





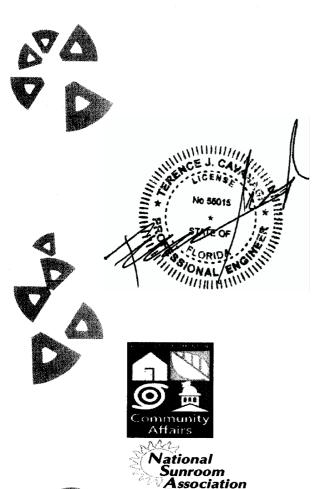
FOUR SEASONS SOLAR PRODUCTS

TAS 202 Tests Series 230 Sun & Shade

3 inch Solid Kick Panel Window with Vertical Utility H-Channels and Adjustable Eave

Report No. TT 507017-202

August 22, 2012 (REV 2.0)



Embossed Corporate Seal

Submitted by:

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Dated: 8/24/4

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1.0 INTRODUCTION

Four Seasons Solar Products (FSSP) contracted with Terrapin Testing (Lab) to perform tests, in accordance with Florida Building Code HVHZ TAS 202-94, (TAS 202), Criteria For Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure. The criteria references ASTM E 283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen (ASTM E 283).

The Lab performed Uniform Static Air Pressure, Water Resistance, and Air Infiltration tests at its facility in Rancho Cordova, California. Section 4.0 below describes the window configuration. This report summarizes the findings and conclusions of the aforementioned tests.

2.0 REPORT IDENTIFICATION

This report, titled "TAS 202 Tests," was prepared by the testing lab, Terrapin Testing, TL-159. The Lab is located at 3206 Luyung Drive, Rancho Cordova, California, 95742-6830. The Lab's unique job number, TT 507017-202 identifies this report.

This report was prepared at the request of FSSP. The proponent's corporate offices and manufacturing facilities are at 5005 Veterans Memorial Highway, Holbrook, NY 11741.

This report is issued as of the date on the report cover. The tests covered by this report began on March 1, 2008 and were completed on March 15, 2008.

Terence Cavanagh, a Florida Professional Engineer, prepared this report and supervised the tests. Terence Cavanagh is part of the Lab's permanent staff. Michael Cavanagh, Lab Manager, performed the tests. Their signatures are on the report cover.

3.0 SPECIMEN DESCRIPTION

The products tested were Series 230 Sun & Shade window bays, 3 inches thick and 48 inches wide, assembled into 8-by-8-foot specimens. Each bay consisted of a kick panel, a slider window, and a glass transom. The kick panel was 22¾ inches tall, the slider window was 58 inches tall, and the glass transom was 11 5/8 inches tall, creating a 92 3/8-inch wall to the top of the adjustable eave.

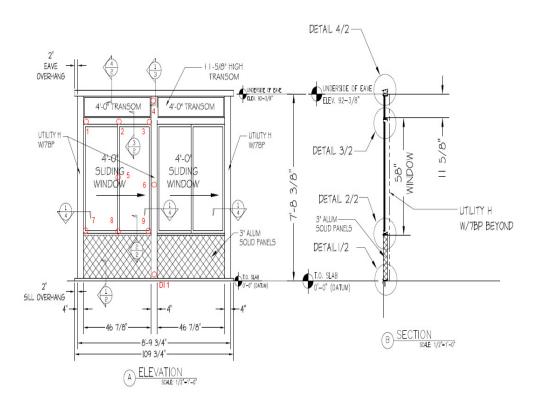
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The kick panel was a laminated sandwich panel with an interior and exterior aluminum skin. The foam core consisted of preformed expanded polystyrene. The slider window consisted of two 24-inch windows: one fixed and one slider. The slider window was closed during testing and locked to the fixed window. Both windows were dual paned. The glass transom window was dual paned, with the glass offset to the exterior side of the sill's centerline. Plastic film was used to seal against air leakage. Figure 1 depicts the specimen configuration.



O = LPT

Figure 1
Specimen Configuration

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Lab personnel did not witness the manufacture of the wall assembly components that were sent to the Lab by FSSP. The wall components were received in good condition at the Lab on February 8, 2008.

Lab personnel fabricated the test specimens from the components received, according to FSSP drawings. See Appendix D for additional detail regarding the specimens tested, including drawings depicting the assemblies.

4.0 **RESULTS**

TAS 202

Upon completion of all testing, the specimens meet the requirement of Section 1619 of the Florida Building Code, Building and TAS 202 for a DP 40 (+40 psf/-40 psf)) rated window. Complete uniform static air pressure test results are within Appendix A.

TAS 202 requires uniform static air pressure in the positive and negative directions at Test Pressures; water penetration at 15% of design pressure and air leakage per ASTM E283.

Uniform Static Air Pressure Tests

No structural damage occurred when the window bays were subjected to the required static air pressures for design pressures of +48 psf and -62 psf.

The specimens passed the Uniform Static Air Pressure Tests.

Water Resistance Tests

No water leakage occurred when subjected to pressures associated with a DP 40 (+40 psf/-40 psf) window.

Water leakage occurred when subjected to pressures associated with a DP 50 (+50 psf/-50 psf) window.

The specimens passed the Water Resistance Tests for a DP40 (+40 psf/-40 psf) rated window.

Air Infiltration Tests

Average air leakage was: 0.07 of cfm/ft2





Revisions Page

Revision Number Date Revision

#2 August 22, 2012

To change reference of ASTM E283-91 to ASTM E283-04

#1 May 5, 2009

To correct 20 HP at Page 7; To correct square feet calculations at Data Tables

Revisions Page added





Appendix AUniform Static Air Pressure Test Report

1.0 INTRODUCTION

Terrapin Testing performed uniform static air pressure tests on window bays for Four Seasons Solar Products (FSSP). These are used primarily in patio rooms. The tests were performed to Design Pressure 40 (DP 40).

2.0 REPORT IDENTIFICATION

This Appendix is incorporated into the main report, number TT 507017-202. Please see additional report identification information within Section 2.0 of the main report.

3.0 SAMPLE DESCRIPTION

The products tested were Series 230 Sun & Shade window bays, 3 inches thick and 48 inches wide, assembled into 8-by-8-foot specimens, using the same configuration as proposed for use in the field. Please see sample description in Section 3.0 of the main report.

4.0 STANDARDS AND REFERENCE

The uniform static air pressure tests were performed in accordance with the provisions of Florida Building Code HVHZ TAS 202-94, (TAS 202), Criteria For Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure.

5.0 TEST PROCEDURES AND EQUIPMENT

Apparatus

Apparatus used in these tests was adequate to provide an essentially constant air-pressure difference for the required test period. The equipment included an air chamber, specimen supports, digital manometer, pressure/vacuum system, film membrane, thermometer/hygrometer, laminar flow element and linear position transducers. Photos A1 - A4 display the test setup.

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- Air chamber, custom fabricated at the LAB. The wood chamber is wall-mounted and the seams of the chamber were sealed to the wood wall with backer rod.
- Digital pressure transducers with various ranges to accommodate pressure range. The transducers measure the test pressure difference within a tolerance of \pm 0.25 percent.
- Pressure/vacuum system a custom built pressure/vacuum wall system. A 20 HP variable speed blower is used to control the amount and rate of change of the differential air pressure within the chamber.
- A 2-mil polyethylene film membrane, is placed over the chamber and specimen. The polyethylene film seals the upper surface of the chamber. The edges of the polyethylene film were secured to the wood frame of the vacuum chamber using duct tape.
- Various temperature, barometer and hygrometer probes.
- Linear position transducers (LPT) were used to measure deflections within the system. Each LPT is capable of reading deflections of up to 10", in 0.0005-inch increments. Dial LPT's are placed at locations in the apparatus to measure the deflection of the support framing.







Photo A1 - Test Set Up



Photo A2 - Test Set Up

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Photo A3- Test Set Up



Photo A4 - Test Set Up

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Procedure

LAB personnel tested the window bay specimen in a accordance with TAS 202, using the following steps:

- 1. Place the specimen into the testing apparatus, with the outside of the window bay facing the wall.
- 2. Place the polyethylene film over the specimen and vacuum chamber and secure with duct tape to the vacuum chamber test frame. Provide enough "slack" in the film to allow for movement of the specimen during testing.
- 3. Place LPT's as indicated in Figure 1.
- 4. Determine the test load, equal to 1.5 times the design pressure (positive and negative) as determined by Section 1619 of the *Florida Building Code, Building* for which the specimen is to be tested. For the purpose of these tests, the design pressure was assumed to be +48 psf and -62 psf.
- 5. Load the specimen in compliance with TAS 202 sub section 5.2.4 and 5.2.5.
 - a. Tare LPT's.
 - b. Apply one half of the test load and hold for 30 seconds.
 - c. Take deflection readings and record visual observations.
 - Release the initial load, and allow the specimen to recover for 1-5 minutes.
 - e. Take deflection readings.
 - f. Apply one half the reverse test load and hold for 30 seconds.
 - g. Take deflection readings.
 - h. Release the reverse load, and allow the specimen to recover for 1 -5 minutes.
 - i. Take deflection readings and record visual observations.
 - j. Apply the full test load and hold for 30 seconds.
 - k. Take deflection readings and record visual observations.
 - Release the test load and allow the specimen to recover for 1 to 5 minutes.
 - m. Take deflection readings.
 - n. Apply the full reverse test load and hold for 30 seconds.
 - o. Take deflection readings.
 - p. Release the reverse test load and allow the specimen to recover for 1 to 5 minutes.
 - g. Take deflection readings.

LAB personnel performed both positive and negative uniform static air pressure on a window bay specimen using the above procedure.





5.0 CALCULATIONS

Not used.

6.0 RESULTS

Three specimens were subjected to static air pressure testing. Tables A1 through A3 present the results of the uniform static air pressure tests.

The testing had the following results, reported here as required by TAS 202:

- The average maximum deflection recorded was 1.452 inches at the center of the window, as recorded by the Linear Position Transducers. (TAS 10.6)
- Permanent deformation is provided in Tables A1 through A3. Locations of LPT's and DI's are documented at Figure 1. (TAS 10.7)
- Pressure differences exerted across the specimens (TAS 10.9) are tabulated on the spreadsheets and graphs following the test photos below.
- The maximum positive pressure used in the tests was 48 pounds per square inch (psi). The maximum negative pressure used in the tests was 62 pounds per square inch (psi). No visible failure of the specimen was noted during the testing. (TAS 10.10)
- After testing, with the exception of permanent deformation, especially at the exterior side of the sill plate, the condition of the test specimens was generally good. Only the exterior side of the sill plate was damaged. (TAS 10.11)
- These tests were conducted in accordance with TAS 202. (TAS 10.13)
- Upon completion of all testing, the specimens meet the requirement of Section 1619 of the Florida Building Code, Building and TAS 202 for a DP40 (+40 psf/-40 psf) window. (TAS 10.12 and 10.14)
- Film was used to seal against air leakage. In the judgment of the test engineer, the film did influence the results of the test.

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As required by TAS 202, Section 9, the Lab notified Americo Segura seven working days before the test, and recorded the tests on video. Americo Segura did not observe the test. The video documentation is on file and available upon request.

The results of the above measurements, test specific failures, and other pertinent data (TAS 10.16) are tabulated within the spreadsheets.





Company: Panel Description:	iption:	Four Sea: 230 Sun	Four Seasons Solar Products 230 Sun n Shade Window Wa	Four Seasons Solar Products 230 Sun n Shade Window Wall		TT Job Clie	TT Job Number: 50 Client Initials FSSP	507017 FSSP			Date: Test: Temp: Rel. Hum.:	5/8/2008 2 76.1 F 37.1%
	Step	Load	LPT 1	LPT 2	LPT 3	LPT 4	LPT 5	LPT 6	LPT 7	LPT 8	LPT 9	DI 1
	Tare	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Rec	36.000	-0.486	-0.56	-0.497	-0.578	-1.145	-0.382	-0.448	-0.602	-0.507	0.245
Docition	Hold 30s	36.000	-0.489	-0.56	-0.501	-0.582	-1.153	-0.386	-0.451	209'0-	-0.510	0.247
אַסאַרוועם	Release	0.000	-0.068	-0.09	-0.075	-0.085	-0.137	-0.067	-0.108	-0.139	-0.113	0.120
	Hold 1m -5m	0.000	-0.063	-0.09	-0.072	-0.081	-0.130	-0.064	-0.104	-0.134	-0.110	0.117
	Rec	46.500	0.446	0.553	0.501	0.605	1.390	0.357	0.399	0.600	0.487	-0.021
Noortivo	Hold 30s	46.500	0.447	0.548	0.500	0.604	1.375	0.360	0.399	0.600	0.483	-0.021
Negative	Release	0.000	0.052	0.032	0.052	0.056	0.073	0.056	0.031	0.049	0.028	0.000
	Hold 1m -5m	0.000	0.052	0.032	0.052	0.056	0.073	0.056	0.031	0.049	0.028	0.002
	Rec	72.000	-0.920	-1.102	-0.961	-1.100	-2.237	-0.752	-0.845	-1.148	186'0-	0.473
Occition	Hold 30s	72.000	-0.941	-1.123	-0.980	-1.122	-2.267	-0.769	-0.861	-1.171	-1.008	0.495
אווועם	Release	0.000	-0.130	-0.161	-0.133	-0.151	-0.235	-0.117	-0.184	-0.227	-0.193	0.199
	Hold 1m -5m	0.000	-0.121	-0.156	-0.127	-0.143	-0.224	-0.111	-0.178	-0.220	-0.188	0.196
	Rec	93.000	0.815	1.093	0.936	1.134	2.774	0.631	0.796	1.187	1.008	-0.147
Nootivo	Hold 30s	93.000	0.829	1.110	0.951	1.154	2.816	0.643	0.810	1.211	1.027	-0.147
Negative	Release	0.000	0.107	0.101	0.111	0.120	0.210	0.108	0.091	0.139	0.110	-0.078
	Hold 1m -5m		0.103	0.098	0.108	0.115	0.196	0.105	0.087	0.133	0.106	-0.074
Max Displa	Max Displacment (absolute value)	e value)	0.941	1.123	0.980	1.154	2.816	0.769	0.861	1.211	1.027	0.495
Max Perm	Max Permanent Set Displacment	lacment										
(;	(absolute value)		0.121	0.156	0.127	0.143	0.224	0.111	0.178	0.220	0.188	0.196
#doioh IIeW		02 50	02 50 inches	ž	7 71 faat	foot						
Wall Width		00.20	s dod	5 6	7.71 leet	ובבר ניסו						
Maximim Load		+48nsf	-62nef	5	0.23	פפר						
Operable Cr	Lenath	312.0	0 inches	o	26.00	feet						
Overall Area		9203.75 sq. in.	sq. in.	. o	63.91 sq. ft.	sq. ft.						

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Company: Panel Description:	ription:	Four Seas	Four Seasons Solar Products 230 Sun n Shade Window Wall	Products 'indow War	_	TT Job Clie	TT Job Number: 50	507017 FSSP			Date: Test:	5/12/2008
					·						Temp: Rel. Hum.:	79.3 F 22.8%
	Sten	Peol										
)		LPT 1	LPT 2	LPT 3	LPT 4	LPT 5	LPT 6	LPT 7	LPT 8	LPT 9	DI 1
	Tare	0.000	000'0	0.000	0.000	0.000	000'0	0.000	0.000	0.000	0.000	0.000
	Rec	36.000	-0.395	-0.62	-0.528	-0.564	-1.233	-0.418	-0.358	-0.642	-0.550	0.313
o, iiti	Hold 30s	36.000	-0.398	-0.62	-0.532	-0.570	-1.242	-0.421	-0.362	-0.648	-0.556	0.320
POSICIVE	Release	0.000	-0.101	-0.14	-0.131	-0.141	-0.244	-0.131	-0.111	-0.186	-0.150	0.138
	Hold 1m -5m	0.000	860'0-	-0.13	-0.128	-0.138	-0.236	-0.129	-0.108	-0.182	-0.146	0.135
	Rec	46.500	0.282	0.510	0.395	0.461	1.278	0.262	0.277	0.495	0.421	-0.147
Notice	Hold 30s	46.500	0.285	0.512	0.398	0.465	1.281	0.265	0.279	0.499	0.423	-0.150
INEGalive	Release	0.000	-0.014	-0.021	-0.022	-0.021	-0.044	-0.023	-0.010	-0.026	-0.018	0.010
	Hold 1m -5m	0.000	-0.014	-0.021	-0.022	-0.021	-0.044	-0.023	-0.010	-0.026	-0.018	0.013
	Rec	72.000	-0.814	-1.248	-1.068	-1.135	-2.430	-0.851	-0.681	-1.249	-1.098	0.330
Docition	Hold 30s	72.000	-0.832	-1.271	-1,090	-1.157	-2.465	-0.870	-0.694	-1.268	-1.117	0.342
חלוועטר	Release	0.000	-0.197	-0.241	-0.239	-0.259	-0.412	-0.238	-0.189	-0.302	-0.255	0.234
	Hold 1m -5m	0.000	-0.183	-0.229	-0.225	-0.241	-0.392	-0.223	-0.180	-0.288	-0.243	0.225
	Rec	93.000	0.554	1.019	0.745	0.909	2.628	0.497	0.580	1.013	0.854	-0.341
Nooth	Hold 30s	93.000	0.561	1.030	0.756	0.923	5.666	0.507	0.590	1.035	0.865	-0.349
ואמלומרו	Release	0.000	-0.005	0.011	-0.004	0.005	0:030	-0.006	0.020	0.024	0.017	-0.028
	Hold 1m -5m	0.000	-0.014	0.003	-0.012	-0.007	0.012	-0.013	0.012	0.015	0.009	-0.024
Max Displ	Max Displacment (absolute value)	te value)	0.832	1.271	1.090	1.157	7.666	0.870	0.694	1.268	1.117	0.349
Max Pern	Max Permanent Set Displacment	lacment										
j	(absolute value)		0.183	0.229	0.225	0.241	0.392	0.223	0.180	0.288	0.243	0.225
:		0	-		1							
Wall Height	L	92.50	92.50 inches	o	7.71 feet	feet						
Wall Width		\circ	99.50 inches	o	8.29 feet	feet						
Maximum Load	oad	<u> </u>	-62psf	;	0	7.07						
	Operable Crack Length	312.0	o inches	L _O	26.00 reet	reer						
Overall Area	ō	9203./5	/5 sq. in.	o	63.9I	63.91 sq. ft.						

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Step Load IPT 2 LPT 3 LPT 4 LPT 5 LPT 3 LPT 4 LPT 5 LPT 7 LPT 7 LPT 7 LPT 3 LPT 4 LPT 5 LPT 7 LPT 7 LPT 3 LPT 4 LPT 5 LPT 7	Company: Panel Description:	iption:	Four Sea: 230 Sun	Four Seasons Solar Products 230 Sun n Shade Window Wa	Four Seasons Solar Products 230 Sun n Shade Window Wall	_	TT Job Clie	TT Job Number: 50 Client Initials FSSP	507017 FSSP			Date: Test: Temp: Rel. Hum.:	5/15/2008 4 93.5 F 34.3%
Steph LOdd LDT 1 LPT 2 LPT 3 LPT 4 LPT 5 LPT 3 LPT 4 LPT 5 LPT 6 LPT 7 Tare 0.000 0.000 0.000 0.000 0.000 0.000 0.000 Rec 36.000 -0.259 -0.41 -0.349 -0.381 -0.957 -0.221 -0.276 Hold Jm -5m 36.000 -0.0261 -0.41 -0.350 -0.038 -0.022 -0.019 Release 0.000 -0.015 -0.01 -0.018 -0.023 -0.023 -0.022 -0.019 Hold Jm -5m 0.000 -0.015 -0.01 -0.018 -0.023 -0.022 -0.019 Hold Jm -5m 0.000 -0.018 -0.018 -0.021 -0.018 -0.018 -0.018 -0.018 -0.018 -0.018 -0.018 -0.018 -0.018 -0.018 -0.018 -0.018 -0.021 -0.018 -0.018 -0.021 -0.018 -0.018 -0.021 -0.021 -0.018 -0.0		0040	7										
Tare 0.000 0.000 0.000 0.000 0.000 0.000 Rec 36.000 -0.259 -0.41 -0.349 -0.381 -0.957 -0.221 -0.276 Hold 30s 36.000 -0.0261 -0.01 -0.033 -0.058 -0.022 -0.019 Hold 1m -5m 0.000 -0.015 -0.01 -0.018 -0.023 -0.023 -0.023 -0.022 -0.019 Hold 1m -5m 0.000 -0.015 -0.01 -0.018 -0.021 -0.018 -0.019 -0.018 -0.018 -0.019 -0.018 -0.019 -0.018		delc		LPT 1	LPT 2	LPT 3	LPT 4	LPT 5	LPT 6	LPT 7	LPT 8	LPT 9	DI 1
Rec 36.000 -0.259 -0.41 -0.349 -0.381 -0.957 -0.221 -0.270 Hold 30s 36.000 -0.261 -0.41 -0.350 -0.383 -0.958 -0.223 -0.027 Release 0.000 -0.015 -0.01 -0.018 -0.023 -0.039 -0.022 -0.019 Hold 1m -5m 0.000 -0.015 -0.01 -0.018 -0.018 -0.019 -0.019 -0.018 -0.019 -0.019 -0.019 -0.019 -0.015 -0.019 -0.015 -0.019 -0.015 -0.018 -0.019 0.013 -0.018 -0.019 0.013 -0.018 -0.019 0.013 -0.018 -0.019 0.013 -0.018 -0.019 0.013 -0.018 -0.019 0.013 -0.018 -0.019 0.014 0.014 0.015 0.019 0.019 0.014 0.015 0.015 0.019 0.019 0.018 0.018 0.019 0.019 0.019 0.019 0.019 0.019 <t< td=""><td></td><td>Tare</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td><td>0.000</td></t<>		Tare	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hold 30s 36.000 -0.261 -0.41 -0.350 -0.383 -0.958 -0.223 -0.277 Release 0.000 -0.019 -0.02 -0.023 -0.023 -0.030 -0.022 -0.019 Hold 1m -5m 0.000 -0.015 -0.01 -0.018 -0.018 -0.021 -0.018 -0.013 Rec 46.500 0.360 0.640 0.495 0.555 1.540 0.319 0.460 Hold 30s 46.500 0.363 0.644 0.495 0.559 1.550 0.320 0.463 Release 0.000 0.095 0.148 0.134 0.125 0.199 0.119 0.138 Hold 1m -5m 0.000 0.091 0.145 0.130 0.121 0.191 0.116 0.134 Hold 1m -5m 0.000 0.0670 -0.084 0.082 -0.101 -0.175 0.082 0.173 Hold 1m -5m 0.000 0.642 1.105 0.892 0.101 0.175 0.082 0.173 Hold 1m -5m 0.000 0.659 1.178 0.907 1.044 3.091 0.556 0.838 Hold 1m -5m 0.000 0.113 0.193 0.167 0.159 0.199 0.145 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.145 0.159 Ithold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.145 0.159 Ithold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.145 0.159 Ithold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.145 0.159 Ithold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.145 0.159 Ithold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.145 0.159		Rec	36.000	-0.259	-0.41	-0.349	-0.381	-0.957	-0.221	-0.276	-0,469	698'0-	0.120
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Hold 1m -5m	שאוואסר	Release	0.000	-0.019	-0.02	-0.023	-0.023	-0.030	-0.022	-0.019	-0.023	-0.018	0.014
Rec 46.500 0.360 0.640 0.495 0.555 1.540 0.319 0.460 Hold 30s 46.500 0.363 0.644 0.497 0.559 1.550 0.320 0.463 Release 0.000 0.095 0.148 0.134 0.121 0.199 0.119 0.138 Hold 1m -5m 0.000 0.091 0.145 0.130 0.121 0.199 0.118 0.136 Hold 1m -5m 0.000 -0.0670 -1.007 -0.851 -0.919 -2.172 0.018 0.013 Hold 1m -5m 0.000 -0.094 -0.103 -0.092 -0.101 -0.175 -0.087 -0.173 Hold 1m -5m 0.000 -0.096 -0.095 -0.084 -0.093 -0.160 -0.076 -0.162 Hold 1m -5m 0.000 0.013 0.193 0.104 0.015 0.104 0.016 0.005 0.018 0.007 0.016 0.016 0.018 0.016 0.018 0.018		Hold 1m -5m	0.000	-0.015	-0.01	-0.018	-0.018	-0.021	-0.018	-0.013	-0.015	-0.014	0.011
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Hold Im -5m 0.000 0.091 0.145 0.130 0.121 0.191 0.116 0.134 Rec 72.000 -0.670 -1.007 -0.851 -0.919 -2.139 -0.618 -0.723 Hold 30s 72.000 -0.693 -1.025 -0.863 -0.937 -2.172 -0.627 -0.776 Release 0.000 -0.086 -0.095 -0.084 -0.093 -0.160 -0.085 -0.173 Hold 1m -5m 0.000 0.642 1.159 0.892 1.025 3.042 0.546 0.816 Hold 1m -5m 0.000 0.113 0.193 0.167 0.159 0.308 0.145 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.142 0.154 Imment (absolute value) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 Imment Set Displacment 0.0109 0.188 0.163 0.153 0.296 0.142 0.162 By out of the color	Negative	Release	0.000	0.095	0.148	0.134	0.125	0.199	0.119	0.138	0.184	0.167	-0.164
Rec 72.000 -0.670 -1.007 -0.851 -0.919 -2.139 -0.618 -0.723 Hold 30s 72.000 -0.693 -1.025 -0.863 -0.937 -2.172 -0.627 -0.776 Release 0.000 -0.094 -0.103 -0.092 -0.101 -0.175 -0.082 -0.173 Hold 1m -5m 0.000 -0.086 -0.095 -0.084 -0.093 -0.160 -0.076 -0.162 Release 93.000 0.642 1.178 0.892 1.025 3.042 0.546 0.838 Hold 30s 93.000 0.659 1.178 0.907 1.044 3.091 0.556 0.838 Hold 1m -5m 0.000 0.113 0.163 0.163 0.153 0.153 0.142 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.142 0.838 Iabsolute value) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 </td <td></td> <td>Hold 1m -5m</td> <td>0.000</td> <td>0.091</td> <td>0.145</td> <td>0.130</td> <td>0.121</td> <td>0.191</td> <td>0.116</td> <td>0.134</td> <td>0.178</td> <td>0.163</td> <td>-0.160</td>		Hold 1m -5m	0.000	0.091	0.145	0.130	0.121	0.191	0.116	0.134	0.178	0.163	-0.160
Hold 30s 72.000 -0.693 -1.025 -0.863 -0.937 -2.172 -0.627 -0.776 Release 0.000 -0.094 -0.103 -0.092 -0.101 -0.175 -0.082 -0.173 Hold 1m -5m 0.000 -0.086 -0.095 -0.084 -0.093 -0.160 -0.076 -0.162 Rec 93.000 0.642 1.159 0.892 1.025 3.042 0.546 0.162 Hold 1m -5m 0.000 0.113 0.193 0.167 0.159 0.188 0.163 0.159 0.145 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.145 0.154 0.154 Ind 1m -5m chalue) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 Ind anent Set Displacment 0.109 0.163 0.163 0.153 0.153 0.142 0.162 Bbsolute value) 0.109 0.188 0.163 0.153 0.142		Rec	72.000	-0.670	-1.007	-0.851	-0.919	-2.139	-0.618	-0.723	-1.135	-0.912	0.420
Release 0.000 -0.094 -0.103 -0.092 -0.101 -0.175 -0.082 -0.173 Hold 1m - 5m 0.000 -0.086 -0.095 -0.084 -0.093 -0.160 -0.076 -0.162 Rec 93.000 0.642 1.159 0.892 1.025 3.042 0.546 0.816 Hold 30s 93.000 0.659 1.178 0.907 1.044 3.091 0.556 0.838 Hold 1m -5m 0.000 0.113 0.163 0.163 0.153 0.159 0.145 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.145 0.159 Identity cyalue) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 Identity value) 0.109 0.188 0.163 0.153 0.142 0.162	Ovition	Hold 30s	72.000	-0.693	-1.025	-0.863	-0.937	-2.172	-0.627	-0.776	-1.177	-0.934	0.446
Hold 1m -5m 0.000 -0.086 -0.095 -0.084 -0.093 -0.160 -0.076 -0.162 Rec 93.000 0.642 1.159 0.892 1.025 3.042 0.546 0.816 Hold 30s 93.000 0.659 1.178 0.907 1.044 3.091 0.556 0.838 Release 0.000 0.113 0.163 0.167 0.159 0.145 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.142 0.154 Industricable 0.693 1.178 0.907 1.044 3.091 0.627 0.838 Industricable 0.109 0.188 0.163 0.153 0.142 0.162 Absolute value) 0.109 0.188 0.163 0.153 0.142 0.162	ביים מכונים מכונים	Release	0.000	-0.094	-0.103	-0.092	-0.101	-0.175	-0.082	-0.173	-0.170	-0.117	0.120
Rec 93.000 0.642 1.159 0.892 1.025 3.042 0.546 0.816 Hold 30s 93.000 0.659 1.178 0.907 1.044 3.091 0.556 0.838 Release 0.000 0.113 0.193 0.167 0.159 0.308 0.145 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.142 0.154 Incent (absolute value) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 Insolute value 0.109 0.188 0.163 0.153 0.142 0.162 Bbsolute value 0.109 0.188 0.163 0.153 0.142 0.162		Hold 1m -5m	0.000	980'0-	-0.095	-0.084	-0.093	-0.160	-0.076	-0.162	-0.157	-0.108	0.114
Hold 30s 93.000 0.659 1.178 0.907 1.044 3.091 0.556 0.838 Release 0.000 0.113 0.193 0.167 0.159 0.308 0.145 0.159 Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.142 0.154 acment (absolute value) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 absolute value) 0.109 0.188 0.163 0.153 0.142 0.162 absolute value) 0.109 0.188 0.163 0.153 0.162 0.162		Rec	93.000	0.642	1.159	0.892	1.025	3.042	0.546	0.816	1.411	1.152	-0.534
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Hold 1m -5m 0.000 0.109 0.188 0.163 0.153 0.296 0.142 0.154 scment (absolute value) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 anent Set Displacment should value value) 0.109 0.188 0.163 0.153 0.296 0.142 0.162 absolute value) 0.109 0.188 0.163 0.153 0.296 0.142 0.162	ואבאמרואב	Release	0.000	0.113	0.193	0.167	0.159	0.308	0.145	0.159	0.245	0.224	-0.218
Increment (absolute value) 0.693 1.178 0.907 1.044 3.091 0.627 0.838 Increment Set Displacment Set Dis		Hold 1m -5m	0.000	0.109	0.188	0.163	0.153	0.296	0.142	0.154	0.236	0.219	-0.215
absolute value) 0.109 0.188 0.163 0.153 0.296 0.142 0.162 0.162 0.250 inches or 7.71 feet	Max Displa	cment (absolut	e value)	0.693	1.178	0.907	1.044	3.091	0.627	0.838	1.441	1.175	0.555
92.50 inches or	Max Perm (a	lanent Set Disp absolute value)	acment	0.109	0.188	0.163	0.153	0.296	0.142	0.162	0.236	0.219	0.114
92.50 Inches or			C C	<u>-</u>		i	-						
	Wall Height		92.50	inches 	ō	7.71	reet						
99.50	Wall Width		99.50	inches	ō	8.29	teet						
6Zpst ochos	Maximum L		+48psr /	-62pst inches	į	00 90	foot						
9203.75 sq. in.	Overall Area	מכת בכוושנוו	9203.75	sa. in.	5 b	63.91	sa. ft.						

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0

Approval: RWC Laminated Sandwich Panel Tests Patio Roof Panels Report No. TT 507017-202

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Appendix BWater Penetration Tests

1.0 INTRODUCTION

Terrapin Testing performed water resistance tests on window bays for Four Seasons Solar Products (FSSP). These are used primarily in patio rooms. The tests were performed to DP 40 (40 psf).

2.0 REPORT IDENTIFICATION

This Appendix is incorporated into the main report, number TT 507017-202. Please see additional report identification information within Section 2.0 of the main report.

3.0 SAMPLE DESCRIPTION

The products tested were Series 230 Sun & Shade window bays, 3 inches thick and 48 inches wide, assembled into 8-by-8-foot specimens, using the same configuration as proposed for use in the field. Please see sample description in Section 3.0 of the main report.

4.0 STANDARDS AND REFERENCE

The water resistance tests were performed in accordance with the provisions of Florida Building Code HVHZ TAS 202-94 (TAS 202), Criteria For Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure.

5.0 TEST PROCEDURES AND EQUIPMENT

Water is sprayed on the specimen at a rate of +5 gph while pressure is maintained for 15 minutes.

Terrapin Testing

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22

Revision #: 2.0

Approval: RWC





6.0 RESULTS

Three specimens were subjected to water resistance testing. Leakage was observed when tested at DP50. The specimens were dried and subjected to water resistance testing at DP40, where no leakage was observed. The results were:

Water Penetration Resistance (ASTM E 547)

	Results	Allowed
DP 40: 300 Pa (6 psf):	No Leakage	No Leakage
DP 50: 375 Pa (7.5 psf):	Leakage	No Leakage





Appendix C Air Infiltration Tests

1.0 INTRODUCTION

Terrapin Testing performed air filtration tests on window bays for Four Seasons Solar Products (FSSP). These are used primarily in patio rooms.

2.0 REPORT IDENTIFICATION

This Appendix is incorporated into the main report, number TT 507017-202. Please see additional report identification information within Section 2.0 of the main report.

3.0 SAMPLE DESCRIPTION

The products tested were Series 230 Sun & Shade window bays, 3 inches thick and 48 inches wide, assembled into 8-by-8-foot specimens, using the same configuration as proposed for use in the field. Please see sample description in Section 3.0 of the main report.

4.0 STANDARDS AND REFERENCE

The air filtration tests were performed in accordance with the provisions of Florida Building Code HVHZ TAS 202-94 (TAS 202), Criteria For Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure, which references ASTM E 283, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen (ASTM E 283).

5.0 <u>TEST PROCEDURES</u>

A positive (infiltration) air pressure of 1.57 psf is applied and the amount of air flow is measured twice. Once while all operable cracks are covered and again when all operable cracks are uncovered. The difference in air flow is the "air leakage". Maximum allowed value is from AAMA 101 as ASTM E283 does not list a maximum.

Terrapin Testing

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22

Revision #: 2.0

Approval: RWC





6.0 RESULTS

Three specimens were subjected to air infiltration testing. Air leakage results were:

Table C1 - Total Air Leakage

Test #	Air Pressure	Results		Allowed
1	75 Pa (1.57 psf)	1.29 L/s (2.56 cfm)	n/a	
2	75 Pa (1.57 psf)	2.95 L/s (6.26 cfm)	n/a	
3	75 Pa (1.57 psf)	2.03 L/s (4.30 cfm)	n/a	

Table C2 - Air Leakage Over Operable Crack Perimeter

Test #	Air Pressure	Results	Allowed
1	75 Pa (1.57 psf)	0.15 L/s/m (0.10 cfm/ft)	n/a
2	75 Pa (1.57 psf)	0.37 L/s/m (0.24 cfm/ft)	n/a
3	75 Pa (1.57 psf)	0.22 L/s/m (0.14 cfm/ft)	n/a

Table C3 - Air Leakage Over Window Area (Outside Frame Dimension)

Test #	Air Pressure	Results	Allowed
1	75 Pa (1.57 psf)	0.20 L/s/m ² (0.04 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²)
2	75 Pa (1.57 psf)	0.51 L/s/m ² (0.10 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²)
3	75 Pa (1.57 psf)	0.36 L/s/m ² (0.07 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²)

Terrapin Testing

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0 Approval: RWC

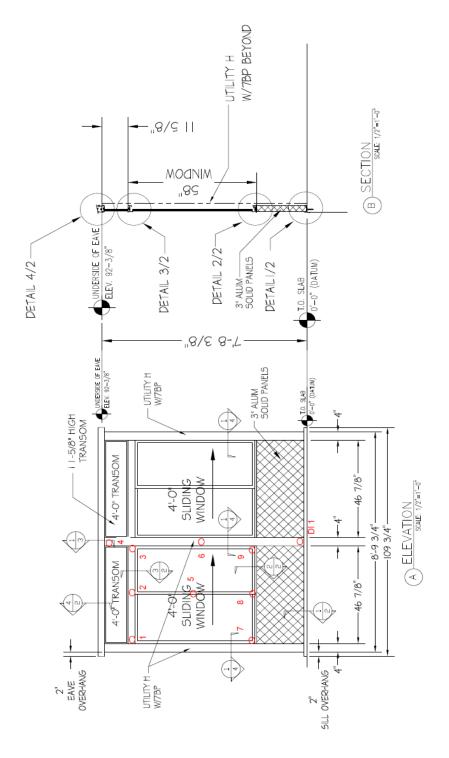




Appendix D Detailed Product Information







O = LPT

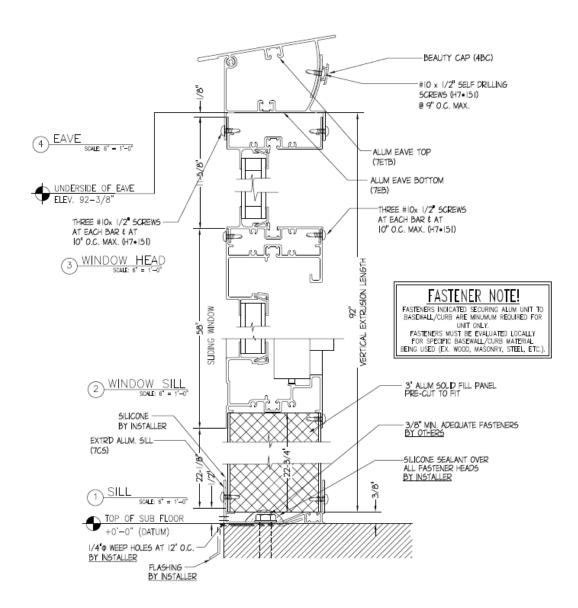
Terrapin Testing

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0

Approval:



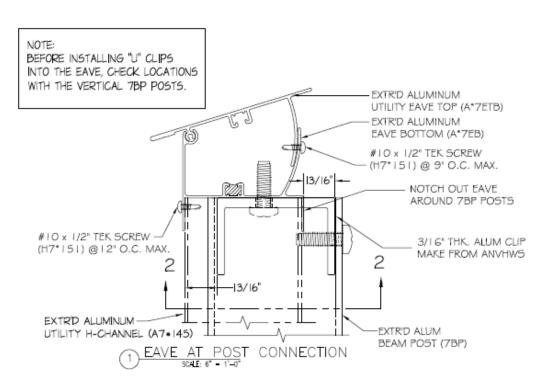


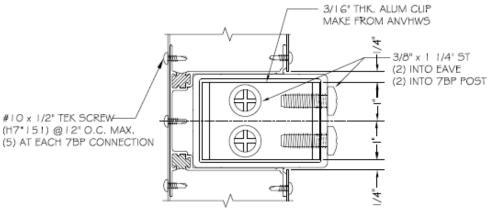


Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0 Approval: RWC









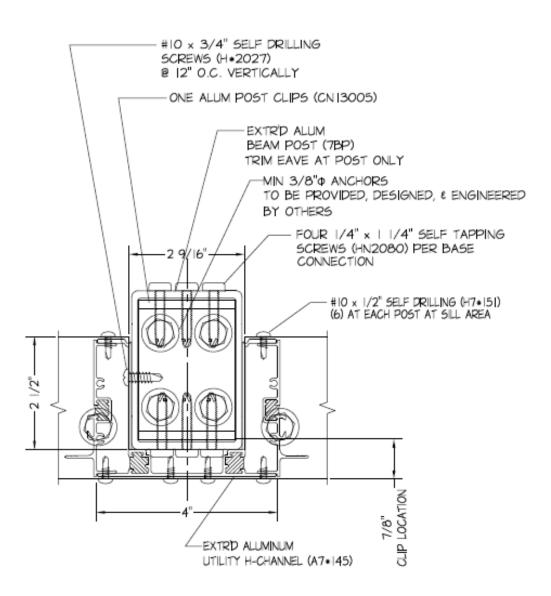
2 EAVE AT POST CONNECTION

Terrapin Testing

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0 Approval: RWC







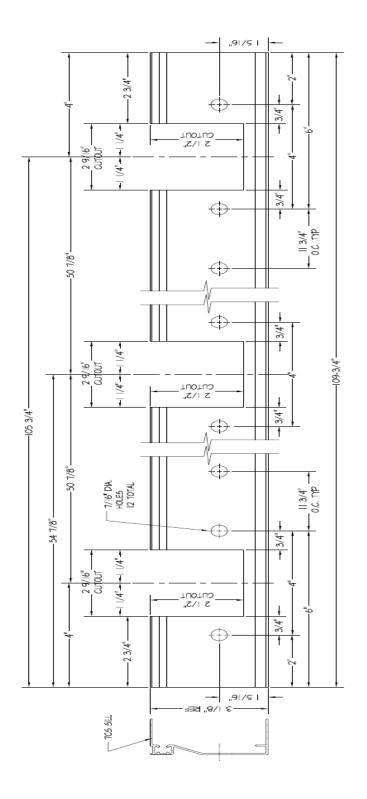
PLAN UTILITY POST/7BP

Terrapin Testing

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0 Approval:







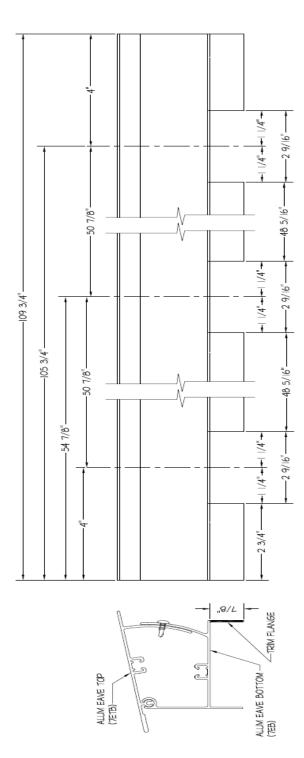
COLOR WHITE

Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0

Approval:







7EB EAVE BOTTOM 7ETB EAVE TOP COLOR WHITE QTY I

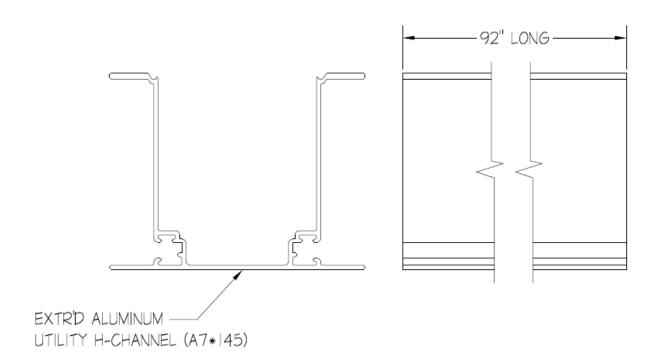
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Orig. Issue Date: 2008-07-11 Revision Date: 2012-08-22 Revision #: 2.0

Approval:



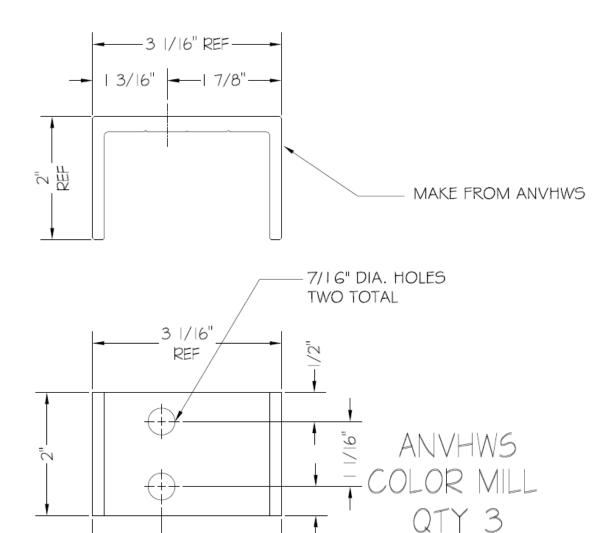




A7W145 COLOR WHITE QTY 3





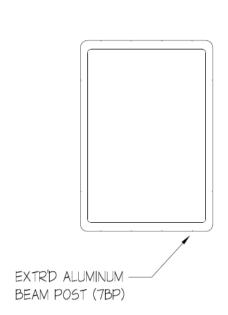


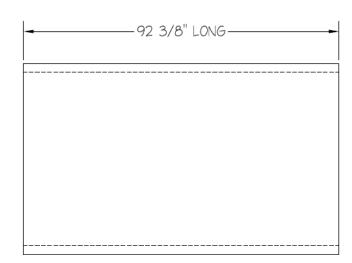
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AN7BP COLOR WHITE QTY 3