0	26.42	1.04	3.556	.140
12.0	34.29	1.35	3.937	.155
14.0	50.04	1.97	7.874	.310
15.0	57.66	2.27	7.620	.300
16.0	82.80	3.26	25.146	.990
16.2	127.00	5.00	220.980	8.700

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-35C TESTED 63 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	241.3	(35.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	5.59	.22	5.588	.220
3.3	26.42	1.04	9.056	.357
4.6	127.00	5.00	77.372	3.046

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-30A TESTED 43 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	206.8	(30.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.02	.04	1.016	.040
4.0	1.78	.07	.254	.010
7.0	8.13	.32	2.117	.083
10.0	11.94	.47	1.270	.050
15.0	18.80	.74	1.372	.054
20.0	25.65	1.01	1.372	.054
25.0	33.78	1.33	1.626	.064
30.0	50.55	1.99	3.353	.132
32.0	56.13	2.21	2.794	.110
34.0	64.01	2.52	3.937	.155
35.5	127.00	5.00	41.995	1.653

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-30B TESTED 43 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	206.8	(30.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	2.29	.09	1.143	.045
4.0	5.59	.22	1.651	.065
6.0	9.14	.36	1.778	.070
10.0	17.02	.67	1.969	.078
15.0	28.70	1.13	2.337	.092
19.0	51.56	2.03	5.715	.225
20.0	55.12	2.17	3.556	.140
21.0	67.31	2.65	12.192	.480
21.3	127.00	5.00	198.967	7.833

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-30C TESTED 43 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	206.8	(30.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	2.03	.08	1.016	.040
5.0	3.30	.13	.423	.017
10.0	7.62	.30	.864	.034
15.0	12.70	.50	1.016	.040
20.0	18.29	.72	1.118	.044
25.0	25.15	.99	1.372	.054
30.0	31.50	1.24	1.270	.050
35.0	41.40	1.63	1.981	.078
40.0	59.69	2.35	3.658	.144
41.0	64.52	2.54	4.826	.190
42.0	76.20	3.00	11.684	.460
42.3	127.00	5.00	169.333	6.667

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-28.5A TESTED 48 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BF-9G7	.0762	(.003)	196.5	(28.5)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.02	.04	.508	.020
5.0	4.32	.17	1.101	.043
10.0	9.14	.36	.965	.038
15.0	14.22	.56	1.016	.040
20.0	19.81	.78	1.118	.044
25.0	25.15	.99	1.067	.042
30.0	30.48	1.20	1.067	.042
35.0	40.39	1.59	1.981	.078
40.0	53.09	2.09	2.540	.100
42.0	58.67	2.31	2.794	.110
43.0	61.47	2.42	2.794	.110
44.0	64.52	2.54	3.048	.120
45.0	70.36	2.77	5.842	.230
45.8	127.00	5.00	70.803	2.788

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-28.5B TESTED 63 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	196.5	(28.5)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	1.02	.04	1.016	.040
3.0	3.30	.13	1.143	.045
5.0	5.08	.20	.889	.035
10.0	9.40	.37	.864	.034
15.0	14.22	.56	.965	.038
20.0	18.80	.74	.914	.036
25.0	24.13	.95	1.067	.042
30.0	32.00	1.26	1.575	.062
35.0	38.61	1.52	1.321	.052
40.0	43.43	1.71	.965	.038
45.0	49.28	1.94	1.168	.046
49.0	58.42	2.30	2.286	.090
51.0	69.09	2.72	5.334	.210
52.0	77.22	3.04	8.128	.320
52.3	127.00	5.00	165.947	6.533

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-28.5C TESTED 68 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	196.5	(28.5)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.52	.06	.762	.030
5.0	4.57	.18	1.016	.040
10.0	8.13	.32	.711	.028
15.0	12.19	.48	.813	.032
20.0	17.27	.68	1.016	.040
30.0	32.26	1.27	1.499	.059
40.0	55.88	2.20	2.362	.093
42.0	64.01	2.52	4.064	.160
43.0	68.58	2.70	4.572	.180
44.0	74.42	2.93	5.842	.230
44.9	127.00	5.00	58.420	2.300

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-27A TESTED 48 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	186.2	(27.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	.76	.03	.381	.015
5.0	2.54	.10	.593	.023
10.0	7.11	.28	.914	.036
15.0	10.92	.43	.762	.030
25.0	16.76	.66	.584	.023
35.0	23.62	.93	.686	.027
45.0	29.72	1.17	.610	.024
55.0	38.61	1.52	.889	.035
60.0	45.97	1.81	1.473	.058
65.0	52.07	2.05	1.219	.048
70.0	58.93	2.32	1.372	.054
75.0	69.09	2.72	2.032	.080
76.0	73.66	2.90	4.572	.180
77.5	127.00	5.00	35.560	1.400

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-27B TESTED 63 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	186.2	(27.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.02	.04	.508	.020
5.0	2.79	.11	.593	.023
10.0	5.59	.22	.559	.022
15.0	9.14	.36	.711	.028
25.0	14.48	.57	.533	.021
35.0	22.10	.87	.762	.030
40.0	26.16	1.03	.813	.032
45.0	30.99	1.22	.965	.038
50.0	36.83	1.45	1.168	.046
55.0	41.91	1.65	1.016	.040
60.0	47.75	1.88	1.168	.046
65.0	57.66	2.27	1.981	.078
68.0	127.00	5.00	23.114	.910

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 7-27C TESTED 64 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
3.20	(.126)	6.30	(.248)	BP-907	.0762	(.003)	186.2	(27.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	.76	.03	.381	.015
5.0	3.05	.12	.762	.030
10.0	6.10	.24	.610	.024
20.0	11.43	.45	.533	.021
30.0	16.76	.66	.533	.021
40.0	21.84	.86	.508	.020
50.0	28.19	1.11	.635	.025
60.0	36.32	1.43	.813	.032
70.0	43.18	1.70	.686	.027
80.0	53.09	2.09	.991	.039
87.0	66.55	2.62	1.923	.076
89.5	127.00	5.00	24.181	.952

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-70A TESTED 39 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	482.6	(70.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	26.67	1.05	26.670	1.050
2.0	43.18	1.70	16.510	.650
3.0	49.78	1.96	6.604	.260
4.0	62.99	2.48	13.208	.520
5.0	74.17	2.92	11.176	.440
6.0	86.11	3.39	11.938	.470
7.0	99.57	3.92	13.462	.530
7.7	149.86	5.90	71.846	2.829

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-7GB TESTED 39 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	482.6	(70.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	33.27	1.31	33.274	1.310
2.0	44.45	1.75	11.176	.440
3.0	67.06	2.64	22.606	.890
4.0	85.60	3.37	18.542	.730
5.0	98.04	3.86	12.446	.490
6.0	108.97	4.29	10.922	.430
7.0	117.09	4.61	8.128	.320
7.7	149.86	5.90	46.809	1.843

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-70C TESTED 40 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	482.6	(70.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	26.16	1.03	26.162	1.030
2.0	45.97	1.81	19.812	.780
3.0	55.63	2.19	9.652	.380
4.0	64.77	2.55	9.144	.360
5.0	80.26	3.16	15.494	.610
6.0	103.63	4.08	23.368	.920
6.5	149.86	5.90	92.456	3.640

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-60A TESTED 41 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	413.7	(60.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	9.65	.38	9.652	.380
2.0	16.00	.63	6.350	.250
3.0	22.35	.88	6.350	.250
5.0	32.51	1.28	5.080	.200
7.0	40.89	1.61	4.191	.165
9.0	48.01	1.89	3.556	.140
10.0	50.29	1.98	2.286	.090
11.0	54.36	2.14	4.064	.160
12.0	57.15	2.25	2.794	.110
13.0	63.50	2.50	6.350	.250
14.0	67.82	2.67	4.318	.170
15.0	71.88	2.83	4.064	.160
16.0	75.69	2.98	3.810	.150
17.0	78.23	3.08	2.540	.100
18.0	86.11	3.39	7.874	.310
19.0	92.20	3.63	6.096	.240
20.0	104.65	4.12	12.446	.490
20.3	149.86	5.90	150.707	5.933

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-60B TESTED 45 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	413.7	(60.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	2.79	.11	2.794	.110
3.0	12.70	.50	4.953	.195
5.0	23.62	.93	5.461	.215
7.0	35.56	1.40	5.969	.235
8.0	41.40	1.63	5.842	.230
9.0	45.47	1.79	4.064	.160
10.0	48.26	1.90	2.794	.110
11.0	50.80	2.00	2.540	.100
13.0	59.94	2.36	4.572	.180
15.0	67.82	2.67	3.937	.155
17.0	71.12	2.80	1.651	.065
19.0	79.76	3.14	4.318	.170
21.0	90.17	3.55	5.207	.205
23.0	96.01	3.78	2.921	.115
24.0	147.83	5.82	51.816	2.040

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-60C TESTED 58 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	413.7	(60.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	15.24	.60	7.620	.300
4.0	30.48	1.20	7.620	.300
6.0	49.02	1.93	9.271	.365
7.0	55.37	2.18	6.350	.250
8.0	61.72	2.43	6.350	.250
9.0	68.07	2.68	6.350	.250
10.0	73.41	2.89	5.334	.210
11.0	78.23	3.08	4.826	.190
12.0	87.12	3.43	8.890	.350
13.0	101.35	3.99	14.224	.560
13.5	148.34	5.84	93.980	3.700

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN B-55A TESTED 53 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	379.2	(55.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
3.0	5.08	.20	1.693	.067
7.0	19.05	* .75	3.492	.137
10.0	29.72	1.17	3.556	.140
14.0	36.83	1.45	1.778	.070
20.0	46.99	1.85	1.693	.067
25.0	53.34	2.10	1.270	.050
30.0	62.23	2.45	1.778	.070
35.0	74.68	2.94	2.489	.098
40.0	92.20	3.63	3.505	.138
42.0	102.87	4.05	5.334	.210
43.0	149.10	5.87	46.228	1.820

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-55B TESTED 54 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	379.2	(55.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
3.0	6.10	.24	2.032	.080
7.0	36.07	1.42	7.493	.295
10.0	44.96	1.77	2.963	.117
13.0	50.80	2.00	1.947	.077
18.0	60.20	2.37	1.880	.074
22.0	66.55	2.62	1.587	.063
28.0	84.84	3.34	3.048	.120
30.0	95.00	3.74	5.080	.200
31.0	98.30	3.87	3.302	.130
32.0	107.70	4.24	9.398	.370
32.3	149.10	5.87	138.007	5.433

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-55C TESTED 55 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	379.2	(55.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
3.0	18.29	.72	6.096	.240
5.0	34.04	1.34	7.874	.310
8.0	38.35	1.51	1.439	.057
11.0	45.21	1.78	2.286	.090
14.0	51.56	2.03	2.117	.083
18.0	57.40	2.26	1.461	.058
20.0	60.71	2.39	1.651	.065
23.0	71.37	2.81	3.556	.140
25.0	81.03	3.19	4.826	.190
28.0	92.71	3.65	3.895	.153
29.0	100.58	3.96	7.874	.310
29.8	149.10	5.87	60.643	2.388

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-50A TESTED 51 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	#0000	(#000)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	2.03	.08	1.016	.040
6.0	11.94	.47	2.476	.098
10.0	19.81	.78	1.968	.077
14.0	27.43	1.08	1.905	.075
18.0	34.04	1.34	1.651	.065
22.0	39.62	1.56	1.397	.055
26.0	44.70	1.76	1.270	.050
30.0	47.50	1.87	.698	.027
34.0	49.53	1.95	.508	.020
38.0	51.31	2.02	.444	.017
42.0	53.59	2.11	.572	.023
50.0	57.66	2.27	.508	.020
60.0	68.83	2.71	1.118	.044
64.0	72.39	2.85	.889	.035
70.0	82.55	3.25	1.693	.067
74.0	93.98	3.70	2.858	.113
76.0	100.58	3.96	3.302	.130
78.0	105.92	4.17	2.667	.105
79.3	149.86	5.90	33.802	1.331

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-50B TESTED 51 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BP-907	*0000	(*000)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	6.35	.25	3.175	.125
6.0	16.00	.63	2.413 *	.095
10.0	27.94	1.10	2.984	.117
14.0	37.59	1.48	2.413	.095
18.0	39.88	1.57	.572	.023
22.0	41.66	1.64	.444	.018
30.0	43.43	1.71	.222	.009
38.0	44.70	1.76	.159	.006
46.0	46.74	1.84	.254	.010
54.0	49.28	1.94	.317	.012
62.0	51.31	2.02	.254	.010
70.0	52.32	2.06	.127	.005
80.0	54.86	2.16	.254	.010
94.0	60.71	2.39	.417	.016
100.0	64.01	2.52	.550	.022
112.0	83.31	3.28	1.609	.063
115.0	93.98	3.70	3.556	.140
118.0	100.08	3.94	2.032	.080
120.0	109.98	4.33	4.953	.195
121.0	149.35	5.88	39.370	1.550

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 8-5DC TESTED 58 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.73	(.068)	BF-907	*0000	(*000)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	1.27	.05	.635	.025
6.0	18.54	.73	4.318	.170
10.0	27.94	1.10	2.349	.092
15.0	32.26	1.27	.864	.034
20.0	40.39	1.59	1.626	.064
30.0	48.01	1.89	.762	.030
40.0	56.90	2.24	.889	.035
50.0	71.37	2.81	1.448	.057
55.0	78.99	3.11	1.524	.060
60.0	89.92	3.54	2.184	.086
63.0	99.06	3.90	3.048	.120
64.6	148.59	5.85	30.956	1.219

* COCURE SPECIMEN WITH NO ADDITIONAL ADHESIVE ADDED

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-7GA TESTED 40 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BF-9G7	.0508	(.002)	482.6	(70.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	14.48	.57	14.478	.570
2.0	26.92	1.06	12.446	.490
3.0	62.99	2.48	36.068	1.420
3.9	148.59	5.85	95.109	3.744

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-708 TESTED 40 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP907	.0508	(.002)	482.6	(70.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	15.24	.60	15.240	.600
2.0	26.92	1.06	11.684	.460
3.0	60.20	2.37	33.274	1.310
3.9	149.35	5.88	99.060	3.900

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-70C TESTED 59 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	482.6	(70.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	13.72	.54	13.716	.540
2.0	26.42	1.04	12.700	.500
3.0	45.72	1.80	19.304	.760
4.0	84.07	3.31	38.354	1.510
4.3	149.10	5.87	216.747	8.533

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-60A TESTED 41 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	413.7	(60.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	10.67	.42	5.334	.210
4.0	19.30	.76	4.318	.170
6.0	29.21	1.15	4.953	.195
8.0	54.86	2.16	12.827	.505
9.0	64.77	2.55	9.906	.390
10.0	83.82	3.30	19.050	.750
11.0	102.87	4.05	19.050	.750
11.5	148.08	5.83	90.424	3.560

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-60B TESTED 41 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	413.7	(60.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	20.07	.79	10.033	.395
4.0	34.29	1.35	7.112	.280
6.0	54.86	2.16	10.287	.405
7.0	63.50	2.50	8.636	.340
8.0	76.45	3.01	12.954	.510
9.0	89.41	3.52	12.954	.510
10.0	148.59	5.85	59.182	2.330

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-60C TESTED 60 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	413.7	(60.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
1.0	8.64	.34	8.636	.340
3.0	18.80	.74	5.080	.200
5.0	23.37	.92	2.286	.090
7.0	44.45	1.75	10.541	.415
8.0	62.23	2.45	17.780	.700
9.0	84.84	3.34	22.606	.890
9.8	149.10	5.87	80.327	3.162

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-55A TESTED 54 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	379.2	(55.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
3.0	4.32	.17	1.439	.057
6.0	14.22	.56	3.302	.130
8.0	18.03	.71	1.905	.075
10.0	23.62	.93	2.794	.110
14.0	43.69	1.72	5.016	.197
16.0	51.82	2.04	4.064	.160
18.0	58.67	2.31	3.429	.135
20.0	67.56	2.66	4.445	.175
22.0	79.76	3.14	6.096	.240
23.0	86.61	3.41	6.858	.270
24.0	89.92	3.54	3.302	.130
25.0	97.79	3.85	7.874	.310
26.0	112.52	4.43	14.732	.580
26.3	149.61	5.89	123.613	4.867

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-55B TESTED 54 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	379.2	(55.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	10.92	.43	5.461	.215
4.0	20.07	.79	4.572	.180
7.0	27.94	1.10	2.625	.103
10.0	32.77	1.29	1.609	.063
14.0	44.70	1.76	2.984	.117
18.0	62.48	2.46	4.445	.175
20.0	80.77	3.18	9.144	.360
22.0	148.08	5.83	33.655	1.325

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-55C TESTED 58 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	379.2	(55.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	11.18	.44	5.588	.220
4.0	17.78	.70	3.302	.130
8.0	33.02	1.30	3.810	.150
10.0	43.94	1.73	5.461	.215
12.0	57.40	2.26	6.731	.265
14.0	70.87	2.79	6.731	.265
16.0	146.05	5.75	37.592	1.480

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-50A TESTED 51 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	344.7	(50.0)

KILOCYCLES	DEBOND LENGTH		DEBOND RATE	
N	MM	(IN)	MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	5.08	.20	2.540	.100
4.0	9.91	.39	2.413	.095
8.0	19.30	.76	2.349	.093
12.0	29.21	1.15	2.476	.097
16.0	33.02	1.30	.952	.037
20.0	36.07	1.42	.762	.030
28.0	49.78	1.96	1.714	.067
36.0	77.72	3.06	3.492	.137
38.0	85.60	3.37	3.937	.155
40.0	94.74	3.73	4.572	.180
42.0	107.44	4.23	6.350	.250
42.7	149.86	5.90	60.597	2.386

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-50B TESTED 53 DAYS AFTER CURE

ADHEREND T MM	(IN)	SPLICE PLATE T MM	(IN)	ADHESIVE	ADHESIVE T MM	(IN)	STRESS(MAX GROSS) MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	5.33	.21	2.667	.105
6.0	13.72	.54	2.095	.082
12.0	23.37	.92	1.609	.063
18.0	32.26	1.27	1.482	.058
24.0	35.05	1.38	.466	.018
34.0	44.45	1.75	.940	.037
42.0	78.74	3.10	4.286	.169
46.0	105.66	4.16	6.731	.265
46.5	149.35	5.88	87.376	3.440

DEBOND LENGTH AS A FUNCTION OF CYCLES FOR
SPECIMEN 9-5GC TESTED 59 DAYS AFTER CURE

ADHEREND T		SPLICE PLATE T		ADHESIVE	ADHESIVE T		STRESS(MAX GROSS)	
MM	(IN)	MM	(IN)		MM	(IN)	MN/SQM	(KSI)
1.55	(.061)	1.75	(.069)	BP-907	.0508	(.002)	344.7	(50.0)

KILOCYCLES N	DEBOND LENGTH MM	(IN)	DEBOND RATE MM/KCY	(IN/KCY)
0.0	0.00	0.00	0.000	0.000
2.0	2.03	.08	1.016	.040
6.0	10.16	.40	2.032	.080
10.0	14.99	.59	1.206	.047
20.0	20.57	.81	.559	.022
30.0	25.91	1.02	.533	.021
44.0	56.39	2.22	2.177	.086
50.0	83.57	3.29	4.530	.178
51.8	149.86	5.90	36.830	1.450

REFERENCES

1. Hoffman, D. J. and June, R. R.: Cyclic Debonding of Adhesive Joints: Summary Report. D6-60136-5, Boeing Commercial Airplane Company, 1973. (Available As NASA CR-2207, 1973.)

2. Comm. on Metric Pract.: ASTM Metric Practice Guide, NGS Handbook 102, U.S. Department of Commerce, March 10, 1967.