

Report of Test

LLI-21188-3

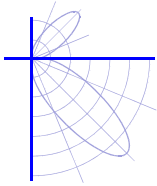
OptoLum Inc - Indoor recessed spot luminaire. Product ID: DL5----2530-----A
Cast aluminum housing with white interior and silver trim.
One COB LED with clear plastic focusing lens.
One Magnitude LED driver. Model: AFLEX-30W-1400-S-L set to 145ma
Operating at 120v AC and 60 Hz.



Performance Summary

Total Light Output	489 lm	Min Power Factor	0.47 @ 277 V
Luminaire Power	6.21 W	Max THD(i)*	39.0 % @ 277 V
Luminous Efficacy	78.7 lm/W		
CCT	3050 K		
CIE(x,y) 1931	(0.436, 0.408)		
CRI	93		

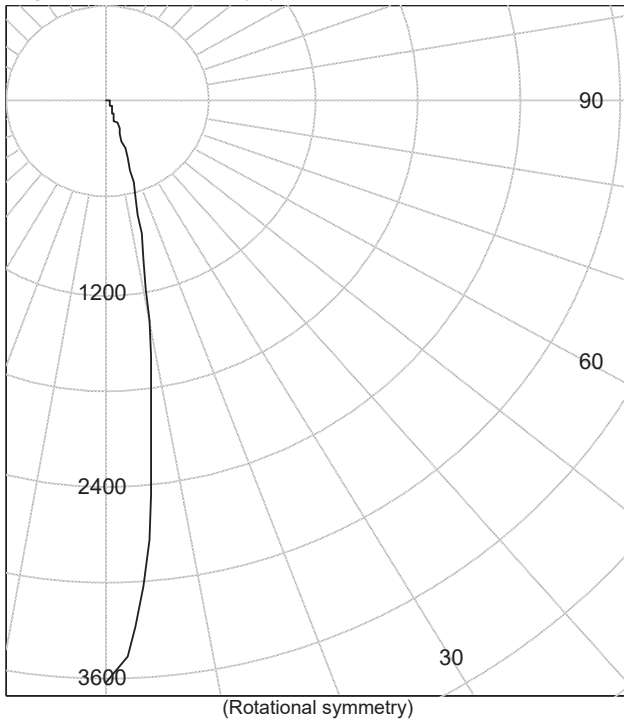
Prepared for : OptoLum Inc. 1407 W 10th Place, Tempe, AZ 85281



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Legend: All planes - Black (cd)



INTENSITY SUMMARY (cd)

Gamma	All Planes	Flux (lm)	Gamma	C0	Flux (lm)
0	3619		90	0	
5	2755	216	95	0	0
10	1385		100	0	0
15	613	176	105	0	0
20	260		110	0	0
25	104	54	115	0	0
30	53		120	0	0
35	31	20	125	0	0
40	19		130	0	0
45	13	10	135	0	0
50	10		140	0	0
55	8	7	145	0	0
60	6		150	0	0
65	4	4	155	0	0
70	2		160	0	0
75	1	1	165	0	0
80	1		170	0	0
85	0	0	175	0	0
90	0		180	0	0

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	%Lamp	%Luminaire
0-30	446	N / A	91.2
0-40	466	N / A	95.3
0-60	483	N / A	98.9
0-90	489	N / A	100.0
40-90	23	N / A	4.7
60-90	6	N / A	1.1
90-180	0	N / A	0.0
0-180	489	N / A	100.0

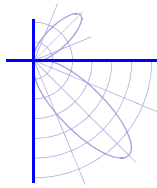
Total Light Output = 489 lm

Signed:

Ryder Tunney
Ryder Tunney
Authorized Signatory

Date of test 8-Jul-2021
Date of report 9-Jul-2021

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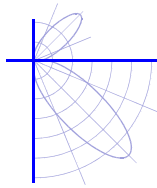


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Intensity (cd) and Flux (lm) data

Gamma	Intensity	Flux	Gamma	Intensity	Flux
0.0	3619		90.0	0	
2.5	3385		92.5	0	
5.0	2755	216	95.0	0	0
7.5	2021		97.5	0	
10.0	1385		100.0	0	
12.5	919		102.5	0	
15.0	613	176	105.0	0	0
17.5	403		107.5	0	
20.0	260		110.0	0	
22.5	163		112.5	0	
25.0	104	54	115.0	0	0
27.5	73		117.5	0	
30.0	53		120.0	0	
32.5	40		122.5	0	
35.0	31	20	125.0	0	0
37.5	24		127.5	0	
40.0	19		130.0	0	
42.5	16		132.5	0	
45.0	13	10	135.0	0	0
47.5	11		137.5	0	
50.0	10		140.0	0	
52.5	8		142.5	0	
55.0	8	7	145.0	0	0
57.5	7		147.5	0	
60.0	6		150.0	0	
62.5	5		152.5	0	
65.0	4	4	155.0	0	0
67.5	3		157.5	0	
70.0	2		160.0	0	
72.5	2		162.5	0	
75.0	1	1	165.0	0	0
77.5	1		167.5	0	
80.0	1		170.0	0	
82.5	0		172.5	0	
85.0	0	0	175.0	0	0
87.5	0		177.5	0	
90.0	0		180.0	0	



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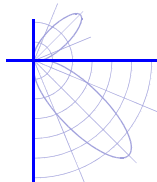
LM-79-08 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.436, 0.408)
	CIE 1976 (u', v') ⁽¹⁾	(0.248, 0.523)
	Correlated Color Temperature (CCT) ⁽¹⁾	3050 K
	Spatial Δ (u', v') Uniformity ⁽²⁾	3.65E-03
	Color Rendering Index (Ra) ⁽¹⁾	93.0
	Special CRI 9 (R ₉) ^{(1),(3)}	59.5
	Distance from Planckian Locus (Duv) ^{(1),(3)}	1.61E-03
	Scotopic/Photopic Ratio ^{(1),(3)}	1.44

Electrical	Voltage	120.0 V	(Setpoint 1)
	Frequency	60.0 Hz	
	Current	0.064 A	
	Power	6.21 W	
	Power Factor	0.81	
	Current THD	15 %	
	Voltage	277.0 V	(Setpoint 2)
	Frequency	60.0 Hz	
	Current	0.049 A	
	Power	6.35 W	
	Power Factor	0.47	
	Current THD	39 %	

Performance data in accordance with IESNA LM-79-08. Spectral calculations are for a CIE 2° observer
 Photometric and spectral values were measured at Setpoint 1

- (1) Value is computed from the weighted average of the spatial measurements
- (2) Value is the maximum deviation of the spatial u' and v' measurements from the weighted average
- (3) Quantity is in addition to the scope of IESNA LM-79-08



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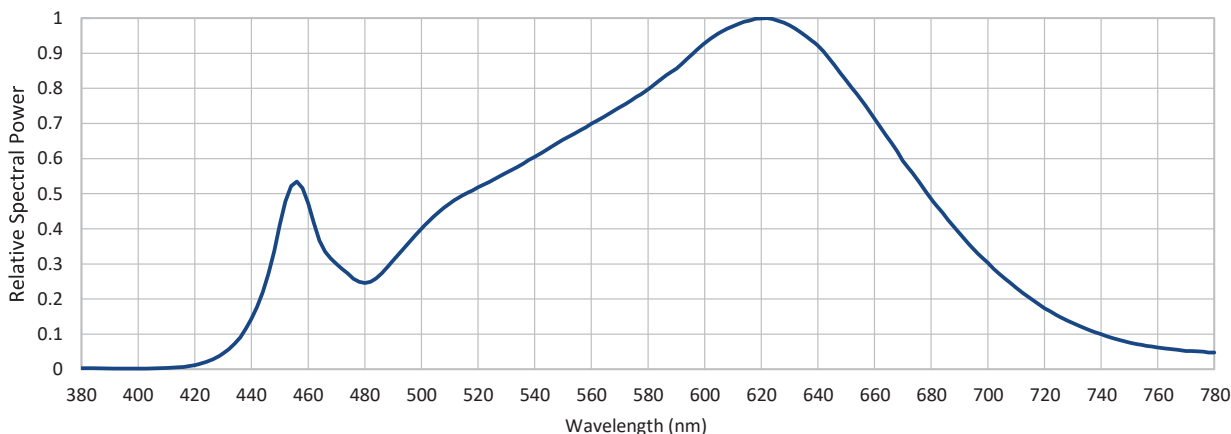
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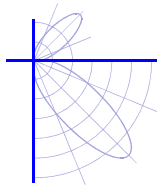
LM-79-08 Performance Data

Relative spectral power distribution

(Relative to peak = 1, weighted average of spatial measurements)

λ (nm)	Relative Power	λ (nm)	Relative Power	λ (nm)	Relative Power	λ (nm)	Relative Power	λ (nm)	Relative Power
380	0.003	460	0.472	540	0.605	620	0.999	700	0.303
385	0.003	465	0.351	545	0.629	625	0.995	705	0.265
390	0.002	470	0.300	550	0.654	630	0.979	710	0.232
395	0.002	475	0.265	555	0.676	635	0.953	715	0.202
400	0.002	480	0.246	560	0.699	640	0.922	720	0.174
405	0.002	485	0.266	565	0.722	645	0.874	725	0.151
410	0.004	490	0.310	570	0.746	650	0.823	730	0.132
415	0.006	495	0.355	575	0.770	655	0.770	735	0.114
420	0.012	500	0.401	580	0.797	660	0.715	740	0.100
425	0.024	505	0.440	585	0.829	665	0.656	745	0.087
430	0.045	510	0.472	590	0.856	670	0.594	750	0.076
435	0.082	515	0.497	595	0.893	675	0.541	755	0.069
440	0.144	520	0.518	600	0.929	680	0.485	760	0.062
445	0.247	525	0.538	605	0.956	685	0.435	765	0.057
450	0.410	530	0.560	610	0.977	690	0.387	770	0.052
455	0.529	535	0.582	615	0.992	695	0.342	775	0.050
								780	0.048





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LM-79-08 Performance Data

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0.0° plane	Horiz. ° plane
0.0	(0.247, 0.523)	(0.247, 0.523)
2.0	(0.246, 0.523)	(0.246, 0.523)
4.0	(0.247, 0.523)	(0.247, 0.523)
6.0	(0.247, 0.522)	(0.247, 0.523)
8.0	(0.248, 0.522)	(0.247, 0.522)
10.0	(0.248, 0.522)	(0.249, 0.522)
12.0	(0.250, 0.523)	(0.249, 0.523)
14.0	(0.250, 0.522)	(0.250, 0.523)
16.0	(0.251, 0.523)	(0.251, 0.523)
18.0	I <= 10% peak	(0.252, 0.524)

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0.0° plane	Horiz. ° plane
18.0	I <= 10% peak	(0.252, 0.524)
20.0	I <= 10% peak	I <= 10% peak
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

Test procedure

All measurements were performed in an environmentally controlled laboratory employing suitable baffling to minimize stray light. The sample was mounted in its normal operating orientation on a rotating mirror goniophotometer and operated from a stabilized supply. The photometric output was monitored and measurements were performed once stability was achieved.

The goniophotometer was used to measure the spatial distribution of both luminous intensity and, in conjunction with a spectroradiometer, spectral irradiance. The distribution locus comprises points in two or more planes (as indicated in the table above) at no more than 10° vertical intervals. The CIE (x,y) coordinates and other derived metrics (CIE (u', v'), CCT and CRI) are calculated from the weighted sum (weighted for intensity and represented solid angle) of the measured spectral irradiances.

Sample Orientation Vertical Stabilization & total operation time 0.75 / 1.75 hours

Equipment and uncertainties

LightLab International R80A C-gamma rotating mirror goniophotometer with a test distance of 8 m.

Luminous Intensity	± 4 %	Temperature	± 1 °C
Luminous Flux	± 4 %	Luminous Efficacy	± 4.5 %
Horiz., Vert. Angles	± 0.25°		

PhotoResearch PR-670 spectroradiometer (grating with 380 - 780 nm range, 2 nm / pixel, 5 nm bandwidth, incandescent/halogen calibration source). Measured at a distance from the sample deemed >5 times the maximum observed luminous opening dimension.

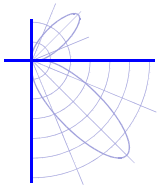
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 2
Spatial Δ (u', v') uniformity	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Rel. Spectral Irradiance *	± 2 %	R9 *	± 2
Duv *	± 5E-04		

Yokogawa WT210 power meter connected in circuit to the sample electrical supply

Voltage	± 0.5 %	Frequency *	± 0.1 Hz
Current	± 0.5 %	Power	± 0.5 %
Current THD	± 3 %	Power Factor	± 0.02

This report contains data that are not covered by the NVLAP accreditation. Quantities marked with * are not covered.

Calculator / report version 1.0.10 / 5.9 (14th Dec 2017)



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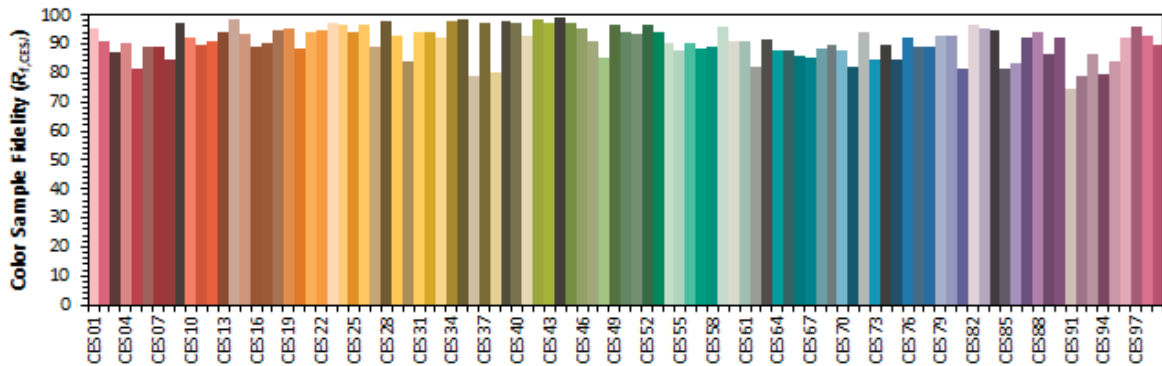
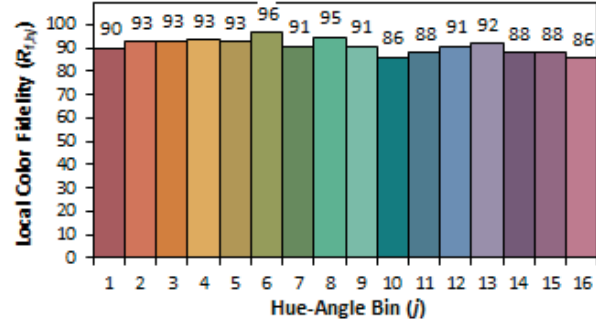
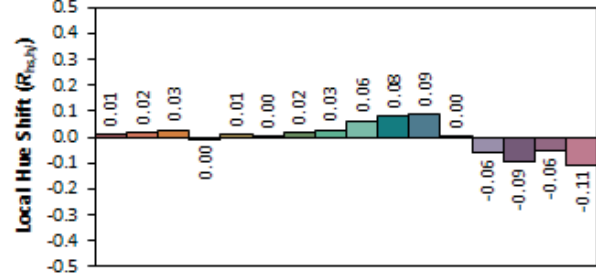
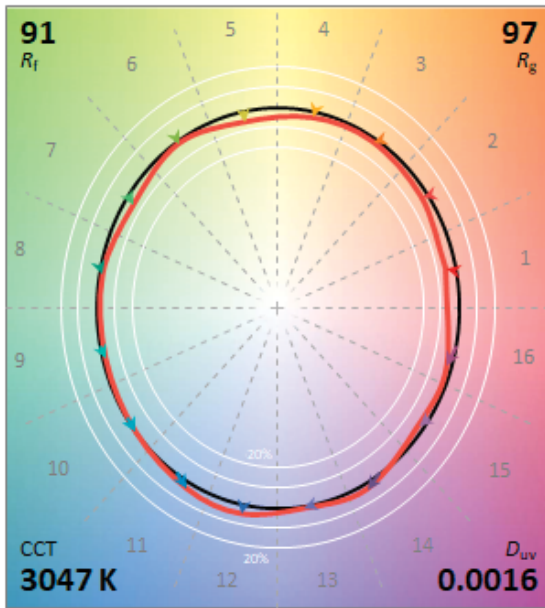
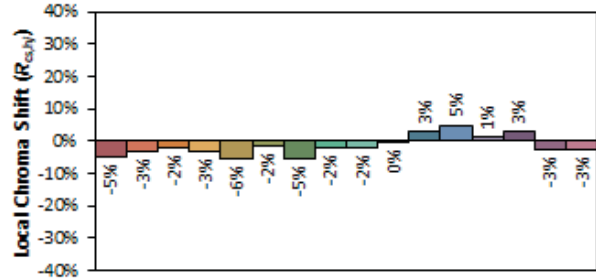
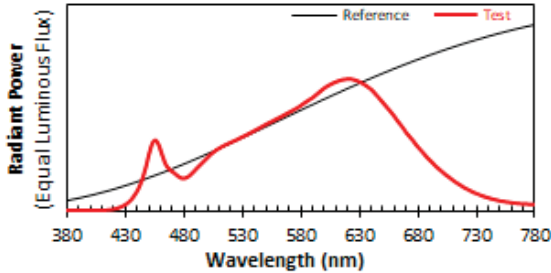
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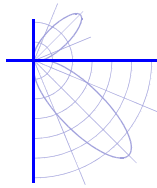
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Test Distance 8.0 m
Test Temperature 25.3 °C

Notes The laboratory has not participated in the selection of samples to be tested. All testing is performed on the understanding that the significance of the report is limited to the extent that the test sample is representative of production units.

Tested in accordance with the applicable sections of publications: IES LM-79-08 (Sec. 12), IES LM-16-93, IES LM-58-13, CIE 13.3:1995, CIE 15:2004, ANSI C78.377:2015, ANSI C82.77-10:2014.

The luminous intensity values, and other derived quantities, contained in this report are based on the absolute data, as measured.

Prorating the performance of the sample for the use of other component combinations (such as lamp / LED / Ballast / driver), or for use in different environmental conditions than that tested, may produce erroneous results.

This report is free of erasures and corrections.

Photometric intensity values are reported using the CIE Gamma coordinate system as defined in CIE publication number 121.

Customer supplied information is identified in this report by enclosing it in double quotes

This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.