REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G102406056 Date: January 11, 2016

REPORT NO. 102406056LAX-018

TEST OF ONE BRILLIANT 3000K 80CRI 7.5W 60 DEGREE

MODEL NO. SM16GW-07-60D-830-03-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-07-60D-830-03-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 LAN1512180812-008.

DATES OF TESTS: January 6, 2016 through January 7, 2016.

SUMMARY

Model No.:	SM16GW-07-60D-830-03-S3
Description:	Brilliant 3000K 80CRI 7.5W 60 degree

	Result	
Criteria	Sphere	Goniometer
Total Lumen Output (Lumens)	489.9	497.5
Total Power (W)	7.740	7.745
Luminaire Efficacy (LPW)	63.29	64.23

Criteria	Result
Power Factor	0.760
Current ATHD %	41.19
Correlated Color Temperature (CCT - K)	2882
Color Rendering Index (CRI - Ra)	85.4
Color Rendering Index (CRI - R9)	16.7
DUV	0.001
Chromaticity Coordinate (x)	0.444
Chromaticity Coordinate (y)	0.404
Chromaticity Coordinate (u')	0.255
Chromaticity Coordinate (v')	0.523

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date
LapSphere 3M Integrating Sphere	CA-11821-LRT	000830	01/04/16	02/04/16
LabSphere Spectrometer	CDS-3020	000834	01/04/16	02/04/16
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	11/16/16
Temp & HR Meter	971	001178	12/18/15	12/18/16
DC Power Supply	LPS-100-0833	000836	05/07/15	05/07/16
LSI High Speed Mirror Goniometer	6440T	000943	01/07/16	02/07/16
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

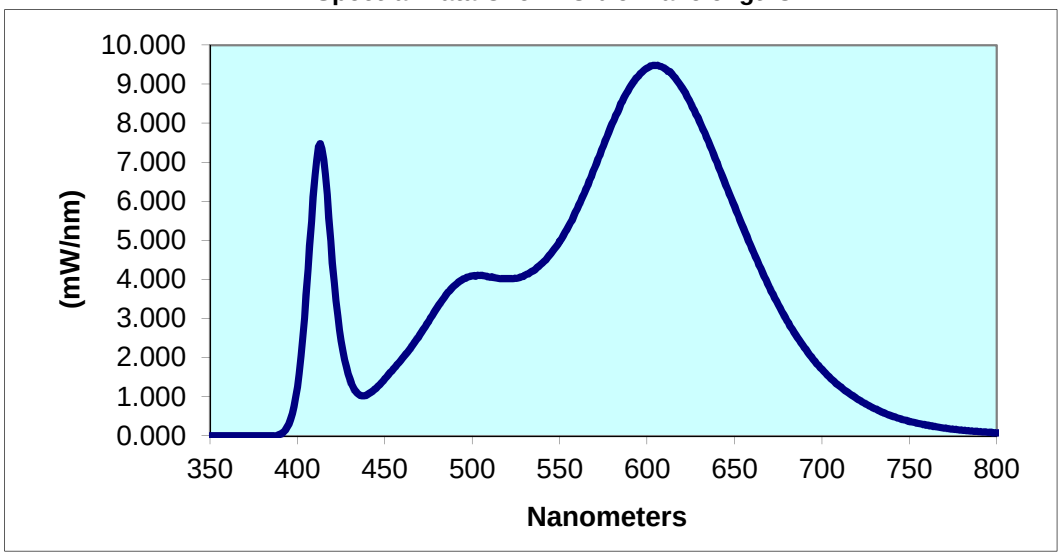
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)	Luminous Flux (Lumens)	Lumen Efficacy (LPW)
LAN1512180812-008	UP	230.0	44.28	7.740	0.760	41.19	489.9	63.29

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')
2882	85.4	16.7	0.001	0.444	0.404	0.255	0.523

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.001	440	1.061	530	4.113	620	8.901	710	1.276
355	0.001	445	1.220	535	4.230	625	8.505	715	1.104
360	0.001	450	1.468	540	4.421	630	8.041	720	0.953
365	0.001	455	1.719	545	4.671	635	7.534	725	0.824
370	0.001	460	1.993	550	4.978	640	6.994	730	0.701
375	0.001	465	2.271	555	5.367	645	6.416	735	0.599
380	0.001	470	2.590	560	5.807	650	5.864	740	0.513
385	0.001	475	2.930	565	6.317	655	5.317	745	0.439
390	0.039	480	3.292	570	6.870	660	4.787	750	0.373
395	0.302	485	3.610	575	7.427	665	4.275	755	0.321
400	1.255	490	3.858	580	7.986	670	3.791	760	0.275
405	3.609	495	4.024	585	8.503	675	3.356	765	0.235
410	6.686	500	4.096	590	8.915	680	2.948	770	0.201
415	7.072	505	4.107	595	9.209	685	2.581	775	0.172
420	4.423	510	4.066	600	9.414	690	2.251	780	0.148
425	2.431	515	4.033	605	9.478	695	1.958		
430	1.448	520	4.021	610	9.408	700	1.704		
435	1.062	525	4.030	615	9.220	705	1.471		

Spectral Data Over Visible Wavelengths



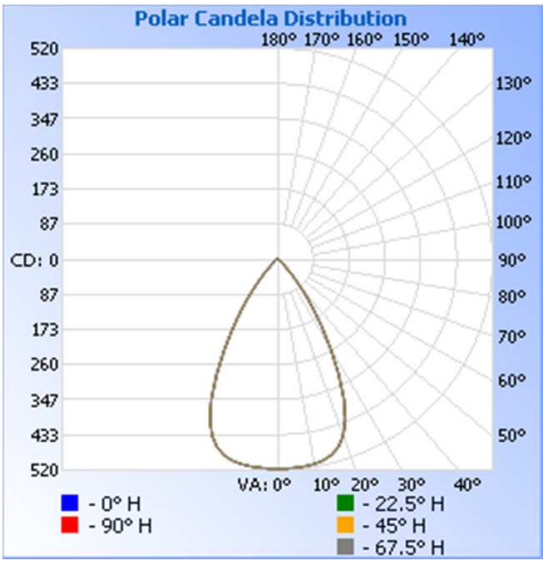
RESULTS OF TEST (cont'd)

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)
LAN1512180812-008	UP	230.0	44.40	7.745	0.759	497.5	64.23

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	516	516	516	516	516
5	513	513	513	513	513
10	509	509	509	509	509
15	497	497	497	497	497
20	461	461	461	461	461
25	375	375	375	375	375
30	253	253	253	253	253
35	152	152	152	152	152
40	77	77	77	77	77
45	32	32	32	32	32
50	15	15	15	15	15
55	10	10	10	10	10
60	7	7	7	7	7
65	5	5	5	5	5
70	4	4	4	4	4
75	3	3	3	3	3
80	2	2	2	2	2
85	1	1	1	1	1
90	0	0	0	0	0

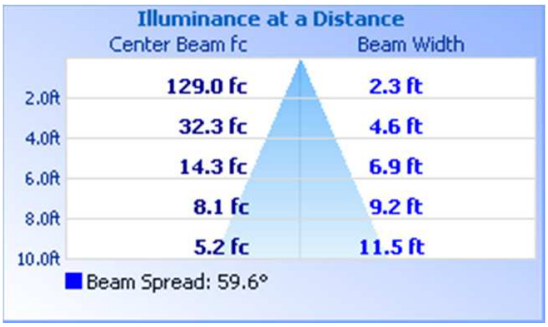


RESULTS OF TEST (cont'd)

Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



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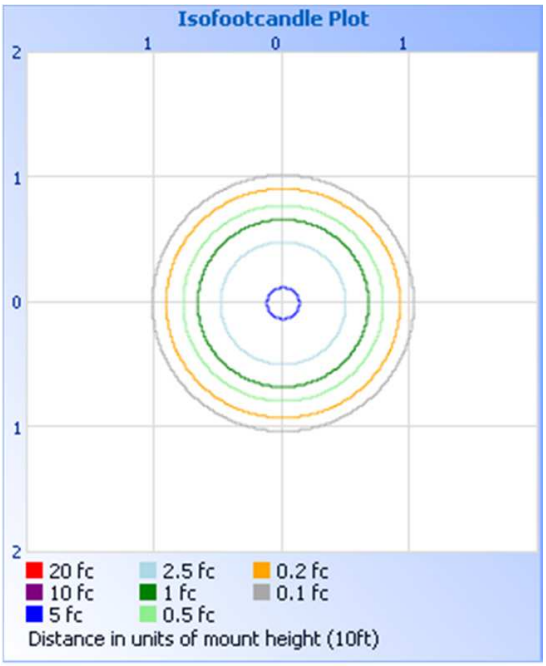

Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	354.7	71.3
0-40	450.8	90.6
0-60	488.4	98.2
60-90	9.2	1.8
0-90	497.5	100.0
90-180	0.0	0.0
0-180	497.5	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	48.9	9.8
10-20	138.8	27.9
20-30	167.0	33.6
30-40	96.1	19.3
40-50	28.5	5.7
50-60	9.1	1.8
60-70	5.4	1.1
70-80	3.0	0.6
80-90	0.8	0.2

Flood Summary at 25°C

	Efficiency (%)	Lumens	Horizontal Spread (°)	Vertical Spread (°)
Field 10%	93.1	463.0	84.8	84.8
Beam 50%	70.6	351.2	59.6	59.6
Total	100.0	497.6		

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
Lighting Performance Team Leac
Lighting Division

Report Reviewed By:

Timothy Quigley
Engineer
Lighting Division

Attachment: None