REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G102406056 Date: December 28, 2015

REPORT NO. 102406056LAX-006

TEST OF ONE VIVID 4000K 95CRI 7.5W 10 DEGREE

MODEL NO. SM16GW-07-10D-940-03-S3

RENDERED TO

SORAA INC
6500 KAISER DR
FREMONT, CA 94555-3661

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

STATEMENT OF LIMITATION: This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00660665.

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: Electrical and Photometric Measurements of Solid State Lighting

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number SM16GW-07-10D-940-03-S3. The sample was received by Intertek on December 18, 2015, in undamaged condition and one sample was tested as received. The sample designation was LAN1512180812-006.

DATES OF TESTS: December 22, 2015 through December 23, 2015.

SUMMARY

Model No.:	SM16GW-07-10D-940-03-S3
Description:	Vivid 4000K 95CRI 7.5W 10 degree

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	417.0	435.0
Total Power (W)	7.670	7.661
Luminaire Efficacy (LPW)	54.37	56.78

Criteria	Result
Power Factor	0.761
Current ATHD %	41.18
Correlated Color Temperature (CCT - K)	3888
Color Rendering Index (CRI - Ra)	95.8
Color Rendering Index (CRI - R9)	94.8
DUV	0.000
Chromaticity Coordinate (x)	0.386
Chromaticity Coordinate (y)	0.380
Chromaticity Coordinate (u')	0.227
Chromaticity Coordinate (v')	0.504

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
LapSphere 3M Integrating Sphere	CA-11821-LRT	000830	11/30/15	12/30/15
LabSphere Spectrometer	CDS-3020	000834	11/30/15	12/30/15
California Instruments Power Supply	CSW5550	001339	VBU	VBU
Yokogawa Power Meter	WT333	001320	06/03/15	06/03/16
Extech Instruments Stop Watch	365510	001379	11/19/15	11/19/16
Temperature Humidity Meter	971	001180	05/26/15	05/26/16
DC Power Supply	LPS-100-0833	000836	05/07/15	05/07/16
LSI High Speed Mirror Goniometer	6440T	000943	12/07/15	01/07/16
Elgar Power Supply	CW1251	000944	VBU	VBU
Yokogawa Power Analyzer	WT210	000945	12/04/15	12/04/16
Temperature Humidity Meter	971	001180	05/26/15	05/26/16
Extech Instruments Stop Watch	9/23/2900	001379	11/19/15	11/19/16
Tape Measure	C1-25	000915	12/04/15	12/04/16

TEST METHODS

Seasoning in Sample Orientation – LED Products

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

Photometric and Electrical Measurements – Integrating Sphere Method

A Labsphere CDS 3020 Spectrometer and Three Meter 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 Yokogawa Power Analyzer.

The calibration of the sphere spectrometer system is traceable to the National Institute of Standards and Technology.

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 Yokogawa Power Analyzer.

Some graphics were created with Photometrics Plus software.

RESULTS OF TEST

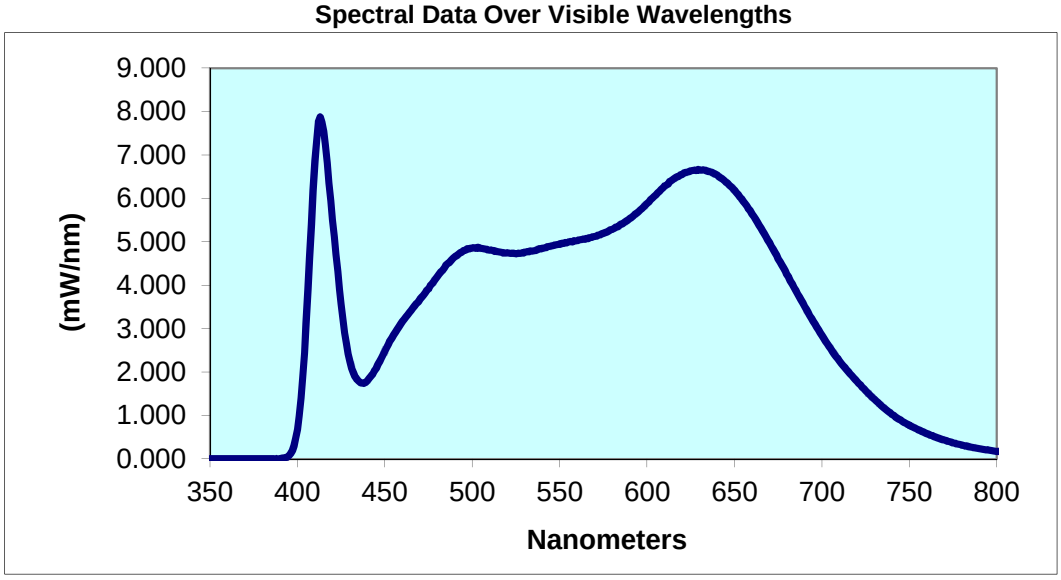
Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) - Integrating Sphere Method

Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1512180812-006	UP	230.0	43.83	7.670	0.761	41.18	417.0	54.37

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3888	95.8	94.8	0.000	0.386	0.380	0.227	0.504

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.000	440	1.803	530	4.760	620	6.558	710	2.253
355	0.000	445	2.091	535	4.793	625	6.634	715	2.009
360	0.000	450	2.482	540	4.853	630	6.654	720	1.782
365	0.000	455	2.856	545	4.905	635	6.624	725	1.574
370	0.000	460	3.172	550	4.948	640	6.541	730	1.371
375	0.000	465	3.422	555	4.996	645	6.377	735	1.190
380	0.000	470	3.673	560	5.027	650	6.176	740	1.028
385	0.000	475	3.922	565	5.075	655	5.930	745	0.891
390	0.005	480	4.201	570	5.127	660	5.644	750	0.777
395	0.073	485	4.466	575	5.196	665	5.319	755	0.673
400	0.679	490	4.658	580	5.290	670	4.976	760	0.584
405	3.122	495	4.798	585	5.404	675	4.610	765	0.505
410	6.869	500	4.856	590	5.538	680	4.248	770	0.433
415	7.541	505	4.854	595	5.693	685	3.880	775	0.372
420	5.508	510	4.805	600	5.883	690	3.515	780	0.321
425	3.569	515	4.768	605	6.084	695	3.169		
430	2.237	520	4.748	610	6.289	700	2.841		
435	1.790	525	4.725	615	6.444	705	2.534		



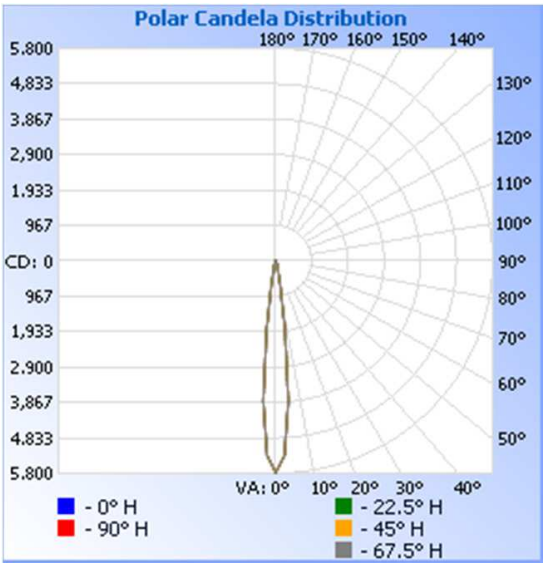
RESULTS OF TEST (cont'd)

Photometric and Electrical Measurements at Ambient Temperature (25°C +/- 1°C) – 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)
LAN1512180812-006	UP	300.0	43.80	7.661	0.760	435.0	56.78

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	5776	5776	5776	5776	5776
5	3840	3840	3840	3840	3840
10	702	702	702	702	702
15	205	205	205	205	205
20	100	100	100	100	100
25	69	69	69	69	69
30	52	52	52	52	52
35	43	43	43	43	43
40	29	29	29	29	29
45	22	22	22	22	22
50	16	16	16	16	16
55	17	17	17	17	17
60	15	15	15	15	15
65	14	14	14	14	14
70	14	14	14	14	14
75	10	10	10	10	10
80	6	6	6	6	6
85	3	3	3	3	3
90	2	2	2	2	2

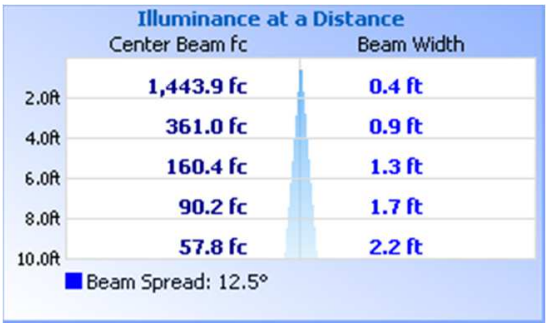


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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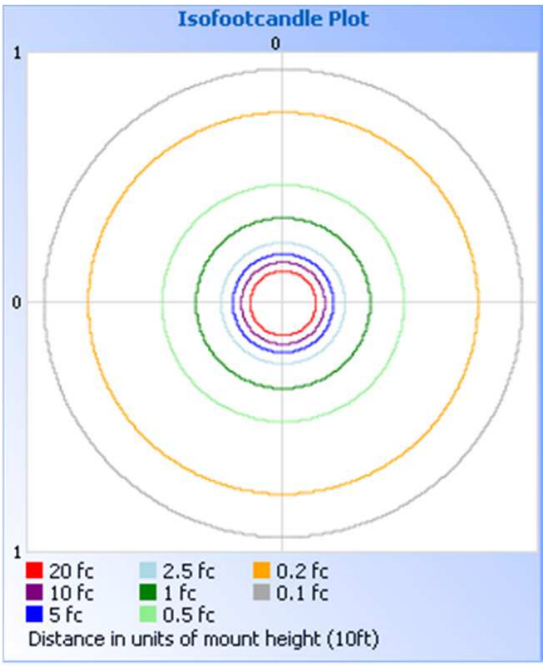

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	348.1	80.0
0-40	374.7	86.1
0-60	406.3	93.4
60-90	28.4	6.5
0-90	434.7	99.9
90-180	0.3	0.1
0-180	435.0	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	247.8	57.0
10-20	67.8	15.6
20-30	32.5	7.5
30-40	26.5	6.1
40-50	17.2	3.9
50-60	14.4	3.3
60-70	13.9	3.2
70-80	10.2	2.3
80-90	4.3	1.0
90-100	0.3	0.1

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:

Ameet Alawi
Technician
Lighting Division

Report Reviewed By:

Kenda Branch
Lighting Performance Team Lead
Lighting Division

Attachment: None