Florida Hurricane and Fire/Flame Test Report

Updates In 2011

1) Company name change to: Coatings International, LLC
2) Product name change to: FOREVER BOND; Product # 50/570/10

*Formulas have not changed and all test results are accurate.

Hurricane Test Laboratory, Inc.

Windows / Doors / Storefronts / Curtain Walls / Skylights / Shutters / EIFS / Metal Building Systems

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MISSILE IMPACT & CYCLIC LOAD TEST REPORT – STRUCTURAL PANEL

Test Date: 09/24-10/01/99 **Job #:** 0211-0906-99 **Specimen #:** 3 – 5

CUSTOMER INFORMATION

1.0 NAME OF APPLICANT: **New Generation Building Systems, Inc.**
2.0 CONTACT PERSON: Jim Lynch
3.0 HTL TEST NOTIFICATION #: HTL99070 (Miami-Dade County)
4.0 HTL LAB CERTIFICATION: Miami-Dade County (99-0301.04)
SBCCI (TL9704A)

PRODUCT DESCRIPTION

5.0 DESCRIPTION OF TESTED UNITS:

5.1 Model Designation: Composite Exterior Wall Panel System.

5.2 Overall Test Specimen Size: 192-in. (w) x 156-in. (h)

5.3 Individual Panel Size: 96-in. (w) x 156-in. (h)

5.4 General Description: Each test specimen consisted of two (2), 96-in. (w) x 156-in. (h) composite wall panels that were each secured into the provided opening via a top and bottom track. The top and bottom track used had overall cross sectional dimensions of 6-in. x 1-5/8-in. x 18 ga. (ASTM A446-Grade 37 – [43 ksi min. yield strength] and had an ASTM A525 G90 galvanizing coating applied to them. Each of the individual composite wall panels consisted of three primary components:

- Exterior Base Coat by INNOVATIVE COATINGS CORPORATION INSTACOAT™ Product #60120-35FR (Patent Pending Use).
- 6-in. x 1-5/8-in. x 18 ga. galvanized steel studs located 16-in. on center.
- 5-in. thick (minimum) Molded Expanded Polystyrene (EPS) infill.

5.5 Following is a brief description of the primary components used in the fabrication of each individual composite wall panel.

5.5.1 Exterior Base Coat: The exterior surface of each composite wall panel was coated with a minimum thickness 0.0625-in. thick polyurea coating produced by INNOVATIVE COATINGS CORPORATION INSTACOAT™ Product #60120-35FR (Patent Pending Use). Please note that this coating was spray-applied to the entire exterior facing surface of the EPS infill and the exposed surfaces of the top and bottom tracks and the perimeter edges of the "CEE" studs that form the sides of the composite panel frame. This method of simultaneous application of the coating forms a monolithic barrier that seals the exterior facing surface and all sides of each individual composite panel.

5.5.2 Intermediate "CEE" Studs: The 6-in. x 1-5/8-in. x 18 ga. steel "CEE" studs used in each composite wall panel were roll-formed in accordance with the specifications of ICBO 4943P. These "CEE" studs were produced on a Knudson Manufacturing Inc. Model KR612 or KR246A roll former.

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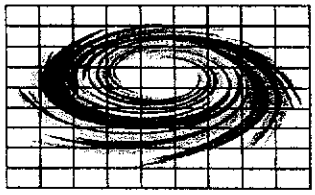

5.5.3 Top and Bottom Tracks: The 6-in. x 1-5/8-in. x 18 ga. steel tracks used in each composite wall panel were roll-formed in accordance with the specifications of ICBO 4943P. These tracks were produced on a Knudson Manufacturing Inc. Model KR612 or KR246A roll former.

5.5.4 Insulation Board: Molded expanded polystyrene (EPS), nominal 1.0 pcf, board incompliance with ASTM C578-85 Type 1 and has a flame spread rating of less than 25 and smoke developed rating of less than 450 when tested in accordance with ASTM E84. Please note that all flame spread and smoke developed rating information on this EPS board was obtained from RADCO listing #1149. Please note that the EPS boards used in this test sample were custom cut from EPS billets using a hot-wire/CNC fabrication method. Each foam segment used had a series of brace-receiving slots pre-cut in them. These brace-receiving slots are used to encapsulate 3-1/2-in. of the "CEE" studs used in each composite wall panel.

6.0 SPECIMEN CONSTRUCTION:

6.1 Individual Composite Wall Panel Assembly: The individual assemblies were fabricated in the following manner:

6.1.1 Position two (2), 48-in. x 96-in. EPS foam segments and two (2), 48-in. x 60-in. EPS foam segments on a makeup table to form a 96" x 156" unit.

6.1.2 Insert 156-in. long, 6-in. x 1-5/8-in. x 18 ga "CEE" studs into the brace-receiving slots that are pre-cut in each EPS foam segment.

6.1.3 Position a 96-in. long, 6-in. x 1-5/8-in. x 18 ga top and bottom track to encompass the ends of the "CEE" studs laterally along the top and bottom edges of the 96-in. x 156-in. EPS foam unit.

6.1.4 Secure the ends of the "CEE" studs to the top and bottom track using a single row of #8 self-drilling, self-tapping screws located 1-in. away from the ends of the track members and 16-in. on center thereafter. Please note that each " CEE" stud was mechanically fastened to the top and bottom track on both the interior and the exterior side.

6.1.5 Seal and adhere the adjacent EPS foam segment to each other, using Abisko Manufacturing Inc. ENERFOAM ENER42 expansive foam sealant.

6.1.6 Apply 0.0625-in. thick polyurea coating produced by INNOVATIVE COATINGS CORPORATION INSTACOAT™ Product #60120-35FR (Patent Pending Use) using a proprietary spray gun system.

6.2 Adjacent Wall Panel Attachment: The two composite wall panels used in this sample were not mechanically fastened to each other in any way. The perimeter seal between the each composite wall panel and the opening was sealed by first inserting a continuous row of ¾-in. diameter close cell backer rod followed by a ½-in. x ½-in. continuous bead of PECORA CORPORATION DYNATRED® two-part electrometric polyurethane sealant.

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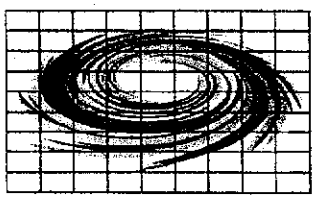

6.3 Composite Wall Installation: Each individual composite wall panel was attached to the opening along it's top and bottom edges only. This attachment was facilitated using a single row of ½-in. diameter anchor bolts with matching nut and washer. A total of six anchor bolts were used to attach each composite wall panel to the opening – three at top and three at bottom. These anchor bolts were located 10-in. away from each composite wall panel corner and then 44-in. on center.

TEST RESULTS

7.0 TEST SEQUENCE:

a. Missile Impact Test per Miami-Dade PA 201.
b. Positive Cyclic Load Test per Miami-Dade PA 203.
c. Negative Cyclic Load Test per Miami-Dade PA 203.

8.0 SPECIMEN # 3 (9/24/99):

8.1 LARGE MISSILE IMPACT TEST:

8.1.1 IMPACT DATA:

Impact #	Velocity (ft/sec)	Missile Length (in.)	Missile Weight (lb.)	X Coordinate (in.)	Y Coordinate (in.)
1	49.53	88.50	9.00	33.00	76.00
2	49.97	88.50	9.00	95.50	75.50
3	49.41	88.50	9.00	146.50	78.00
4	49.65	88.50	9.00	13.75	7.50

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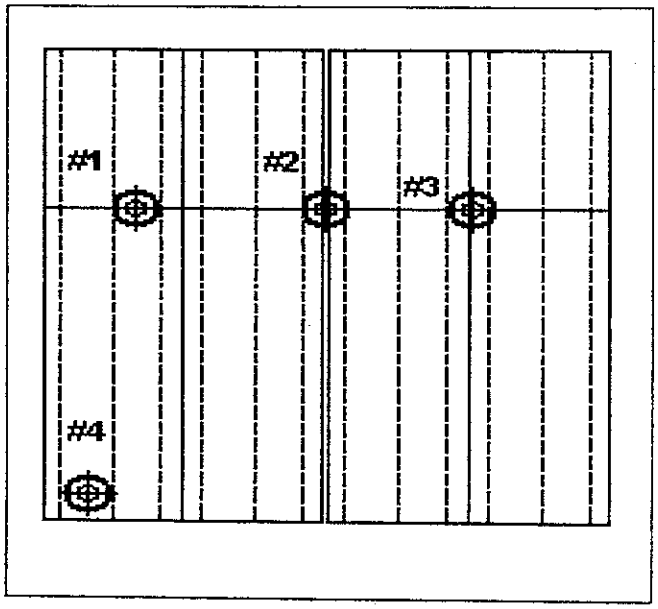
8.1.2 IMPACT LOCATIONS AND REMARKS:

All impacts hit the intended targets resulting in the recorded measurements. No openings were observed on the unit after the large missile impact test.

Upon completion of the large missile impact test, this sample subsequently underwent the cyclic load test as specified Miami-Dade PA 203.



8.2 CYCLIC LOAD TEST:

8.2.1 CYCLIC TEST PRESSURE:

$(P_d)_{in}$ = P_{max} = **45 psf**

$(P_d)_{out}$ = P_{max} = **60 psf**

8.2.2 CYCLIC LOAD SPECTRUM:

8.2.2.1 POSITIVE CYCLIC LOAD SPECTRUM:

# OF INWARD ACTING CYCLES/STAGE		
0 – 22.5 (psf)	**0 – 27 (psf)**	**0 – 58.5 (psf)**
600	70	1

8.2.2.2 NEGATIVE CYCLIC LOAD SPECTRUM:

# OF OUTWARD ACTING CYCLES/STAGE		
0 – 30 (psf)	**0 – 36 (psf)**	**0 – 78 (psf)**
600	70	1

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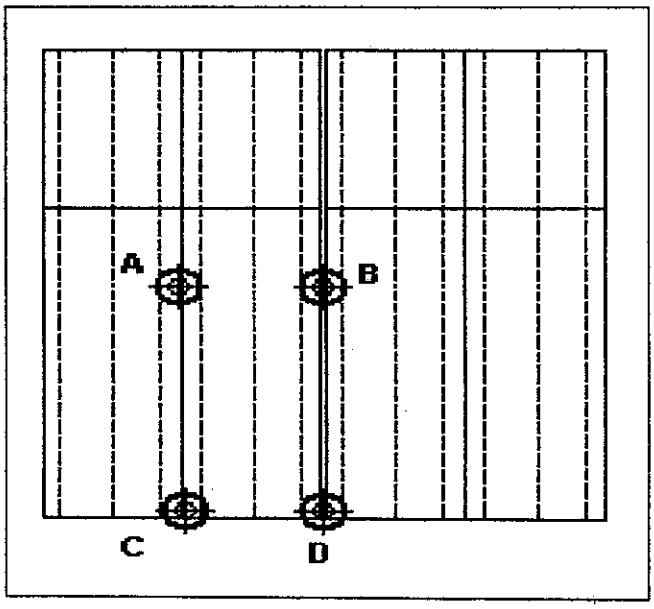
8.2.3 DEFLECTION GAGE LOCATIONS:



8.2.4 DEFLECTION DATA:

LOCATION A:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
1.57	0.15	90.45	1.36	0.17	87.50

LOCATION B:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.73	0.10	86.30	0.77	0.09	90.91

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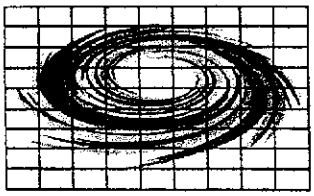

LOCATION C:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.34	0.05	85.29	0.53	0.20	62.26

LOCA/TION D:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.28	0.06	78.57	0.34	0.12	64.70

8.2.5 REMARKS:

No signs of failure were observed in any of the components of this test sample during the cyclic load test, as such, this sample was found to satisfy the cyclic load test requirements of Miami-Dade County Protocol PA 203.

9.0 SPECIMEN # 4 (9/29/99):

9.1 LARGE MISSILE IMPACT TEST:

9.1.1 IMPACT DATA:

Impact #	Velocity (ft/sec)	Missile Length (in.)	Missile Weight (lb.)	X Coordinate (in.)	Y Coordinate (in.)
1	49.48	90.00	9.12	143.50	95.00
2	49.21	90.00	9.12	95.50	94.75
3	49.50	90.00	9.12	50.50	94.50
4	49.78	90.00	9.12	30.50	96.00
5	49.29	90.00	9.12	19.00	6.00

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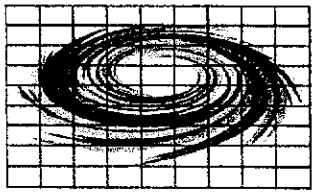
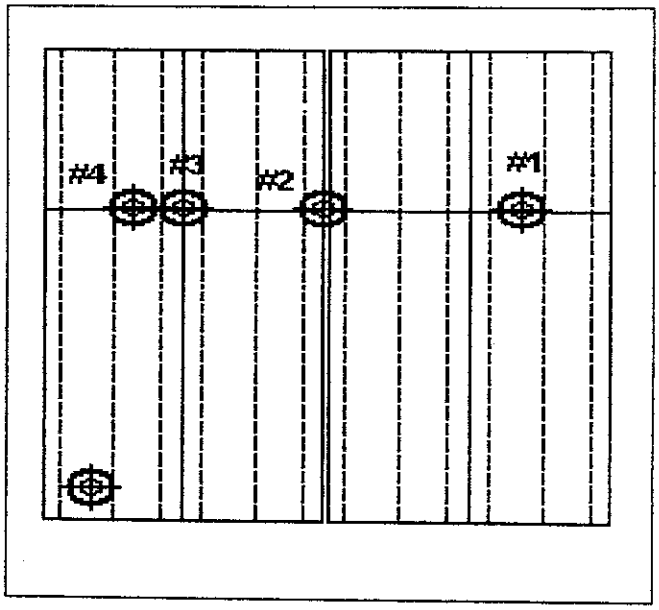


MISSILE IMPACT & CYCLIC LOAD TEST REPORT – STRUCTURAL PANEL

9.1.2 IMPACT LOCATIONS AND REMARKS:

All impacts hit the intended targets resulting in the recorded measurements. No openings were observed on the unit after the large missile impact test.

Upon completion of the large missile impact test, this sample subsequently underwent the cyclic load test as specified Miami-Dade PA 203.



9.2 CYCLIC LOAD TEST:

9.2.1 CYCLIC TEST PRESSURE:

$(P_d)_{in}$ = P_{max} = **45 psf**

$(P_d)_{out}$ = P_{max} = **60 psf**

9.2.2 CYCLIC LOAD SPECTRUM:

9.2.2.1POSITIVE CYCLIC LOAD SPECTRUM:

# OF INWARD ACTING CYCLES/STAGE		
0 – 22.5 (psf)	**0 – 27 (psf)**	**0 – 58.5 (psf)**
600	70	1

9.2.2.2NEGATIVE CYCLIC LOAD SPECTRUM:

# OF OUTWARD ACTING CYCLES/STAGE		
0 – 30 (psf)	**0 – 36 (psf)**	**0 – 78 (psf)**
600	70	1

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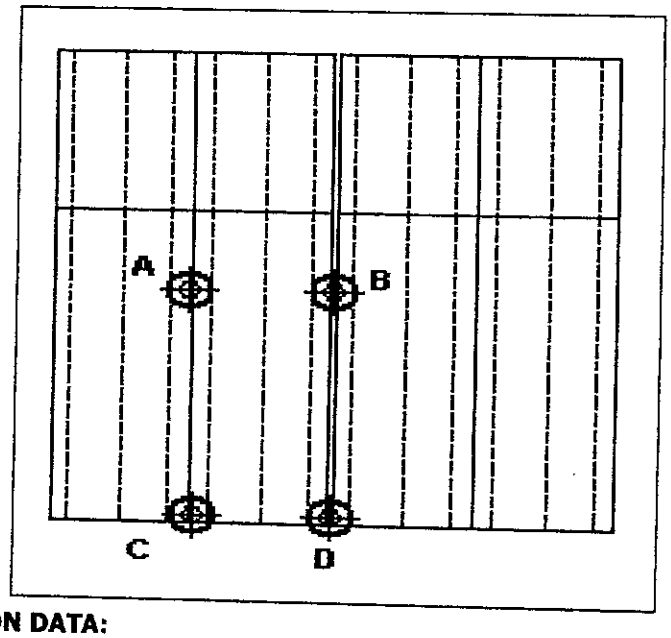
9.2.3 DEFLECTION GAGE LOCATIONS:



9.2.4 DEFLECTION DATA:

LOCATION A:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
2.36	0.28	88.14	1.60	0.06	96.25

LOCATION B:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
1.31	0.18	86.26	1.06	0.05	95.28

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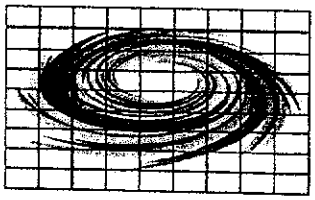

LOCATION C:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.54	0.04	92.59	0.64	0.08	87.50

LOCATION D:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.52	0.18	65.38	0.50	0.08	84.00

9.2.5 REMARKS:

No signs of failure were observed in any of the components of this test sample during the cyclic load test, as such, this sample was found to satisfy the cyclic load test requirements of Miami-Dade County Protocol PA 203.

10.0 SPECIMEN # 5 (10/01/99):

10.1 LARGE MISSILE IMPACT TEST:

10.1.1 IMPACT DATA:

Impact #	Velocity (ft/sec)	Missile Length (in.)	Missile Weight (lb.)	X Coordinate (in.)	Y Coordinate (in.)
1	49.70	90.00	9.13	167.00	96.00
2	49.86	90.00	9.13	144.00	96.00
3	49.53	90.00	9.13	95.50	95.75
4	49.96	90.00	9.13	178.50	8.50

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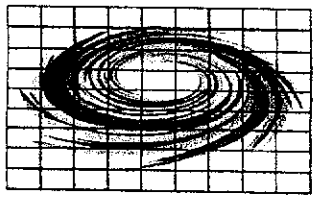
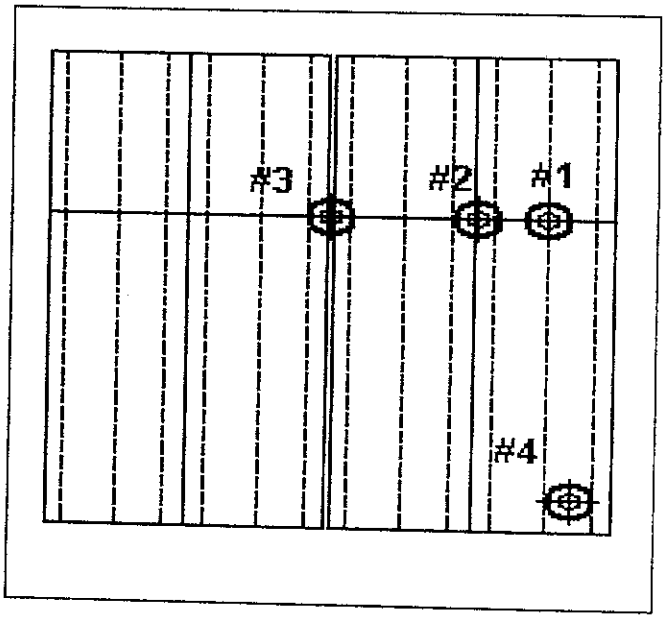


10.1.2 IMPACT LOCATIONS AND REMARKS:

All impacts hit the intended targets resulting in the recorded measurements. No openings were observed on the unit after the large missile impact test.

Upon completion of the large missile impact test, this sample subsequently underwent the cyclic load test as specified Miami-Dade PA 203.



10.2 CYCLIC LOAD TEST:

10.2.1 CYCLIC TEST PRESSURE:

$(P_d)_{in}$ = P_{max} = 45 psf

$(P_d)_{out}$ = P_{max} = 60 psf

10.2.2 CYCLIC LOAD SPECTRUM:

10.2.2.1POSITIVE CYCLIC LOAD SPECTRUM:

# OF INWARD ACTING CYCLES/STAGE		
0 – 22.5 (psf)	**0 – 27 (psf)**	**0 – 58.5 (psf)**
600	70	1

10.2.2.2NEGATIVE CYCLIC LOAD SPECTRUM:

# OF OUTWARD ACTING CYCLES/STAGE		
0 – 30 (psf)	**0 – 36 (psf)**	**0 – 78 (psf)**
600	70	1

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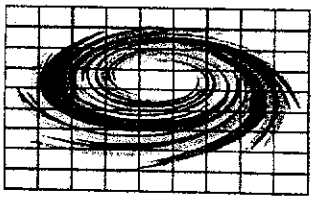
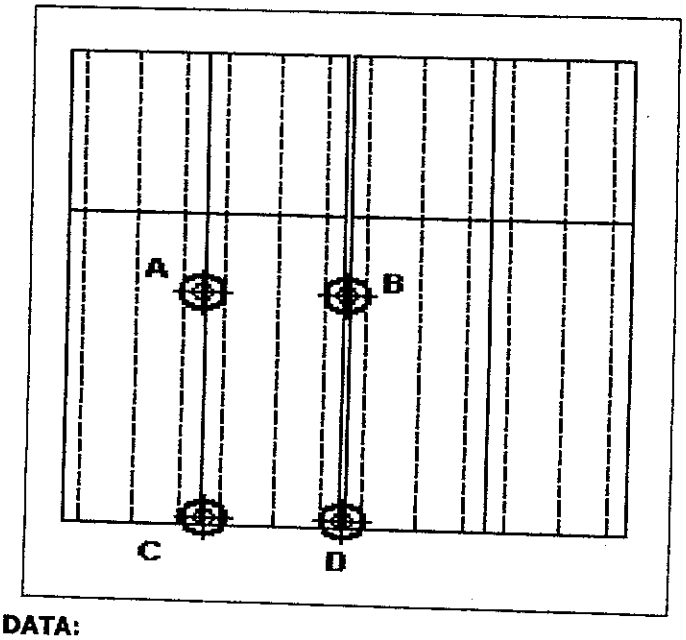


10.2.3 DEFLECTION GAGE LOCATIONS:



10.2.4 DEFLECTION DATA:

LOCATION A:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.92	0.09	90.21	1.48	0.14	90.54

LOCATION B:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
1.41	0.14	90.08	2.02	0.18	91.35

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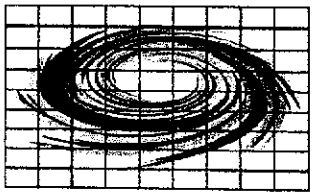

MISSILE IMPACT & CYCLIC LOAD TEST REPORT – STRUCTURAL PANEL

LOCATION C:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.80	0.08	90.00	0.80	0.08	90.00

LOCATION D:

MAXIMUM INWARD DEFLECTION (in.)			MAXIMUM OUTWARD DEFLECTION (in.)		
Total Deflection	Perm. Set	% Recovery	Total Deflection	Perm. Set	% Recovery
0.78	0.07	91.03	1.06	0.10	90.57

10.2.5 REMARKS:

No signs of failure were observed in any of the components of this test sample during the cyclic load test, as such, this sample was found to satisfy the cyclic load test requirements of Miami-Dade County Protocol PA 203.

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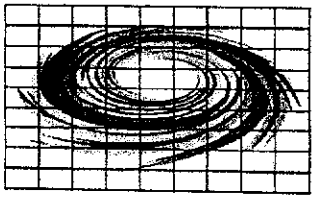

11.0 TEST CONCLUSION:

SPECIMEN # 3		
Test Method	**Test Condition**	**Conclusion**
Large Missile Impact Test	**PA 201**	PASS
Cyclic Load Test (PA 203)	**+ 45 and – 60 psf Design Pressure**	PASS
SPECIMEN # 4		
Test Method	**Test Condition**	**Conclusion**
Large Missile Impact Test	**PA 201**	PASS
Cyclic Load Test (PA 203)	**+ 45 and – 60 psf Design Pressure**	PASS
SPECIMEN # 5		
Test Method	**Test Condition**	**Conclusion**
Large Missile Impact Test	**PA 201**	PASS
Cyclic Load Test (PA 203)	**+ 45 and – 60 psf Design Pressure**	PASS

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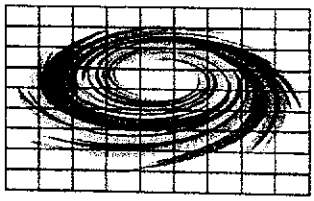

MISCELLANEOUS INFORMATION

12.0 CERTIFICATION & DISCLAIMER STATEMENT:

The test and the results summarized in this test report were conducted in accordance with the specifications of the applicable codes, standards & test methods listed below by the Hurricane Test Laboratory, Inc. located at 6655 Garden Road, Riviera Beach, FL 33404. This report is only intended for the use of the entity named in section 1.0 of this report. The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the referenced specification. This report does not constitute certification of this product which may only be granted by the Validator.

13.0 APPLICABLE CODES, STANDARDS & TEST METHODS:

Miami-Dade County Protocol PA 201 – Impact Test Procedures

Miami-Dade County Protocol PA 203 – Criteria For Testing Products Subject To Cyclic Wind Pressure Loading.

14.0 LIST OF OFFICIAL OBSERVERS:

Vinu J. Abraham – HTL, Professional Engineer
José E. Colón – HTL, Test Engineer
Joe Gibson – HTL, Technician
Terry Roberts – HTL, Technician

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