



National
Technical
Systems

Saugus Division
20988 West Golden Triangle Road
Saugus, California 91350-2679
Tel: 661-259-8184

Data Report Number 10823

Blowing Rain Testing

of

Skylight Dome Unit

Part Number ASD-600

Tests Initiated: April 24, 2001
Tests Completed: April 26, 2001

June 8, 2001

TESTED FOR:

SANYO E & E CORPORATION
2001 Sanyo Avenue
San Diego, CA 92144-6297

TESTED BY:

NATIONAL TECHNICAL SYSTEMS
Testing Division
20988 West Golden Triangle Road
Saugus, California 91350

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Test Report 10823
Purchase Order Number 4500008795
June 8, 2001

SANYO E & E CORPORATION
2001 Sanyo Avenue
San Diego, CA 92144-6297

TEST ITEMS

One Skylight Dome Unit, Part Number ASD-600, Serial Number 00001.

SUMMARY

The Unit described above has been subjected to a wind test per Sanyo instructions and blowing rain per MIL-STD-810F, Method 506.4, Procedure I. The wind test was conducted using wind speeds ranging from 80 to 105 miles per hour for 10 minutes on each of four sides. The rain test was conducted using a wind speed of 70 miles per hour and a rainfall of four inches per hour. Testing was conducted for 30 minutes on each of four sides.

The Unit failed the first rain test as detailed on Notice of Deviation No. WDR #1. The Unit was modified and the rain test was repeated. After completing another modification during the retest, the rain test was restarted and ultimately passed the specification requirements.

Test data are attached.

TEST EQUIPMENT

The required test equipment was calibrated in accordance with American National Standards Institute (ANSI)/National Conference of Standards Laboratories (NCSL) Z540-1, General Requirements for Calibration Laboratories and Measuring and Test Equipment. The calibration records are maintained on file in the NTS Quality Control Office.

TEST CONDITIONS

Unless otherwise specified herein, all tests were performed at ambient conditions defined as a temperature of $73 \pm 18^{\circ}\text{F}$ ($23 \pm 10^{\circ}\text{C}$), a relative humidity of 50 ± 30 percent, and a barometric pressure of 28.5 ± 2.0 - 3.0 inches of mercury absolute (725 ± 50 , -75 mm of mercury absolute).

UNIT DISPOSITION

The Skylight Dome Unit was returned to Sanyo E & E Corporation upon completion of the test program.



TEST PROCEDURES AND TEST RESULTS

Wind Test

Date Performed: 24 April 2001

The Unit was placed into the test setup such that the wind would blow horizontally and uniformly over the Unit. Photograph 1 shows the Unit under test.

The Unit was subjected to a horizontal blowing wind at 80, 90, 100 and 105 miles per hour on each of four sides of the Unit. The Unit was rotated manually at 0°, 90°, 180° and 270° for each exposure. The wind velocity was maintained for 10 minutes at each level. Upon completion of the wind exposures, a visual examination of the Unit revealed no evidence of damage or other adverse effects. Test data are attached as Appendix A.

Rain Test

Date Performed: 25 April 2001

The Unit was placed into the test setup such that the rain and wind would blow uniformly over the Unit. Photograph 2 shows the Unit under test. The wind was set for 70 miles per hour, and the rainfall for four inches per hour. These conditions were held for 30 minutes on each of four faces. Upon completion of the blowing rain exposure, the Unit was inspected for water intrusion. Water in the amount of 315 milliliters was taken from the inside of the Unit, which exceed the allowable water limit of 140 milliliters. The Unit was returned to Sanyo for modification. Refer to Notice of Deviation No. WDR #1.

Rain Retest

Date Performed: 26 April 2001

Upon return to NTS, the Unit was placed into the test setup such that the rain and wind would blow uniformly over the Unit. Photograph 2 shows the Unit under test. The wind was set for 70 miles per hour, and the rainfall for four inches per hour. These conditions were held for 30 minutes on the first face of the Unit. The Unit was inspected for water intrusion. Water was noted inside the Unit, and the Unit was removed from the test area for additional modifications.

Upon return to the test sight, the blowing rain test was restarted as described above. The rain and wind conditions were held for 30 minutes on each of four faces. Upon completion of the blowing rain exposure, the Unit was inspected for water intrusion. Water in the amount of 40 milliliters was taken from the inside of the Unit. This amount of water did not exceed the allowable water limit of 140 milliliters, and the Unit met the specified requirements. Test data are attached. Appendix B-1 contains the initial test data; Appendix B-2 contains the retest data.

The Unit was returned to Sanyo E & E Corporation for further evaluation.

Project Engineer, Robert Carpenter

Quality Assurance Manager, Linda Schulz



Report 10823
P.O. No. 4500008795
June 8, 2001

APPENDIX A
WIND TEST DATA



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Fax: 661-254-4814

GENERAL TEST DATA LOG

Page # _____	of _____	TEST TITLE: <u>Wind Test</u>
Customer: _____	<u>Sanyo E & E</u>	Date: <u>04/24/01</u>
Part Name: _____	<u>Skylight Dome Unit</u>	MJO No: <u>10823</u>
Part No: _____	<u>ASD-600</u>	P.O. No: <u>4500008795</u>
Serial No: _____	<u>00001</u>	NTS Engr: <u>Bob Carpenter</u>
Test Spec: _____	<u>Mil-Std-810F, M. 506.4, Pro 1</u>	Revision <u>N/A</u> Para. <u>N/A</u>

Date	Time	Remarks	Init.
		1 Skylight Dome Unit to be subjected to Wind tests at speeds of 80, 90, 100, and 105 mph. At each speed, each side shall be exposed for a duration of 10 min. Unit is nonoperational.	
04/24/01	0843	Begin blowing wind at 80 mph for 10 min. Side #1.	EA
04/24/01	0853	Stop wind. Rotate unit 90°.	EA
04/24/01	0855	Begin blowing wind at 80 mph for 10 min. Side #2.	EA
04/24/01	0905	Stop wind. Rotate unit 90°.	EA
04/24/01	0907	Begin blowing wind at 80 mph for 10 min. Side #3.	EA
04/24/01	0917	Stop wind. Rotate unit 90°.	EA
04/24/01	0925	Begin blowing wind at 80 mph for 10 min. Side #4.	EA
04/24/01	0935	Stop wind. Calibrate speed for 90 mph.	EA
04/24/01	0939	Begin blowing wind at 90 mph for 10 min. Side #1.	EA
04/24/01	0949	Stop wind. Rotate unit 90°.	EA
04/24/01	0950	Begin blowing wind at 90 mph for 10 min. Side #2.	EA
04/24/01	1000	Stop wind. Rotate unit 90°.	EA
04/24/01	1002	Begin blowing wind at 90 mph for 10 min. Side #3.	EA
04/24/01	1012	Stop wind. Rotate unit 90°.	EA
04/24/01	1021	Begin blowing wind at 90 mph for 10 min. Side #4.	EA
04/24/01	1031	Stop wind. Calibrate speed for 100 mph.	EA

Test operator is required to print and sign name below along with providing initials after each log entry.

Print Name: <u>Eric Anderson</u>	Signature: <u></u>	Initials: <u>EA</u>
Print Name: _____	Signature: _____	Initials: _____
Print Name: _____	Signature: _____	Initials: _____
Print Name: _____	Signature: _____	Initials: _____



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GENERAL TEST DATA LOG

Page # of TEST TITLE: Wind Test

Customer: Sanyo E & E Date: 04/24/01

Part Name: Skylight Dome Unit MJO No: 10823

Part No: ASD-600 P.O. No: 4500008795

Serial No: 00001 NTS Engr: Bob Carpenter

Test Spec: Mil-Std-810F, M. 506.4, Pro 1 Revision N/A Para. N/A

Date	Time	Remarks	Init
04/24/01	1035	Begin blowing wind at 100 mph for 10 min. Side #1.	EA
04/24/01	1045	Stop wind. Rotate unit 90°.	EA
04/24/01	1046	Begin blowing wind at 100 mph for 10 min. Side #2.	EA
04/24/01	1056	Stop wind. Rotate unit 90°.	EA
04/24/01	1057	Begin blowing wind at 100 mph for 10 min. Side #3.	EA
04/24/01	1107	Stop wind. Rotate unit 90°.	EA
04/24/01	1112	Begin blowing wind at 100 mph for 10 min. Side #4.	EA
04/24/01	1122	Stop wind. Calibrate speed for 105 mph.	EA
04/24/01	1124	Begin blowing wind at 105 mph for 10 min. Side #1.	EA
04/24/01	1134	Stop wind. Rotate unit 90°.	EA
04/24/01	1135	Begin blowing wind at 105 mph for 10 min. Side #2.	EA
04/24/01	1145	Stop wind. Rotate unit 90°.	EA
04/24/01	1146	Begin blowing wind at 105 mph for 10 min. Side #3.	EA
04/24/01	1156	Stop wind. Rotate unit 90°.	EA
04/24/01	1157	Begin blowing wind at 105 mph for 10 min. Side #4.	EA
04/24/01	1207	Stop wind. Test is complete. Post test visual inspection reveals no	EA
		effects.	

Test operator is required to print and sign name below along with providing initials after each log entry.

Print Name: Eric Anderson Signature: *Eric Anderson* Initials: EA

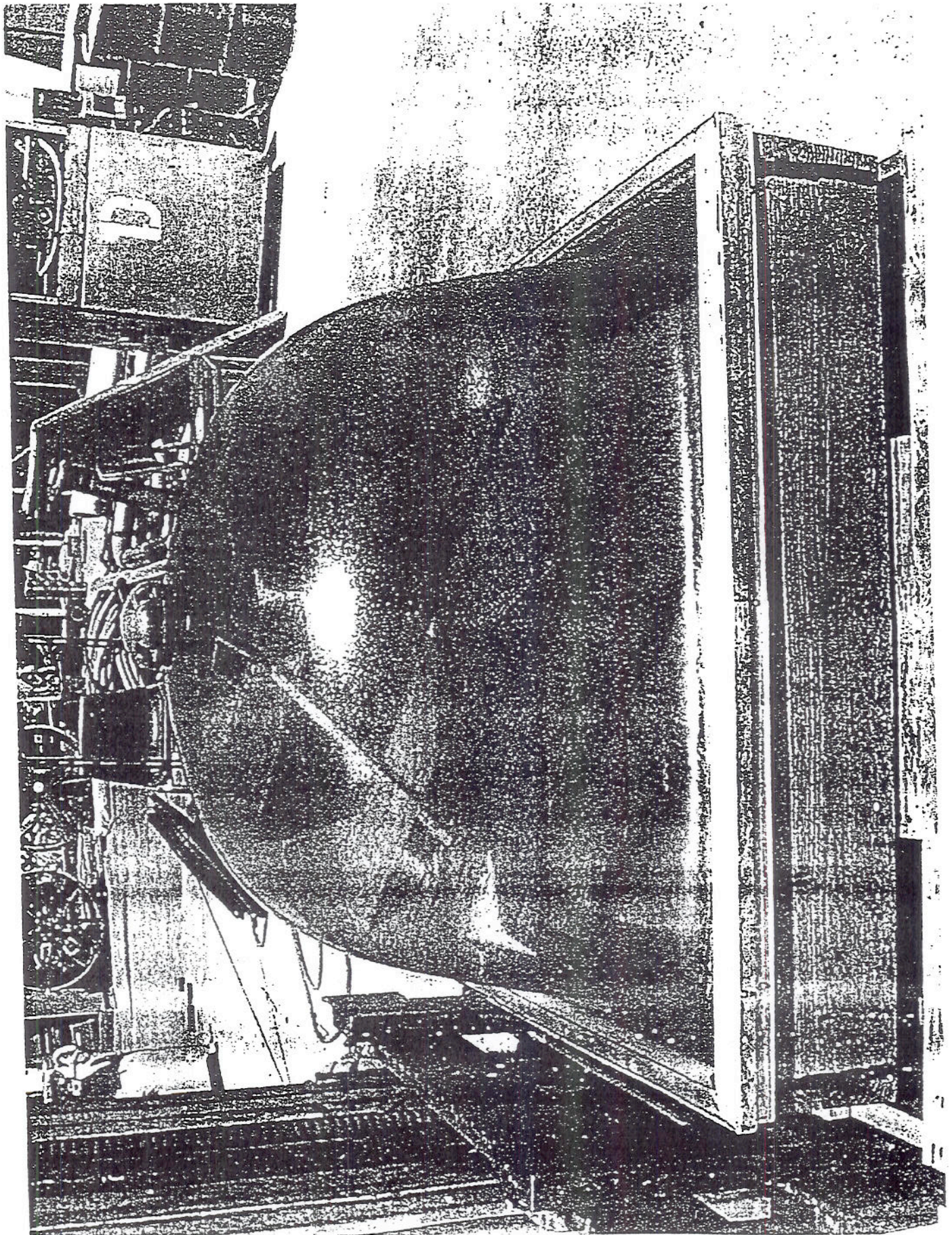
Print Name: _____ Signature: _____ Initials: _____

Print Name: _____ Signature: _____ Initials: _____

Print Name: _____ Signature: _____ Initials: _____



REPORT NO. 10823
PHOTOGRAPH 1
WIND TEST SETUP





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June 8, 2001

APPENDIX B-1

RAIN TEST DATA



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GENERAL TEST DATA LOG

Page # 1 of 1 TEST TITLE: Wind driven rain

Customer: SANYO E&E Date: 04/25/01

Part Name: Skylight dome unit MJO No: 10823

Part No: ASD-600 P.O. No: 4500008795

Serial No: 00001 NTS Engr: Bob Carpenter

Test Spec: MIL-STD-810F, Method 506.4 Pro I Revision _____ Para. _____

Date	Time	Remarks	Init.
04/25/01	0800	Rain test area set up and calibrated per Mil-Std 810-F 506.4 Pro I	RS
		Rain set to 4 inches per hour, Wind set at 70 mph . T/P reviewed	
		Photo taken of setup. Test started	
04/25/01	1015	Rain on side #1	RS
	1045	Rain off side #1	
04/25/01	1050	Rain on side #2	RS
	1120	Rain off side #2	
04/25/01	1137	Rain on side #3	RS
	1207	Rain off side #3	
04/25/01	1219	Rain on side #4	RS
	1249	Rain off side #4	
		Unit inspected for water intrusion. Water was found in the unit. Dome	RS
		was removed from box assy. and water was removed from unit.	
		Water from unit measured 315 ml. Mil-Std 810F 506.4 states	
		no more than 4 ml ³ per 1ft ³ water is allowed. The allowable water limit	
		is 140 ml based on volume. The amount of water in the specimen	
		was (8.8 ml ³ per 1ft ³). Unit failed.	RS

Test operator is required to print and sign name below along with providing initials after each log entry.

Print Name: Randall Shaw Signature: Randall Shaw Initials: RS

Print Name: _____ Signature: _____ Initials: _____

Print Name: _____ Signature: _____ Initials: _____

Print Name: _____ Signature: _____ Initials: _____



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NOTICE OF DEVIATION

N.O.D. No.: <u>W.D.R. #1</u>		TEST TITLE: <u>Wind driven rain</u>	
Customer: <u>SANYO E&E</u>	Date: <u>04/26/01</u>		
Part Name: <u>Skylight dome unit</u>	MJO No.: <u>10823</u>		
Part No.: <u>ASD-600</u>	P.O. No.: <u>450008795</u>		
Serial No.: <u>00001</u>	NTS Engr.: <u>Bob Carpenter</u>		
Test Spec.: <u>MIL-STD-810F, Method 506.4 Pro I</u>	Revision: <u>N/A</u>	Para.: <u>N/A</u>	

Requirement:

Mil-Std-810F 506.4 states No more than 4 ml³ per 1ft³ water is allowed.
The allowable water limit is 140 ml based on volume of UUT.

Deviation:

Unit inspected for water intrusion. Water was found in the unit. Dome was removed from box assy. and water was removed from unit. Water from unit measured 315 ml. Mil-Std 810F 506.4 states no more than 4 ml³ per 1ft³ water is allowed. The allowable water limit is 140 ml based on volume. The amount of water in the specimen was (8.8 ml³ per 1ft³). Unit failed.

Disposition:

Customer wants to reseal dome and rerun the test . (See C.O.S. 1 REV. A)

Corrective Action Required: Yes No CAR # _____
Completion Date: _____

Customer Notification:

Made To: Donato Labaco Method: Phone
Date & Time: 04/25/01 By Whom: Randall Shaw

Approval: Please print name

Customer Rep.:	<u>Donato Labaco</u>	Signature:	
NTS Quality:	<u>Linda Schulz</u>	Signature:	
NTS Test Engineer:	<u>Bob Carpenter</u>	Signature:	
DCMAO		Signature:	

DCMAO Notified: Yes No N/A Date Notified: _____



REPORT NO. 10823
PHOTOGRAPH 2
RAIN TEST SETUP





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APPENDIX B-2

RAIN RETEST DATA



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GENERAL TEST DATA LOG

Page # 1 of 1 TEST TITLE: Wind driven rain #2

Customer: SANYO E&E Date: 04/26/01

Part Name: Skylight dome unit MJO No: 10823

Part No: ASD-600 P.O. No: 4500008795

Serial No: 00001 NTS Engr: Bob Carpenter

Test Spec: MIL-STD-810F, Method 506.4 Pro I Revision _____ Para. _____

Date	Time	Remarks	Init.
04/26/01	0830	Rain test area set up and calibrated per Mil-Std 810-F 506.4 Pro I	RS
		Rain set to 4 inches per hour, Wind set at 70 mph . T/P reviewed	
		Photo taken of setup. Test started	
04/26/01	0910	Rain on side #1	RS
	0940	Rain off side #1	RS
		Unit inspected for water intrusion , Water found in the unit , Dome removed and customer is making modifications on unit .	
04/26/01	1247	Rerun side #1 , Rain on	RS
	1317	Rain off side #1	RS
04/26/01	1320	Rain on side #2	RS
	1350	Rain off side #2	RS
04/26/01	1355	Rain on side #3	RS
	1425	Rain off side #3	RS
04/26/01	1430	Rain on side #4	RS
	1500	Rain off side #4	RS
		Unit inspected.. Water found in the unit. Water in unit measured 40 ml.	RS
		Mil-std 810F 506.4 states no more than 4 ml ³ per 1ft ³ water is allowed.	
		The allowable water limit is 140 ml based on volume . Unit passed.	
		Note: customer modified UUT prior to testing. Flashing added inside channel.	RS

Test operator is required to print and sign name below along with providing initials after each log entry.

Print Name: Randall Shaw Signature: [Signature] Initials: RS

Print Name: _____ Signature: _____ Initials: _____

Print Name: _____ Signature: _____ Initials: _____

Print Name: _____ Signature: _____ Initials: _____