



FOR THE SCOPE OF
ACCREDITATION UNDER NVLAP LAB
CODE 100402-0.

REPORT

3933 US ROUTE 11 CORTLAND, NEW YORK 13045

Project No. G100446416

Date: September 1, 2011

REPORT NO. 100446416CRT-001

TEST OF ONE LED ROADWAY LUMINAIRE

FIXTURE MODEL NO. PIANO 1

RENDERED TO

SCHREDER LIGHTING LLC
985 BUSSE ROAD
ELK GROVE VILLAGE, IL 60007

TEST: Electrical and Photometric tests as required to the IESNA test standard.

LABORATORY NOTE: The laboratory that conducted the testing detailed in this report has been Qualified, Verified, and Recognized for LM-79 Testing for ENERGY STAR for SSL by US DOE's CALiPER program.

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number 500314832.

STANDARDS USED: The following American National Standards or Illuminating Engineering Society of North America Test Guides were used in part or totally to test each specimen:

IESNA LM-79: 2008 Approved Method for Electrical and Photometric Measurements of Solid-State Lighting Products

ANSI NEMA ANSLG C78.377: 2008 Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one sample of model number PIANO 1. The sample was received by Intertek on June 5, 2011, in undamaged condition, and one sample was tested as received. The sample designation was S12204L.

DATES OF TESTS: July 21, 2011 through August 30, 2011.

SUMMARY

Model No.: PIANO 1
Description: LED Roadway Luminaire

Criteria	Result
Total Lumen Output	5405 Lumens
Total Power	62.90 W
Luminaire Efficacy	85.93
Power Factor	0.996
Current ATHD	6.00%
Correlated Color Temperature (CCT)	4268 K
Color Rendering Index (CRI) - Ra	68.9
Color Rendering Index (CRI) - R9	-23.3
Duv	0.003
Chromaticity Coordinate (x)	0.371
Chromaticity Coordinate (y)	0.377
Chromaticity Coordinate (u')	0.219
Chromaticity Coordinate (v')	0.500
Backlight Rating:	B 1
Uplight Rating:	U 1
Glare Rating:	G 1

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Calibration Date	Calibration Due Date
Leeds & Northup Standard Resistor	Manganin	Y089	02/17/11	02/17/12
Data Precision Digital Voltmeter	3600	V124	02/17/11	02/17/12
Fluke Multimeter	45	M133	02/17/11	02/17/12
Fluke Temperature Meter	53 II	T1318	02/25/11	02/25/12
Kikusui DC Power Supply	35-10L	E160	---	---
Sorenson DC Power Supply	DLM150-20E	--	---	---
NIST Spectral Flux Standard Source	RF1024	---	09/18/10	100 hours of use
Elgar AC Power Supply	CW1251	--	--	--
Yokogawa Power Meter	WT210	E464	04/19/11	04/19/12
LSI High Speed Mirror Goniometer	6440	--	w/use	w/use
Cole Parmer Hygro Thermometer	445703	T1357	10/12/10	10/12/11
Yokogawa Power Analyzer	WT1600	E462	06/22/11	06/22/12
ITS 3 Meter Sphere	W/ CDS 1100	N307	w/use	w/use



TEST METHODS

Seasoning in Sample Orientation – LED Products

No seasoning was performed in accordance with IESNA LM-79.

Photometric and Electrical measurements – Distribution Method

A LSI Type C High Speed Model 6440 Mirror Goniometer was used to measure the intensity (candelas) at each angle of distribution for each sample.

Ambient temperature was measured equal to the height of the sample mounted on the Goniometer equipment. Each sample was operated at input rated voltage in its designated orientation. Each sample was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere Model DAS 1100 Diode Array Spectroradiometer and Two Meter or Ten Foot Sphere was used to measure correlated color temperature, chromaticity coordinates, and the color rendering index for each SSL unit.

Ambient temperature was measured at a position inside the sphere. Each SSL unit was operated on the client provided driver at the rated input voltage in its designated orientation. Each SSL unit was allowed to stabilize for at least thirty minutes before measurements were made. Electrical measurements including voltage, current, and power were measured using the Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer system is traceable to the National Institute of Standards and Technology.

Estimated Total Operating Time

<u>Model No.</u>	<u>Total Hours</u>
PIANO 1	3

TEST METHODS (cont'd)

BUG Ratings (Backlight, Uplight, Glare) – for Outdoor Fixtures Only

Zonal Lumens were calculated and grouped using the formula in IESNA TM-15-07 (revised) for each zone as defined in the BUG addendum. The maximum lumen rating in each zone was compared against the BUG zonal requirements of Energy Star.

RATING TABLE: BACKLIGHT

NOTE: MAX RATING IN ANY ZONE = RATING FOR LUMINAIRE

	B0	B1	B2	B3	B4	B5
BH	110	500	1000	2500	5000	>5000
BM	220	1000	2500	5000	8500	>8500
BL	110	500	1000	2500	5000	>5000

RATING TABLE: UPLIGHT

NOTE: MAX RATING IN ANY ZONE = RATING FOR LUMINAIRE

	U0	U1	U2	U3	U4	U5
UH	0	10	100	500	1000	>1000
UL	0	10	100	500	1000	>1000
FVH	10	75	150	>150	NA	NA
BVH	10	75	150	>150	NA	NA

GLARE RATINGS

NOTE: MAX RATING IN ANY ZONE = RATING FOR LUMINAIRE

FOR ASYMMETRICAL LUMINAIRE TYPES (I, II, III, IV)

	G0	G1	G2	G3	G4	G5
FVH	10	250	375	500	750	>750
BVH	10	250	375	500	750	>750
FH	660	1800	5000	7500	12000	>12000
BH	110	500	1000	2500	5000	>5000

FOR QUADRILATERAL SYMMETRICAL LUMINAIRE TYPES (V, VSQUARE)

	G0	G1	G2	G3	G4	G5
FVH	10	250	375	500	750	>750
BVH	10	250	375	500	750	>750
FH	660	1800	5000	7500	12000	>12000
BH	660	1800	5000	7500	1200	>12000

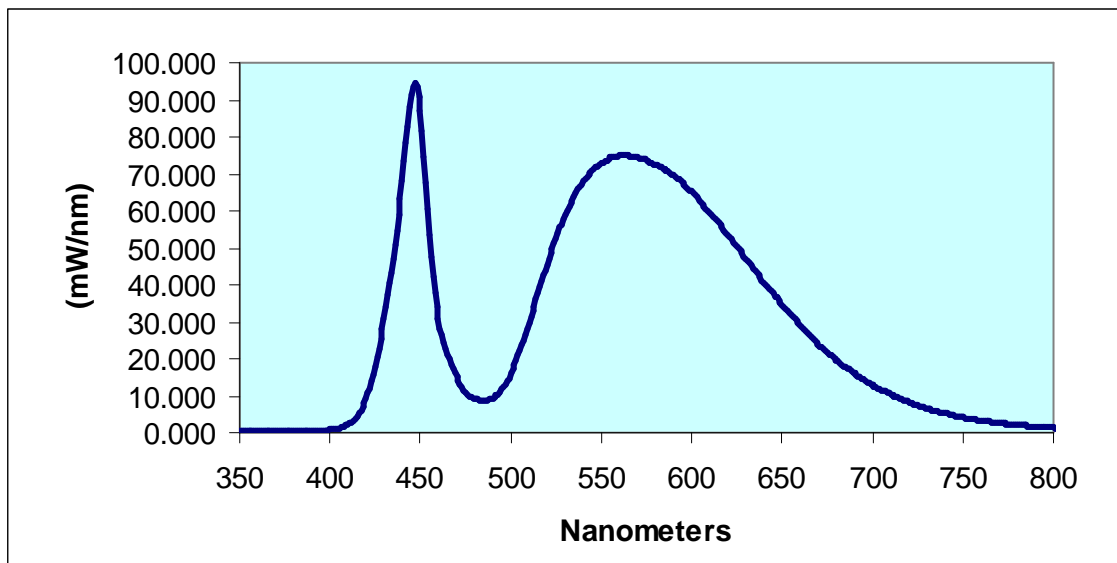


RESULTS OF TESTS

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
PIANO 1							
350	0.346	460	30.842	570	74.569	680	19.661
355	0.578	465	21.309	575	73.671	685	17.706
360	0.655	470	14.957	580	72.549	690	16.027
365	0.603	475	10.845	585	71.124	695	14.422
370	0.600	480	9.329	590	69.610	700	12.954
375	0.526	485	8.826	595	67.378	705	11.605
380	0.609	490	9.330	600	65.193	710	10.338
385	0.544	495	11.634	605	62.268	715	9.291
390	0.619	500	15.980	610	59.498	720	8.266
395	0.738	505	22.140	615	56.558	725	7.401
400	0.847	510	29.495	620	53.700	730	6.601
405	1.328	515	37.647	625	50.359	735	5.866
410	2.315	520	45.656	630	47.069	740	5.236
415	4.485	525	52.685	635	43.906	745	4.709
420	9.301	530	58.898	640	40.655	750	4.154
425	18.084	535	63.928	645	37.582	755	3.723
430	31.065	540	67.899	650	34.706	760	3.333
435	46.961	545	70.823	655	31.888	765	0.000
440	68.224	550	72.781	660	29.084	770	2.653
445	91.222	555	74.420	665	26.460	775	2.336
450	86.807	560	74.931	670	24.008	780	2.110
455	53.607	565	74.931	675	21.736		

Schreder Lighting LLC
Sample No. S12204L
Model No. PIANO 1
Spectral Data Over Visible Wavelengths



RESULTS OF TESTS (cont'd)

Photometric Measurements at 25°C – Integrating Sphere Method

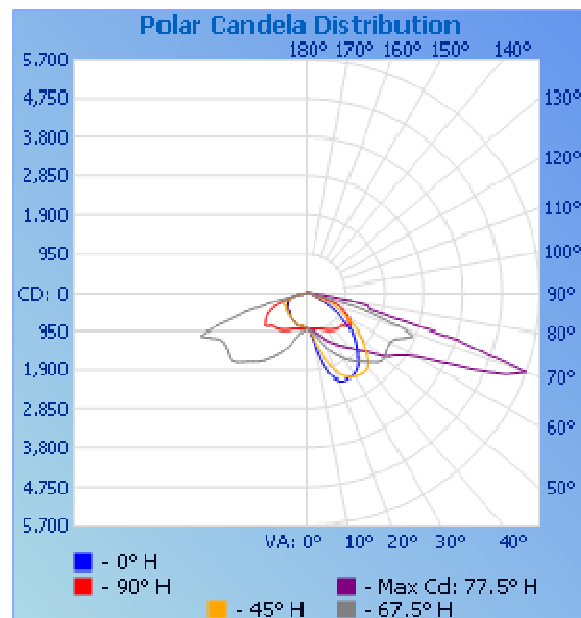
Intertek Sample No.	Correlated Color		CRI -Ra	CRI -R9	Duv	Current ATHD (%)	CIE 31' Chromaticity Coordinate	CIE 31' Chromaticity Coordinate	CIE 76' Chromaticity Coordinate	CIE 76' Chromaticity Coordinate
	Temperature (K)						(x)	(y)	(u')	(v')
PIANO 1										
S12204L	4268		68.9	-23.3	0.003	6.00	0.371	0.377	0.219	0.500

Photometric and Electrical Measurements – Distribution Method

Intertek Sample No.	Base Orientation	Input Voltage (Vac)	Input Current (mA)	Input Power (Watts)	Input Power Factor	Absolute Luminous Flux (Lumens)	Lumen Efficacy (Lumens Per Watt)
PIANO 1							
S12204L	UP	120.0	526.8	62.90	0.996	5405	85.93

Intensity (Candlepower) Summary at 25°C - Candelas

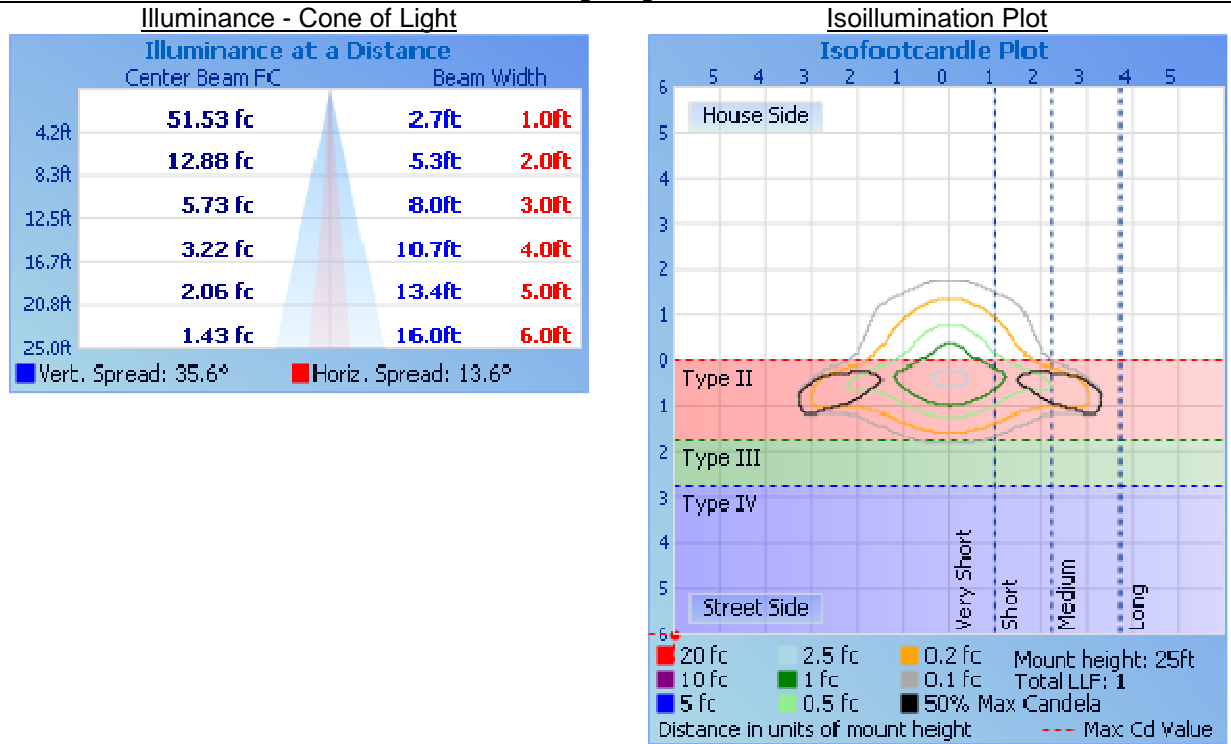
Angle	0	22.5	45	67.5	90
PIANO 1					
0	895	895	895	895	895
5	1047	1037	1001	946	898
10	1518	1455	1278	1044	911
15	2023	1957	1674	1221	924
20	2301	2270	2035	1453	956
25	2351	2383	2268	1668	1009
30	2288	2356	2368	1863	1072
35	2149	2262	2379	2058	1121
40	1896	1988	2320	2214	1155
45	1650	1719	2028	2420	1171
50	1364	1414	1702	2468	1290
55	977	1056	1373	2396	1257
60	602	715	1032	2381	1165
65	285	406	609	2626	974
70	172	197	248	2366	680
75	84	125	146	915	250
80	34	57	46	91	81
85	9	10	10	18	18
90	0	0	0	0	0



RESULTS OF TESTS (cont'd)

Illumination Plots

Model No.: PIANO 1
Mounting Height: 25 ft.



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
PIANO 1		
0-30	1083	20.0
0-40	1972	36.5
0-60	4000	74.0
60-90	1405	26.0
0-90	5405	100.0
90-180	0.0	0.0
0-180	5405	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
PIANO 1		
0-10	92.7	1.7
10-20	345.6	6.4
20-30	644.5	11.9
30-40	889.5	16.5
40-50	1018	18.8
50-60	1010	18.7
60-70	945.0	17.5
70-80	424.0	7.8
80-90	35.5	0.7



RESULTS OF TESTS (cont'd)

BUG Rating (Backlight, Uplight, Glare)

<u>Zone</u>	<u>Total Lumens</u>	<u>Frontlight Category</u>	<u>Frontlight Lumens</u>	<u>Backlight Category</u>	<u>Backlight Lumens</u>	<u>Uplight Category</u>	<u>Uplight Lumens</u>
<u>PIANO 1</u>							
0-30	1082	FL	742	BL	340	--	--
30-60	2918	FM	2096	BM	822	--	--
60-80	1369	FH	934	BH	435	--	--
80-90	35	FVH	24	BVH	11	--	--
90-100	0					UL	0
100-180	0					UH	0

Backlight Rating: B 1

Uplight Rating: U 1

Glare Rating: G 1

Picture (not to scale)



CONCLUSION

The results tabulated in this report are representative of the actual test samples submitted for this report only. The data is provided to the client for further evaluation. Compliance to the referenced specification requirements was not determined in this report.

In Charge Of Tests:



Kenda Branch
Engineer
Lighting Division

Attachment: None

Report Reviewed By:



Jeffery Davis
Senior Associate Engineer
Lighting Division