

Report of Test

LLI-14272-3

OptoLum "EcoLine" Extruded Aluminum Luminaire. Cat No. EL-RD-L--358UOD-A072000

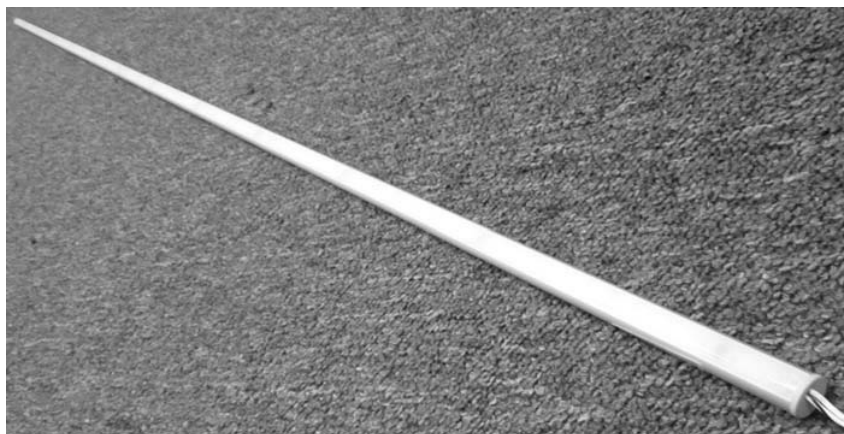
Circular extruded housing with extents ~ 72.375" x 0.7" diameter.

Twelve white PCB sections marked "OptoLum EcoLine LO R4.1" with five LEDs each on 1.187" centers.

Curved opal plastic lens. Luminous Opening ~ 72 x 0.4 x 0.07".

One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.

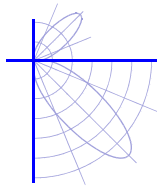
Tested at 120V 60Hz with luminous opening horizontal facing nadir.



Performance Summary

Total Light Output	1581 lm	Min Power Factor	0.81 @ 277 V
Luminaire Power	50.2 W	Max THD(i)*	15.8 % @ 277 V
Luminous Efficacy	31.5 lm/W	SC along*, across*	1.26 , 1.28
CCT	3320 K	SC Diagonal*	1.40
CIE(x,y) 1931	(0.413, 0.388)		
CRI	86		
0-60° Zonal Flux %	75.7 %		

PREPARED FOR : OptoLum Inc., 1407 W 10th Place, Tempe, AZ



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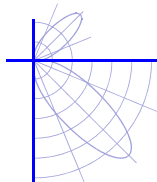
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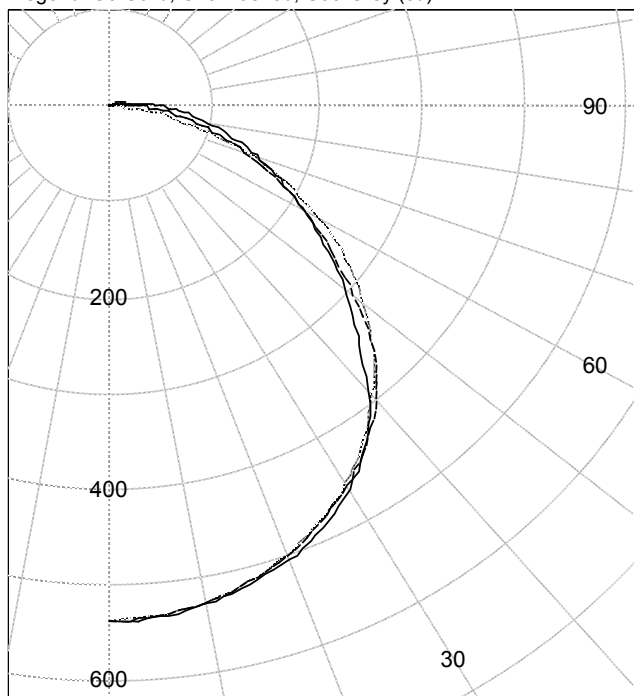
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	538	538	538	538	538	
5.0	536	534	535	537	534	51
10.0	528	527	527	530	527	
15.0	517	516	515	517	515	146
20.0	504	501	500	501	499	
25.0	486	483	481	480	479	222
30.0	462	461	459	456	454	
35.0	430	430	432	427	426	269
40.0	390	395	400	396	394	
45.0	337	341	361	362	359	272
50.0	295	297	307	325	320	
55.0	253	255	260	283	278	237
60.0	215	214	217	235	233	
65.0	181	179	175	180	188	179
70.0	151	147	138	132	141	
75.0	122	116	104	91	92	111
80.0	95	90	74	56	48	
85.0	71	66	51	29	14	52
90.0	51	46	32	12	0	

ZONAL FLUX AND PERCENTAGES

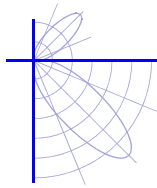
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	419	N / A	26.5
0-40	687	N / A	43.5
0-60	1197	N / A	75.7
0-90	1540	N / A	97.4
40-90	852	N / A	53.9
60-90	343	N / A	21.7
90-180	42	N / A	2.6
0-180	1581	N / A	100.0

Total Light Output = 1,581 lm

Signed: *E Southgate*

Eric Southgate
Authorized Signatory

Date of test 8-Oct-2014
Date of report 13-Oct-2014



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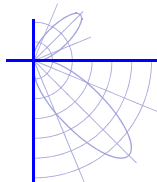
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Tested at 120V 60Hz with luminous opening horizontal facing nadir.

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	538	538	538	538	538
2.5	538	536	537	539	536
5.0	536	534	535	537	534
7.5	532	531	532	534	531
10.0	528	527	527	530	527
12.5	523	522	521	524	521
15.0	517	516	515	517	515
17.5	511	509	508	509	507
20.0	504	501	500	501	499
22.5	496	493	491	491	489
25.0	486	483	481	480	479
27.5	475	473	470	469	467
30.0	462	461	459	456	454
32.5	446	446	446	442	441
35.0	430	430	432	427	426
37.5	413	414	417	412	410
40.0	390	395	400	396	394
42.5	360	366	382	380	376
45.0	337	341	361	362	359
47.5	316	319	334	344	340
50.0	295	297	307	325	320
52.5	274	276	283	305	300
55.0	253	255	260	283	278
57.5	233	234	238	259	256
60.0	215	214	217	235	233
62.5	198	197	196	208	211
65.0	181	179	175	180	188
67.5	165	163	156	155	164
70.0	151	147	138	132	141
72.5	136	131	120	110	117
75.0	122	116	104	91	92
77.5	108	103	88	73	70
80.0	95	90	74	56	48
82.5	83	77	62	41	29
85.0	71	66	51	29	14
87.5	61	56	41	19	3
90.0	51	46	32	12	0



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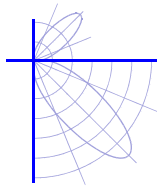
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	51	46	32	12	0
92.5	42	38	24	7	0
95.0	35	30	18	4	0
97.5	28	24	14	4	0
100.0	23	19	11	3	0
102.5	19	16	9	3	0
105.0	16	14	9	3	0
107.5	15	13	8	2	0
110.0	14	12	8	2	0
112.5	13	12	7	1	0
115.0	13	11	7	1	0
117.5	12	10	7	1	0
120.0	11	10	6	1	0
122.5	11	9	5	0	0
125.0	10	8	4	0	0
127.5	9	8	3	0	0
130.0	8	7	3	0	0
132.5	7	5	2	0	0
135.0	5	4	2	0	0
137.5	4	4	1	0	0
140.0	4	3	1	0	0
142.5	3	2	0	0	0
145.0	2	2	0	0	0
147.5	2	1	0	0	0
150.0	1	0	0	0	0
152.5	0	0	0	0	0
155.0	0	0	0	0	0
157.5	0	0	0	0	0
160.0	0	0	0	0	0
162.5	0	0	0	0	0
165.0	0	0	0	0	0
167.5	0	0	0	0	0
170.0	0	0	0	0	0
172.5	0	0	0	0	0
175.0	0	0	0	0	0
177.5	0	0	0	0	0
180.0	0	0	0	0	0



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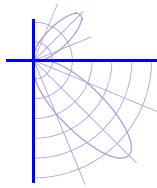
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Coefficients Of Utilization * - Zonal Cavity Method
Effective Floor Cavity Reflectance 0.20

RC	80		80		70		70		50		50		30		30		10		10		0
RW	70	50	30	10	10	70	50	30	10	10	50	30	10	10	50	30	10	10	0	0	
0	118	118	118	118		115	115	115	115		110	110	110		104	104	104		100	100	97
1	108	103	98	94		105	100	96	92		95	92	89		91	88	86		87	85	80
2	98	89	82	76		95	87	81	75		83	78	73		79	75	71		76	72	67
3	89	78	70	64		86	77	69	63		73	67	61		70	65	60		67	63	56
4	82	69	61	54		79	68	60	53		65	58	52		62	56	51		60	55	48
5	75	62	53	46		73	61	52	46		58	51	45		56	50	44		54	48	42
6	69	56	47	40		67	55	46	40		53	45	40		51	44	39		49	43	36
7	64	51	42	36		62	50	41	36		48	41	35		46	40	35		45	39	32
8	60	46	38	32		58	45	37	32		44	37	31		42	36	31		41	35	29
9	56	42	34	29		54	42	34	29		40	33	28		39	33	28		38	32	26
10	52	39	31	26		51	39	31	26		37	30	26		36	30	25		35	29	23



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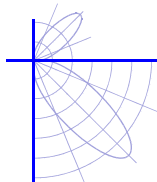
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LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.413, 0.388)	
	CIE 1976 (u', v') ⁽¹⁾	(0.242, 0.511)	
	Correlated Color Temperature (CCT) ⁽¹⁾	3320 K	
	Color Spatial Uniformity ⁽²⁾	0.0055	
	Color Rendering Index (Ra) ⁽¹⁾	86	
	Special CRI 9 (R _g) ^{(1),(3)}	31	
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-0.0027	
	Scotopic/Photopic Ratio ^{(1),(3)}	1.51	
Electrical	Voltage	120 V	(Setpoint 1)
	Frequency	60 Hz	
	Current	0.4271 A	
	Power	50.24 W	
	Power Factor	0.980	
	Current THD	11.28 %	
	Voltage	277 V	(Setpoint 2)
	Frequency	60 Hz	
	Current	0.2417 A	
	Power	54.13 W	
	Power Factor	0.808	
	Current THD	15.75 %	

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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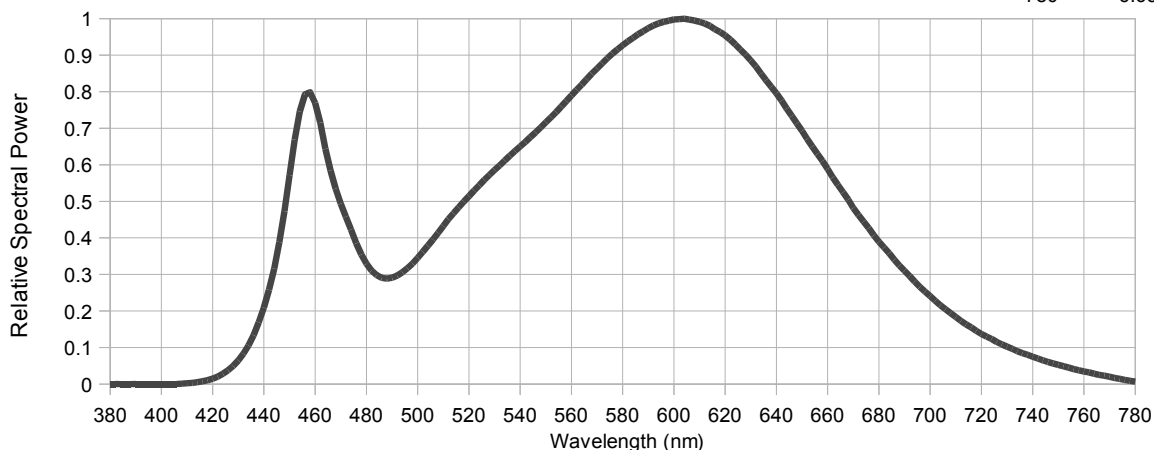
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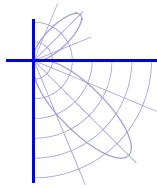
LM-79 Performance Data

Summary Relative Spectral Irradiance Distribution (wavelength – nm, irradiance – relative to peak = 1)

380	0.00E+00	480	3.29E-01	580	9.27E-01	680	3.90E-01
385	0.00E+00	485	2.94E-01	585	9.52E-01	685	3.49E-01
390	2.92E-05	490	2.91E-01	590	9.74E-01	690	3.10E-01
395	0.00E+00	495	3.11E-01	595	9.89E-01	695	2.73E-01
400	3.68E-05	500	3.45E-01	600	9.98E-01	700	2.41E-01
405	2.23E-04	505	3.87E-01	605	9.99E-01	705	2.10E-01
410	1.95E-03	510	4.32E-01	610	9.91E-01	710	1.83E-01
415	6.24E-03	515	4.75E-01	615	9.76E-01	715	1.59E-01
420	1.48E-02	520	5.14E-01	620	9.54E-01	720	1.37E-01
425	3.28E-02	525	5.51E-01	625	9.22E-01	725	1.19E-01
430	6.46E-02	530	5.86E-01	630	8.86E-01	730	1.02E-01
435	1.19E-01	535	6.18E-01	635	8.41E-01	735	8.74E-02
440	2.09E-01	540	6.50E-01	640	7.96E-01	740	7.47E-02
445	3.52E-01	545	6.82E-01	645	7.44E-01	745	6.27E-02
450	5.72E-01	550	7.16E-01	650	6.93E-01	750	5.24E-02
455	7.69E-01	555	7.52E-01	655	6.40E-01	755	4.31E-02
460	7.69E-01	560	7.90E-01	660	5.88E-01	760	3.44E-02
465	6.14E-01	565	8.27E-01	665	5.35E-01	765	2.66E-02
470	4.94E-01	570	8.64E-01	670	4.82E-01	770	1.99E-02
475	4.04E-01	575	8.98E-01	675	4.36E-01	775	1.30E-02
						780	6.63E-03



* The spectral power distribution combines the weighted spectral power distributions of all spatial measurements.



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Tested at 120V 60Hz with luminous opening horizontal facing nadir.

LM-79 Performance Data

Spatial measurements

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
0	(0.243, 0.511)	(0.243, 0.511)
10	(0.243, 0.511)	(0.243, 0.511)
20	(0.243, 0.512)	(0.243, 0.511)
30	(0.243, 0.512)	(0.243, 0.512)
40	(0.241, 0.511)	(0.243, 0.512)
50	(0.239, 0.510)	(0.243, 0.512)
60	(0.237, 0.509)	(0.243, 0.512)
70	(0.238, 0.510)	(0.243, 0.512)
80	(0.239, 0.511)	I <= 10 %
90	I <= 10 %	I <= 10 %

Spatial measurements

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
90	I <= 10 %	I <= 10 %
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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	Horizontal	Stabilization Time	.75 hour
		Total Operation Time	3.5 hour

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 %
Horizontal, Vertical Angles	± 0.25°		

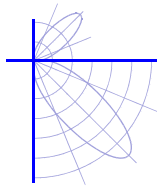
PhotoResearch PR-670 spectroradiometer (380 - 780 nm., 2 nm. per pixel) measuring at a distance from the sample deemed greater than five times the maximum observed luminous opening dimension.

CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 2
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 2

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.
IESNA LM-79-08 Calculator v4.9 (23rd Sep 2014)



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Tested at 120V 60Hz with luminous opening horizontal facing nadir.

Test Distance: 8.0 metres

Test Temperature: 24.8 degrees Celsius

Significance: 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.

Test Procedure: Tested in accordance with the applicable sections of IESNA publication LM-79-08.

Notes: 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.

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