REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G103858894 Date: March 13, 2019

REPORT NO. 103858894LAX-001

TEST OF ONE DL RGL H/H 35K 4'

MODEL NO. DL- RGL- H/H- 35K- 4' (DOBLE-LED REGRESSED LENS)
LED MODEL NO. OSRAM SYLVANIA
DRIVER MODEL NO. OSRAM SYLVANIA

RENDERED TO

PRIMUS LIGHTING INC
3570 LEXINGTON AVE
EL MONTE, CA 91731

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

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00958862-6.

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

ANSI NEMA ANSLG C78.377: 2015: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number DL- RGL- H/H- 35K- 4' (DOBLE-LED REGRESSED LENS). The sample was received by Intertek on March 5, 2019, in undamaged condition and one sample was tested as received. The sample designation was LAN1903051054-001A.

DATES OF TESTS: March 7, 2019 through March 8, 2019.

SUMMARY

Model No.: DL- RGL- H/H- 35K- 4' (DOBLE-LED REGRESSED LENS)
Description: DL RGL H/H 35K 4'

Criteria	Result
Total Lumen Output (Lumens)	8652
Total Power (W)	109.2
Luminaire Efficacy (LPW)	79.23
Power Factor at 120Vac	0.998
Power Factor at 277Vac	0.978
Current ATHD % at 120Vac	5.92
Current ATHD % at 277Vac	12.20
Correlated Color Temperature (CCT - K)	3461
Color Rendering Index (CRI - Ra)	81.7
Color Rendering Index (CRI - R9)	9.7
DUV	0.001
Chromaticity Coordinate (x)	0.407
Chromaticity Coordinate (y)	0.390
Chromaticity Coordinate (u')	0.237
Chromaticity Coordinate (v')	0.511

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Goniophotometer	6440T	000943	VBU	VBU	03/07/19
AC Source	CW1251P	000944	VBU	VBU	03/07/19
Power Analyzer	WT210	000945	11/28/18	11/28/19	03/07/19
Tape Measure	33-428	001491	04/24/18	04/24/19	03/07/19
Magnetic Level	581-9	001610	10/31/18	10/31/19	03/07/19
Thermometer	DPi8-C24	001782	09/21/18	09/21/19	03/07/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/07/19
3m Sphere	CSTM-LMS-3M-3020	000830	VBU	VBU	03/08/19
Spectrometer	CDS-3020-T	000834	VBU	VBU	03/08/19
Power Supply (AC 3P / DC)	CSW5550-208-LAN	001339	VBU	VBU	03/08/19
Power Meter	WT330	001319	08/13/18	08/13/19	03/08/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/08/19
DC Power Supply	LPS-100-0833	000832	01/31/19	01/31/20	03/08/19
Network TC Reader	iSD-TC	000824	02/01/19	02/01/20	03/08/19

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 Model CDS-3020 High Sensitivity Multi Channel Spectrometer and Two Meter or 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 Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer 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 Xitron or 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

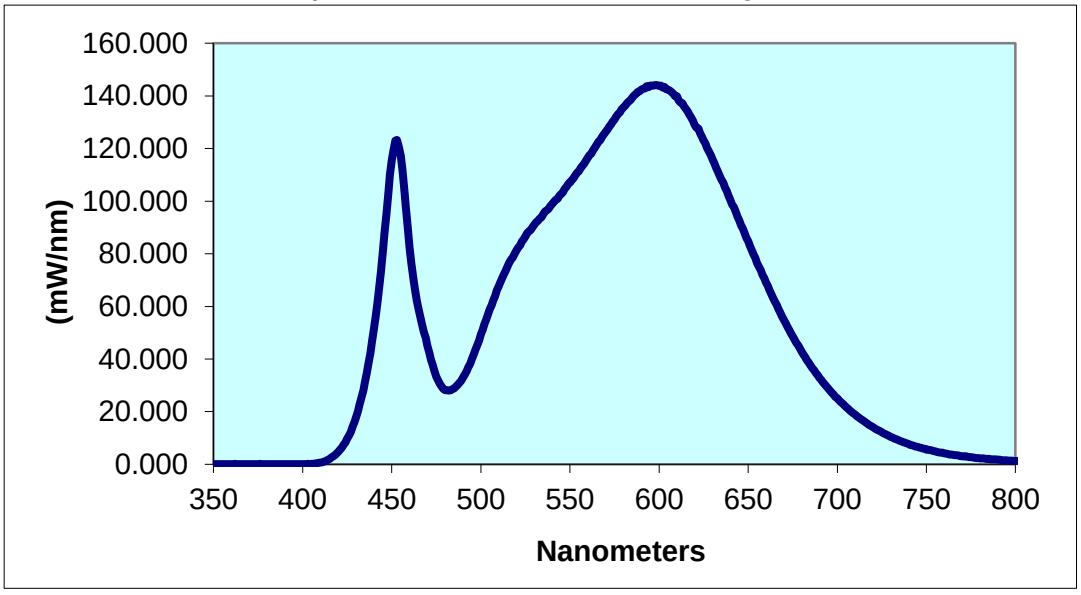
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)
LAN1903051054-001A	Up	120.0	918.5	110.0	0.998	5.92
		276.9	398.5	108.0	0.978	12.20

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3461	81.7	9.7	0.001	0.407	0.390	0.237	0.511

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.000	440	51.45	530	91.02	620	129.1	710	18.85
355	0.000	445	80.99	535	94.98	625	123.1	715	16.29
360	0.000	450	115.8	540	98.94	630	115.9	720	14.09
365	0.000	455	117.2	545	102.7	635	108.1	725	12.18
370	0.000	460	82.75	550	107.2	640	100.4	730	10.35
375	0.000	465	59.33	555	111.3	645	92.58	735	8.956
380	0.000	470	45.08	560	116.4	650	84.65	740	7.706
385	0.000	475	33.21	565	121.4	655	76.59	745	6.611
390	0.000	480	28.13	570	126.4	660	69.10	750	5.683
395	0.000	485	28.87	575	131.1	665	61.87	755	4.880
400	0.031	490	32.87	580	135.7	670	54.91	760	4.201
405	0.144	495	39.93	585	139.4	675	48.54	765	3.595
410	0.628	500	49.25	590	142.4	680	42.77	770	3.086
415	1.981	505	58.89	595	143.9	685	37.65	775	2.734
420	4.735	510	67.68	600	143.9	690	32.89	780	2.272
425	9.636	515	75.33	605	142.4	695	28.69		
430	17.84	520	81.40	610	139.9	700	25.04		
435	31.26	525	86.51	615	135.0	705	21.68		

Spectral Data Over Visible Wavelengths



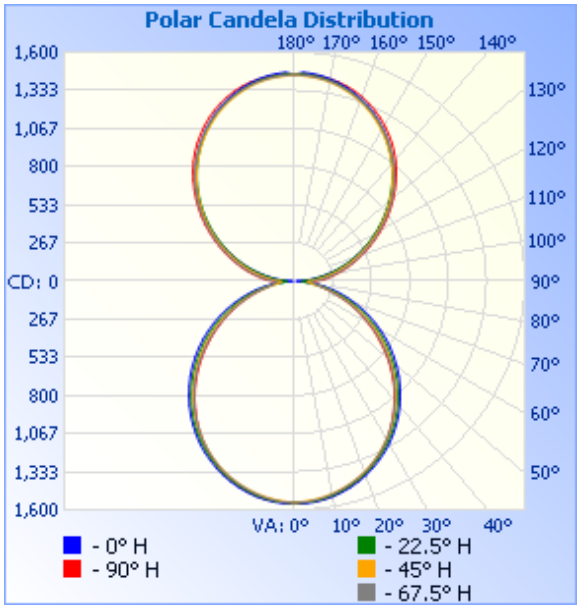
RESULTS OF TEST (cont'd)

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 (LPW)
LAN1903051054-001A	Up	120.0	911.7	109.2	0.998	8652	79.23

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	1549	1549	1549	1549	1549
5	1551	1544	1535	1540	1545
10	1529	1521	1509	1513	1524
15	1493	1483	1469	1473	1485
20	1445	1433	1418	1421	1432
25	1384	1371	1354	1356	1363
30	1314	1297	1278	1278	1280
35	1230	1213	1191	1188	1185
40	1137	1116	1093	1088	1080
45	1035	1011	986	977	968
50	927	897	871	858	848
55	812	779	751	733	723
60	693	656	626	606	598
65	570	533	499	479	474
70	445	408	373	358	355
75	326	286	254	244	246
80	209	168	146	159	174
85	100	71	102	132	143
90	13	52	95	128	138
95	92	118	170	209	223
100	194	204	248	285	298
105	302	305	338	372	383
110	414	413	437	467	477
115	527	524	543	567	577
120	641	636	651	672	682
125	754	747	760	778	790
130	864	855	863	882	894
135	967	958	962	980	996
140	1063	1054	1054	1071	1093
145	1150	1141	1139	1153	1178
150	1229	1219	1214	1227	1253
155	1298	1287	1280	1291	1319
160	1355	1344	1335	1344	1371
165	1401	1389	1380	1387	1410
170	1436	1422	1413	1418	1434
175	1456	1443	1433	1437	1445
180	1447	1447	1447	1447	1447

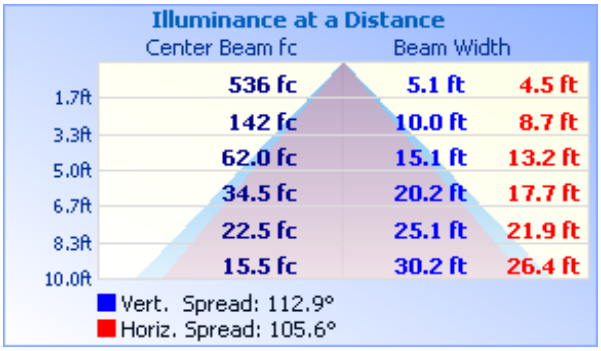


RESULTS OF TEST (cont'd)

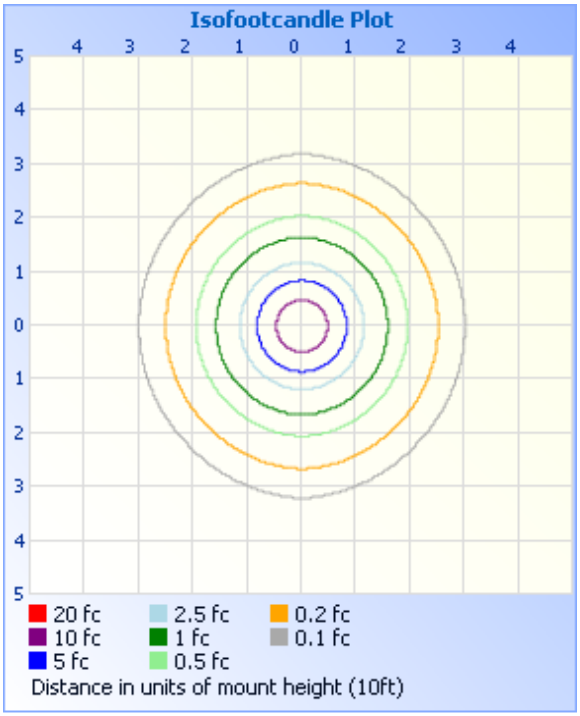
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	1192	13.8
0-40	1942	22.4
0-60	3384	39.1
60-90	912.4	10.5
0-90	4297	49.7
90-180	4356	50.3
0-180	8652	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	146.3	1.7
10-20	417.1	4.8
20-30	628.0	7.3
30-40	750.0	8.7
40-50	766.2	8.9
50-60	676.8	7.8
60-70	502.9	5.8
70-80	285.0	3.3
80-90	124.5	1.4
90-100	180.5	2.1
100-110	359.9	4.2
110-120	541.4	6.3
120-130	683.0	7.9
130-140	748.2	8.6
140-150	718.6	8.3
150-160	594.9	6.9
160-170	392.2	4.5
170-180	136.9	1.6

PICTURES (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:

Vladimir Kozak
Engineering Supervisor
Lighting Division

Report Reviewed By:

Erik Linares
Associate Engineer
Lighting Division

Attachment: None

REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G103858894 Date: March 13, 2019

REPORT NO. 103858894LAX-002

TEST OF ONE DL FRL H/H 35K 4'

MODEL NO. DL- FRL- H/H- 35K- 4' (DOBLE-LED FRL LENS)
LED MODEL NO. OSRAM SYLVANIA
DRIVER MODEL NO. OSRAM SYLVANIA

RENDERED TO

PRIMUS LIGHTING INC
3570 LEXINGTON AVE
EL MONTE, CA 91731

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

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00958862-6.

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

ANSI NEMA ANSLG C78.377: 2015: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number DL- FRL- H/H- 35K- 4' (DOBLE-LED FRL LENS). The sample was received by Intertek on March 5, 2019, in undamaged condition and one sample was tested as received. The sample designation was LAN1903051054-001B.

DATES OF TESTS: March 7, 2019 through March 8, 2019.

SUMMARY

Model No.:	DL- FRL- H/H- 35K- 4' (DOBLE-LED FRL LENS)
Description:	DL FRL H/H 35K 4'

Criteria	Result
Total Lumen Output (Lumens)	8191
Total Power (W)	109.1
Luminaire Efficacy (LPW)	75.08
Power Factor at 120Vac	0.998
Power Factor at 277Vac	0.978
Current ATHD % at 120Vac	5.92
Current ATHD % at 277Vac	12.20
Correlated Color Temperature (CCT - K)	3454
Color Rendering Index (CRI - Ra)	81.6
Color Rendering Index (CRI - R9)	9.6
DUV	0.001
Chromaticity Coordinate (x)	0.407
Chromaticity Coordinate (y)	0.391
Chromaticity Coordinate (u')	0.237
Chromaticity Coordinate (v')	0.511

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Goniophotometer	6440T	000943	VBU	VBU	03/07/19
AC Source	CW1251P	000944	VBU	VBU	03/07/19
Power Analyzer	WT210	000945	11/28/18	11/28/19	03/07/19
Tape Measure	33-428	001491	04/24/18	04/24/19	03/07/19
Magnetic Level	581-9	001610	10/31/18	10/31/19	03/07/19
Thermometer	DPi8-C24	001782	09/21/18	09/21/19	03/07/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/07/19
3m Sphere	CSTM-LMS-3M-3020	000830	VBU	VBU	03/08/19
Spectrometer	CDS-3020-T	000834	VBU	VBU	03/08/19
Power Supply (AC 3P / DC)	CSW5550-208-LAN	001339	VBU	VBU	03/08/19
Power Meter	WT330	001319	08/13/18	08/13/19	03/08/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/08/19
DC Power Supply	LPS-100-0833	000832	01/31/19	01/31/20	03/08/19
Network TC Reader	iSD-TC	000824	02/01/19	02/01/20	03/08/19

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 Model CDS-3020 High Sensitivity Multi Channel Spectrometer and Two Meter or 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 Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer 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 Xitron or 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

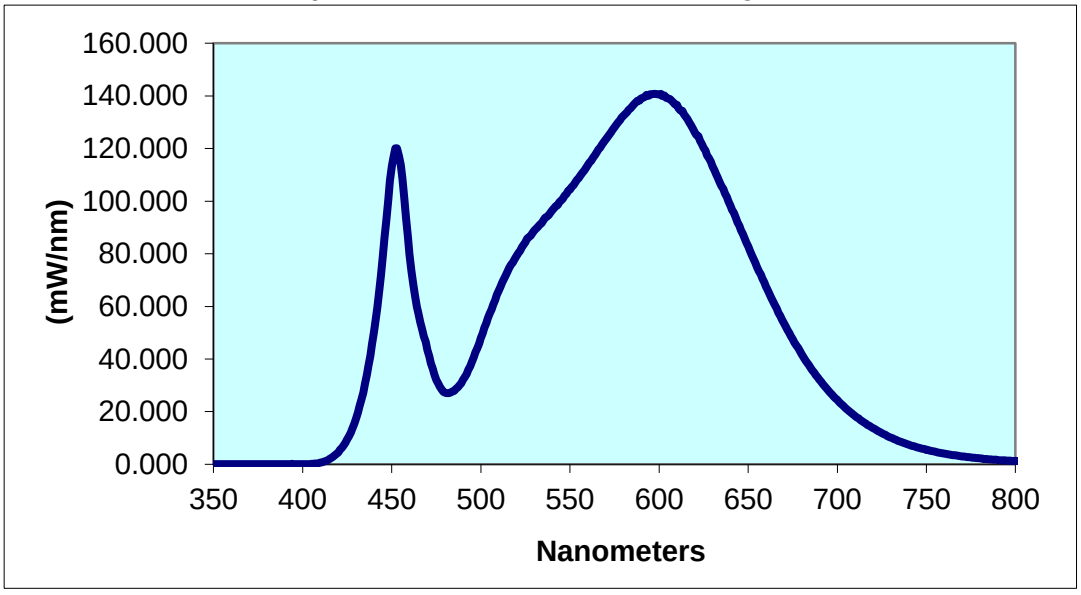
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)
LAN1903051054-001B	Up	120.0	918.5	110.0	0.998	5.92
		276.9	398.5	108.0	0.978	12.20

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3454	81.6	9.6	0.001	0.407	0.391	0.237	0.511

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.000	440	50.15	530	88.85	620	126.3	710	18.34
355	0.000	445	79.37	535	92.64	625	120.4	715	15.89
360	0.000	450	113.2	540	96.48	630	113.3	720	13.73
365	0.000	455	113.7	545	100.3	635	105.8	725	11.86
370	0.000	460	79.86	550	104.5	640	98.29	730	10.14
375	0.000	465	57.34	555	108.8	645	90.60	735	8.698
380	0.017	470	43.50	560	113.6	650	82.72	740	7.491
385	0.000	475	32.07	565	118.6	655	74.94	745	6.405
390	0.000	480	27.21	570	123.4	660	67.56	750	5.521
395	0.000	485	27.93	575	128.1	665	60.52	755	4.736
400	0.000	490	32.06	580	132.5	670	53.63	760	4.084
405	0.128	495	38.87	585	136.1	675	47.47	765	3.467
410	0.634	500	47.95	590	139.0	680	41.79	770	2.993
415	1.943	505	57.37	595	140.6	685	36.76	775	2.557
420	4.564	510	65.98	600	140.5	690	32.16	780	2.215
425	9.391	515	73.44	605	139.1	695	27.97		
430	17.35	520	79.26	610	136.7	700	24.44		
435	30.58	525	84.27	615	132.0	705	21.14		

Spectral Data Over Visible Wavelengths



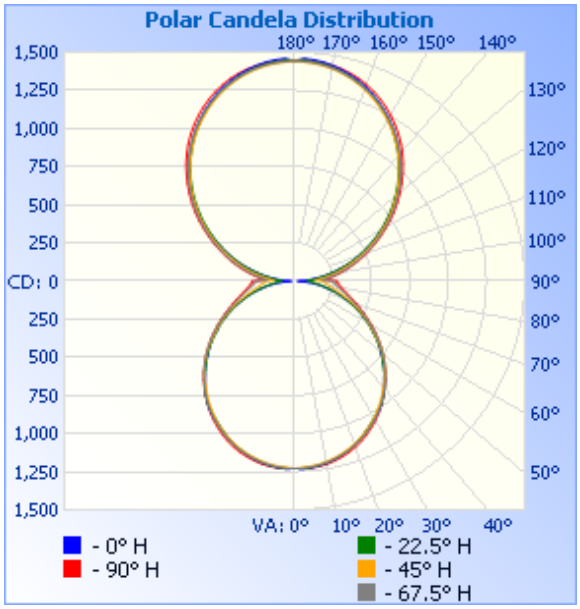
RESULTS OF TEST (cont'd)

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 (LPW)
LAN1903051054-001B	Up	120.0	911.3	109.1	0.998	8191	75.08

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	1228	1228	1228	1228	1228
5	1228	1225	1218	1223	1228
10	1210	1207	1201	1207	1218
15	1181	1178	1174	1181	1192
20	1142	1140	1137	1146	1158
25	1093	1092	1091	1101	1111
30	1041	1035	1035	1047	1053
35	985	984	972	984	987
40	908	911	901	914	914
45	828	823	832	836	836
50	738	741	752	753	753
55	652	648	655	665	666
60	561	555	564	577	580
65	464	457	474	491	497
70	362	361	387	414	426
75	270	271	309	352	368
80	179	189	250	304	323
85	94	130	210	270	291
90	21	102	190	256	278
95	92	118	170	209	223
100	194	204	248	285	298
105	302	305	338	372	383
110	414	413	437	467	477
115	527	524	543	567	577
120	641	636	651	672	682
125	754	747	760	778	790
130	864	855	863	882	894
135	967	958	962	980	996
140	1063	1054	1054	1071	1093
145	1150	1141	1139	1153	1178
150	1229	1219	1214	1227	1253
155	1298	1287	1280	1291	1319
160	1355	1344	1335	1344	1371
165	1401	1389	1380	1387	1410
170	1436	1422	1413	1418	1434
175	1456	1443	1433	1437	1445
180	1447	1447	1447	1447	1447

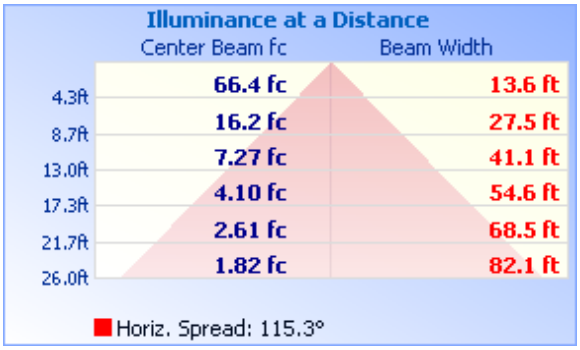


RESULTS OF TEST (cont'd)

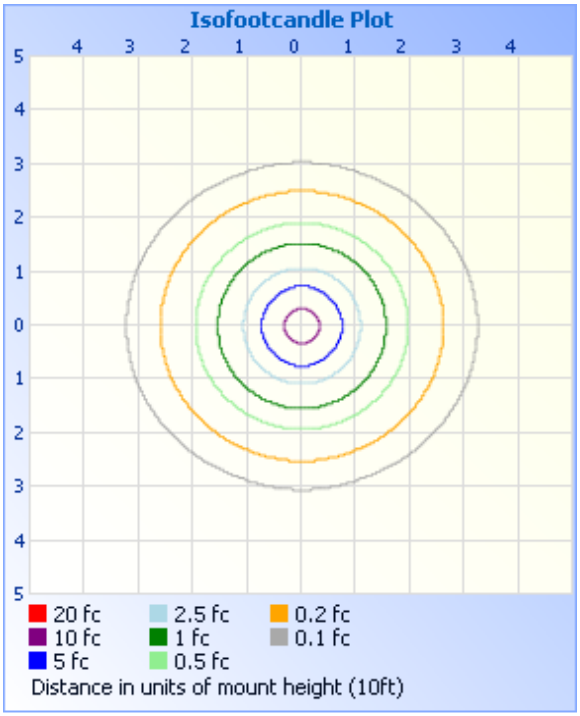
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	954.4	11.7
0-40	1568	19.1
0-60	2796	34.1
60-90	1028	12.5
0-90	3824	46.7
90-180	4367	53.3
0-180	8191	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	116.2	1.4
10-20	332.9	4.1
20-30	505.2	6.2
30-40	613.2	7.5
40-50	640.8	7.8
50-60	587.5	7.2
60-70	471.8	5.8
70-80	332.7	4.1
80-90	223.1	2.7
90-100	192.4	2.3
100-110	359.9	4.4
110-120	541.4	6.6
120-130	683.0	8.3
130-140	748.2	9.1
140-150	718.6	8.8
150-160	594.9	7.3
160-170	392.2	4.8
170-180	136.9	1.7

PICTURES (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:

Vladimir Kozak
Engineering Supervisor
Lighting Division

Report Reviewed By:

Erik Linares
Associate Engineer
Lighting Division

Attachment: None

REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G103858894 Date: March 13, 2019

REPORT NO. 103858894LAX-003

TEST OF ONE DL RLR H/H 35K 4'

MODEL NO. DL- RLR- H/H- 35K- 4' (DOBLE-LED RLR LENS)
LED MODEL NO. OSRAM SYLVANIA
DRIVER MODEL NO. OSRAM SYLVANIA

RENDERED TO

PRIMUS LIGHTING INC
3570 LEXINGTON AVE
EL MONTE, CA 91731

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

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00958862-6.

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

ANSI NEMA ANSLG C78.377: 2015: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number DL- RLR- H/H- 35K- 4' (DOBLE-LED RLR LENS). The sample was received by Intertek on March 5, 2019, in undamaged condition and one sample was tested as received. The sample designation was LAN1903051054-001C.

DATES OF TESTS: March 7, 2019 through March 8, 2019.

SUMMARY

Model No.:	DL- RLR- H/H- 35K- 4' (DOBLE-LED RLR LENS)
Description:	DL RLR H/H 35K 4'

Criteria	Result
Total Lumen Output (Lumens)	8349
Total Power (W)	109.3
Luminaire Efficacy (LPW)	76.39
Power Factor at 120Vac	0.998
Power Factor at 277Vac	0.978
Current ATHD % at 120Vac	5.92
Current ATHD % at 277Vac	12.20
Correlated Color Temperature (CCT - K)	3457
Color Rendering Index (CRI - Ra)	81.6
Color Rendering Index (CRI - R9)	9.6
DUV	0.001
Chromaticity Coordinate (x)	0.407
Chromaticity Coordinate (y)	0.391
Chromaticity Coordinate (u')	0.237
Chromaticity Coordinate (v')	0.511

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Goniophotometer	6440T	000943	VBU	VBU	03/07/19
AC Source	CW1251P	000944	VBU	VBU	03/07/19
Power Analyzer	WT210	000945	11/28/18	11/28/19	03/07/19
Tape Measure	33-428	001491	04/24/18	04/24/19	03/07/19
Magnetic Level	581-9	001610	10/31/18	10/31/19	03/07/19
Thermometer	DPi8-C24	001782	09/21/18	09/21/19	03/07/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/07/19
3m Sphere	CSTM-LMS-3M-3020	000830	VBU	VBU	03/08/19
Spectrometer	CDS-3020-T	000834	VBU	VBU	03/08/19
Power Supply (AC 3P / DC)	CSW5550-208-LAN	001339	VBU	VBU	03/08/19
Power Meter	WT330	001319	08/13/18	08/13/19	03/08/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/08/19
DC Power Supply	LPS-100-0833	000832	01/31/19	01/31/20	03/08/19
Network TC Reader	iSD-TC	000824	02/01/19	02/01/20	03/08/19

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 Model CDS-3020 High Sensitivity Multi Channel Spectrometer and Two Meter or 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 Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer 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 Xitron or 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

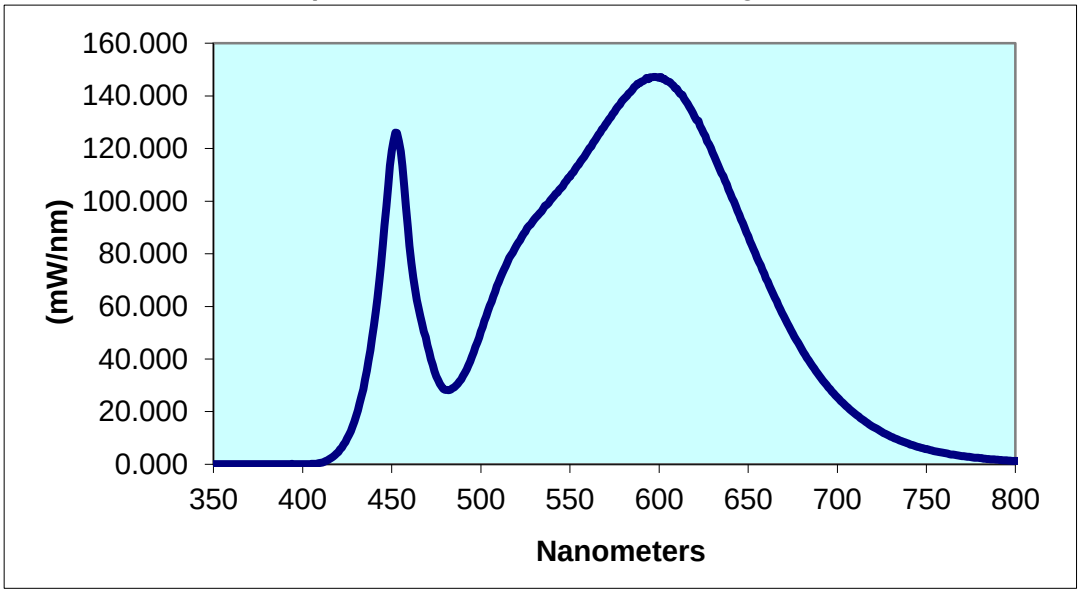
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)
LAN1903051054-001C	Up	120.0	918.5	110.0	0.998	5.92
		276.9	398.5	108.0	0.978	12.20

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3457	81.6	9.6	0.001	0.407	0.391	0.237	0.511

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.000	440	52.71	530	93.13	620	132.1	710	19.12
355	0.000	445	83.62	535	97.14	625	125.9	715	16.58
360	0.000	450	119.2	540	101.1	630	118.5	720	14.33
365	0.000	455	118.9	545	105.0	635	110.6	725	12.36
370	0.000	460	83.03	550	109.4	640	102.9	730	10.55
375	0.000	465	59.63	555	113.9	645	94.82	735	9.044
380	0.000	470	45.28	560	119.1	650	86.64	740	7.779
385	0.000	475	33.31	565	124.1	655	78.45	745	6.645
390	0.000	480	28.31	570	129.2	660	70.63	750	5.749
395	0.000	485	29.17	575	133.9	665	63.33	755	4.930
400	0.000	490	33.52	580	138.7	670	56.18	760	4.248
405	0.117	495	40.76	585	142.4	675	49.69	765	3.623
410	0.576	500	50.41	590	145.5	680	43.69	770	3.113
415	1.921	505	60.23	595	147.1	685	38.45	775	2.650
420	4.683	510	69.29	600	146.9	690	33.63	780	2.285
425	9.781	515	77.05	605	145.5	695	29.26		
430	18.13	520	83.22	610	142.8	700	25.51		
435	32.01	525	88.40	615	138.0	705	22.04		

Spectral Data Over Visible Wavelengths



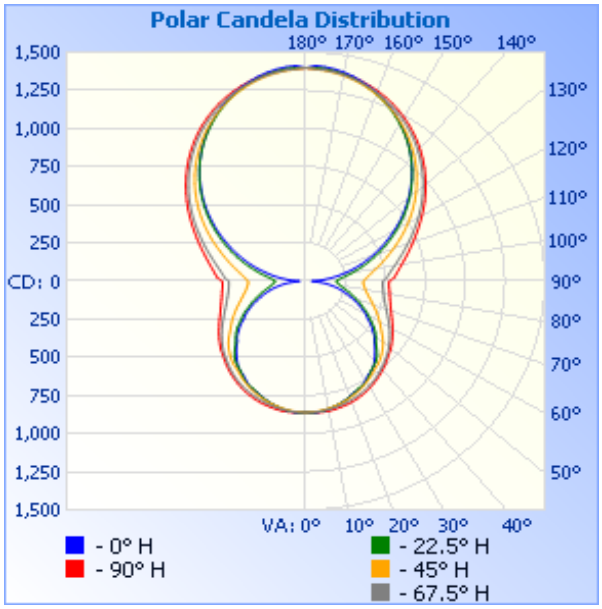
RESULTS OF TEST (cont'd)

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 (LPW)
LAN1903051054-001C	Up	120.0	912.7	109.3	0.998	8349	76.39

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	862	862	862	862	862
5	862	860	856	860	864
10	850	849	846	853	863
15	830	830	832	842	855
20	805	807	813	830	844
25	785	778	790	814	828
30	751	758	764	794	806
35	718	717	733	770	782
40	672	686	707	742	754
45	616	630	675	711	724
50	564	574	634	680	696
55	501	521	581	643	663
60	436	457	536	606	629
65	370	393	493	569	597
70	300	334	450	538	570
75	234	282	413	513	549
80	166	237	385	496	535
85	99	206	368	485	525
90	40	193	362	483	525
95	114	224	396	524	571
100	208	287	443	564	610
105	309	366	503	615	656
110	413	457	573	674	710
115	521	552	651	740	772
120	628	652	735	812	839
125	737	752	820	887	911
130	841	850	904	961	982
135	940	944	985	1033	1053
140	1032	1032	1061	1101	1120
145	1116	1114	1132	1164	1182
150	1191	1186	1196	1221	1237
155	1257	1249	1253	1272	1286
160	1312	1302	1301	1314	1326
165	1356	1345	1339	1348	1357
170	1389	1377	1368	1373	1379
175	1409	1396	1386	1389	1392
180	1398	1398	1398	1398	1398

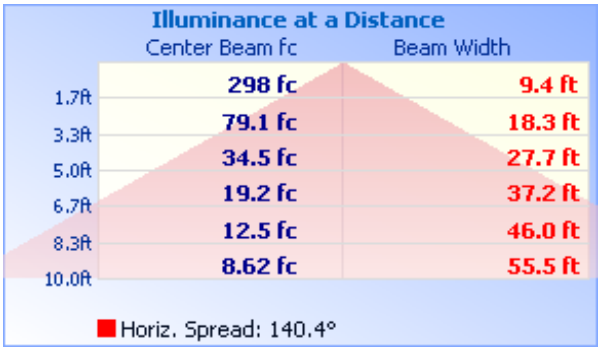


RESULTS OF TEST (cont'd)

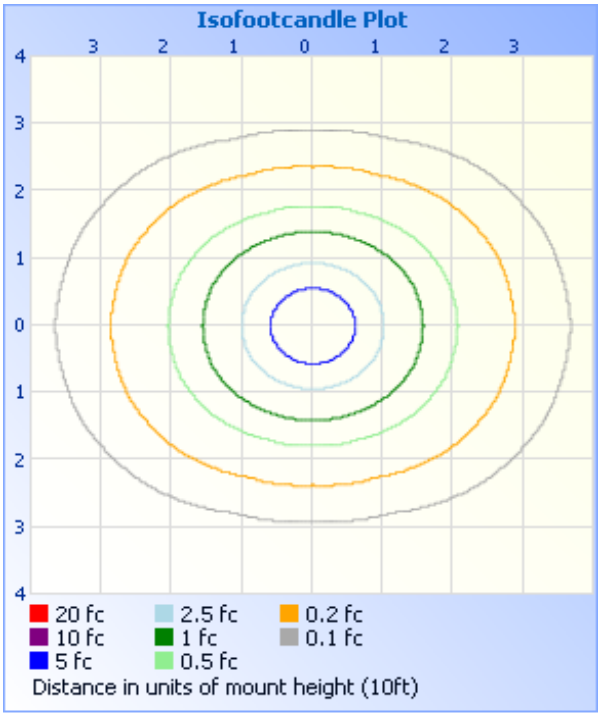
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	686.4	8.2
0-40	1152	13.8
0-60	2191	26.2
60-90	1281	15.3
0-90	3472	41.6
90-180	4876.0	58.4
0-180	8349	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	81.8	1.0
10-20	236.5	2.8
20-30	368.2	4.4
30-40	465.6	5.6
40-50	518.7	6.2
50-60	520.5	6.2
60-70	481.2	5.8
70-80	424.1	5.1
80-90	375.9	4.5
90-100	408.0	4.9
100-110	521.3	6.2
110-120	642.3	7.7
120-130	734.4	8.8
130-140	763.6	9.1
140-150	713.1	8.5
150-160	581.2	7.0
160-170	380.2	4.6
170-180	132.3	1.6

PICTURES (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:

Vladimir Kozak
Engineering Supervisor
Lighting Division

Report Reviewed By:

Erik Linares
Associate Engineer
Lighting Division

Attachment: None

REPORT

25800 COMMERCENTRE DRIVE, LAKE FOREST, CA 92630

Project No. G103858894 Date: March 13, 2019

REPORT NO. 103858894LAX-004

TEST OF ONE DL SQL H/H 35K 4'

MODEL NO. DL- SQL- H/H- 35K- 4' (DOBLE-LED SQL LENS)
LED MODEL NO. OSRAM SYLVANIA
DRIVER MODEL NO. OSRAM SYLVANIA

RENDERED TO

PRIMUS LIGHTING INC
3570 LEXINGTON AVE
EL MONTE, CA 91731

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

AUTHORIZATION: The testing performed was authorized by signed quote number Qu-00958862-6.

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

ANSI NEMA ANSLG C78.377: 2015: Specifications of the Chromaticity of Solid State Lighting Products

DESCRIPTION OF SAMPLE: The client submitted one production sample of model number DL- SQL- H/H- 35K- 4' (DOBLE-LED SQL LENS). The sample was received by Intertek on March 5, 2019, in undamaged condition and one sample was tested as received. The sample designation was LAN1903051054-001D.

DATES OF TESTS: March 8, 2019 through March 12, 2019.

SUMMARY

Model No.:	DL- SQL- H/H- 35K- 4' (DOBLE-LED SQL LENS)
Description:	DL SQL H/H 35K 4'

Criteria	Result
Total Lumen Output (Lumens)	8745
Total Power (W)	109.1
Luminaire Efficacy (LPW)	80.16
Power Factor at 120Vac	0.998
Power Factor at 277Vac	0.978
Current ATHD % at 120Vac	5.92
Current ATHD % at 277Vac	12.20
Correlated Color Temperature (CCT - K)	3462
Color Rendering Index (CRI - Ra)	81.6
Color Rendering Index (CRI - R9)	9.4
DUV	0.001
Chromaticity Coordinate (x)	0.407
Chromaticity Coordinate (y)	0.391
Chromaticity Coordinate (u')	0.237
Chromaticity Coordinate (v')	0.512

EQUIPMENT LIST

Equipment Used	Model Number	Control Number	Last Date Calibrated	Calibration Due Date	Date Used
Goniophotometer	6440T	000943	VBU	VBU	03/12/19
AC Source	CW1251P	000944	VBU	VBU	03/12/19
Power Analyzer	WT210	000945	11/28/18	11/28/19	03/12/19
Tape Measure	33-428	001491	04/24/18	04/24/19	03/12/19
Magnetic Level	581-9	001610	10/31/18	10/31/19	03/12/19
Thermometer	DPi8-C24	001782	09/21/18	09/21/19	03/12/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/12/19
3m Sphere	CSTM-LMS-3M-3020	000830	VBU	VBU	03/08/19
Spectrometer	CDS-3020-T	000834	VBU	VBU	03/08/19
Power Supply (AC 3P / DC)	CSW5550-208-LAN	001339	VBU	VBU	03/08/19
Power Meter	WT330	001319	08/13/18	08/13/19	03/08/19
Temp. & RH Meter	971	001177	01/29/19	01/29/20	03/08/19
DC Power Supply	LPS-100-0833	000832	01/31/19	01/31/20	03/08/19
Network TC Reader	iSD-TC	000824	02/01/19	02/01/20	03/08/19

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 Model CDS-3020 High Sensitivity Multi Channel Spectrometer and Two Meter or 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 Xitron or Yokogawa Power Analyzer.

The calibration of the sphere photometer-spectroradiometer 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 Xitron or 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

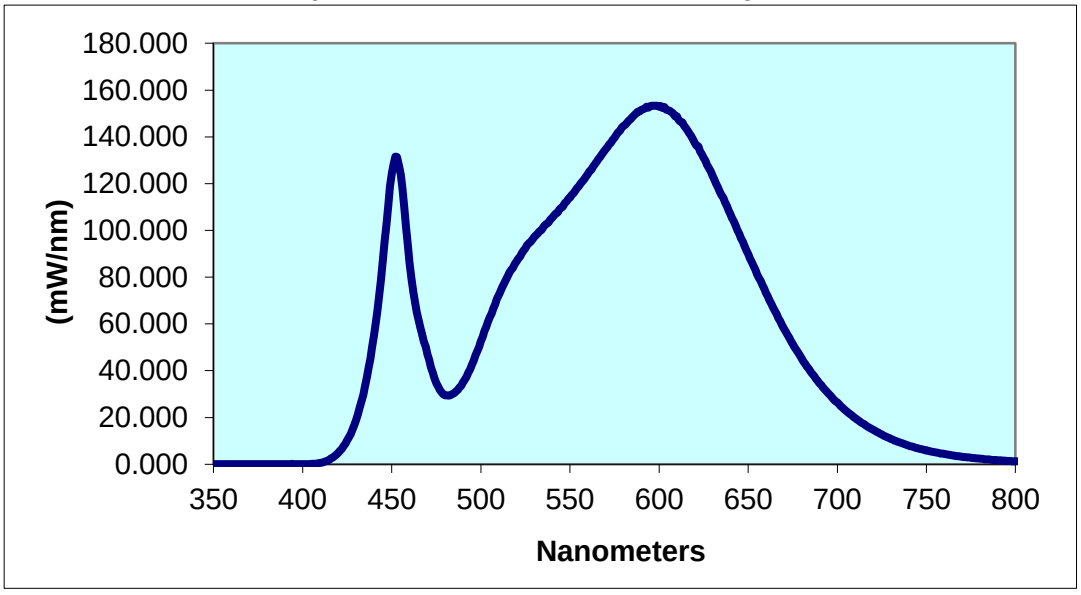
Intertek Sample No.	Base Orientation	Input Voltage {Vac}	Input Current (mA)	Input Power (Watts)	Input Power Factor	Current ATHD (%)
LAN1903051054-001D	Up	120.0	918.5	110.0	0.998	5.92
		276.9	398.5	108.0	0.978	12.20

Correlated Color Temperature (K)	CRI -Ra	CRI -R9	DUV	CIE 31' Chromaticity Coordinate (x)	CIE 31' Chromaticity Coordinate (y)	CIE 76' Chromaticity Coordinate (u')	CIE 76' Chromaticity Coordinate (v')
3462	81.6	9.4	0.001	0.407	0.391	0.237	0.512

Spectral Distribution over Visible Wavelengths

nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm	nm	mW/nm
350	0.000	440	54.95	530	97.21	620	137.5	710	19.75
355	0.000	445	87.30	535	101.3	625	131.2	715	17.10
360	0.000	450	124.4	540	105.5	630	123.5	720	14.77
365	0.000	455	123.9	545	109.6	635	115.1	725	12.74
370	0.000	460	86.34	550	114.2	640	106.9	730	10.89
375	0.000	465	62.07	555	118.8	645	98.39	735	9.312
380	0.000	470	47.07	560	124.1	650	89.84	740	8.033
385	0.000	475	34.63	565	129.4	655	81.34	745	6.862
390	0.000	480	29.46	570	134.6	660	73.26	750	5.923
395	0.000	485	30.39	575	139.7	665	65.55	755	5.067
400	0.000	490	34.91	580	144.6	670	58.11	760	4.356
405	0.137	495	42.53	585	148.5	675	51.41	765	3.709
410	0.602	500	52.54	590	151.5	680	45.18	770	3.209
415	1.984	505	62.92	595	153.2	685	39.75	775	2.730
420	4.903	510	72.30	600	153.0	690	34.71	780	2.344
425	10.18	515	80.37	605	151.4	695	30.22		
430	18.84	520	86.84	610	148.8	700	26.39		
435	33.33	525	92.30	615	143.7	705	22.78		

Spectral Data Over Visible Wavelengths



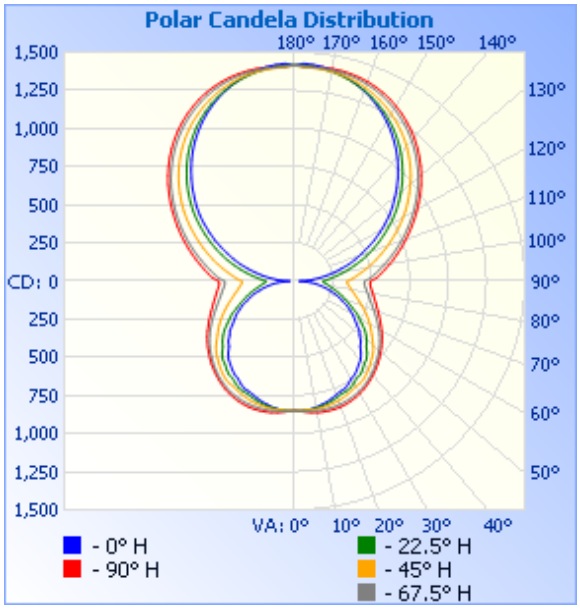
RESULTS OF TEST (cont'd)

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 (LPW)
LAN1903051054-001D	Up	120.0	911.3	109.1	0.998	8745	80.16

Intensity (Candlepower) Summary at 25°C - Candelas

Angle	0	22.5	45	67.5	90
0	850	850	850	850	850
5	850	850	849	856	862
10	838	843	850	862	875
15	818	830	844	864	879
20	792	812	834	861	877
25	777	796	819	852	868
30	738	772	798	836	850
35	708	747	784	814	827
40	669	707	750	786	798
45	604	668	712	752	766
50	553	614	670	716	731
55	494	558	614	678	694
60	439	487	566	634	655
65	374	417	516	590	615
70	307	353	466	549	578
75	240	297	421	514	547
80	174	246	383	485	521
85	109	207	356	463	500
90	32	186	343	456	495
95	120	243	407	524	565
100	215	320	475	587	626
105	316	410	550	657	693
110	425	506	632	732	765
115	531	605	720	811	841
120	642	707	810	892	919
125	753	808	899	973	1000
130	852	904	984	1052	1077
135	951	995	1066	1125	1150
140	1044	1080	1140	1192	1216
145	1128	1157	1206	1252	1275
150	1204	1224	1263	1302	1324
155	1270	1283	1311	1344	1363
160	1326	1331	1349	1375	1391
165	1370	1368	1377	1395	1408
170	1404	1394	1395	1407	1415
175	1424	1410	1403	1408	1412
180	1414	1414	1414	1414	1414

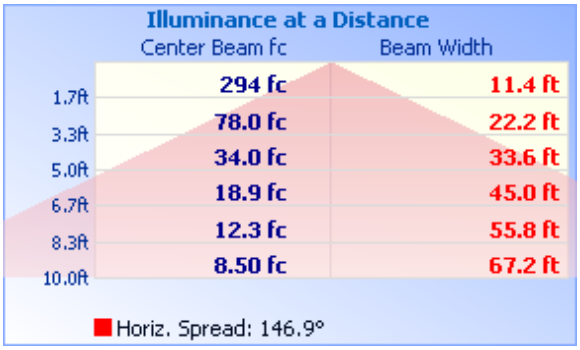


RESULTS OF TEST (cont'd)

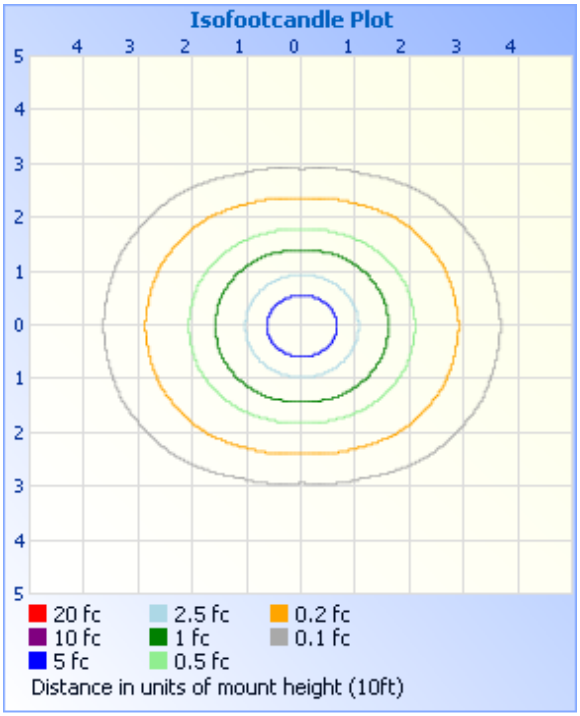
Illumination Plots

Mounting Height: 10 ft.

Illuminance - Cone of Light



Isoillumination Plot



Zonal Lumen Summary and Percentages at 25°C

Zone	Lumens	% Luminaire
0-30	699.9	8.0
0-40	1186	13.6
0-60	2277	26.0
60-90	1296	14.8
0-90	3573	40.9
90-180	5172.0	59.1
0-180	8745	100.0

Zonal Lumens and Percentages at 25°C

Zone	Lumens	% Luminaire
0-10	81.4	0.9
10-20	239.4	2.7
20-30	379.0	4.3
30-40	486.2	5.6
40-50	544.1	6.2
50-60	546.7	6.3
60-70	500.5	5.7
70-80	430.6	4.9
80-90	364.6	4.2
90-100	415.1	4.7
100-110	561.7	6.4
110-120	699.5	8.0
120-130	795.2	9.1
130-140	817.2	9.3
140-150	753.4	8.6
150-160	605.6	6.9
160-170	390.5	4.5
170-180	134.3	1.5

PICTURES (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:

Vladimir Kozak
Engineering Supervisor
Lighting Division

Report Reviewed By:

Erik Linares
Associate Engineer
Lighting Division

Attachment: None