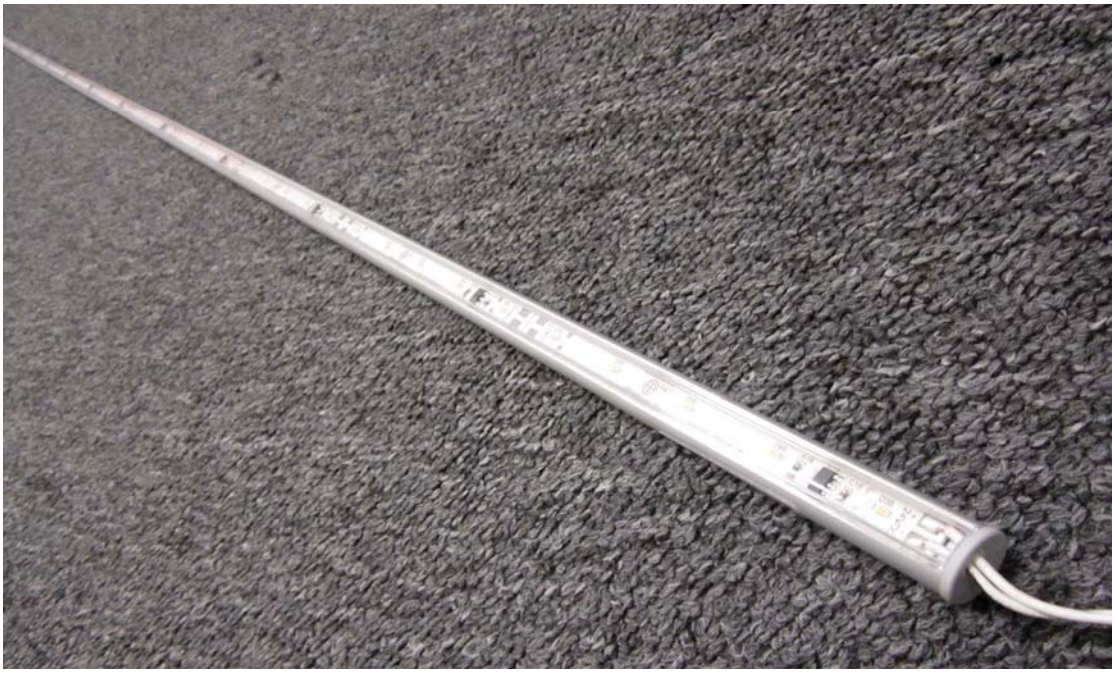
Report of Test

LLI-14272-2

OptoLum "EcoLine" Circular Extruded Aluminum Luminaire. Cat No. EL-RD-L--358USD-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 clear 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	1969 lm	Min Power Factor	0.81 @ 277 V
Luminaire Power	50.3 W	Max THD(i)*	15.8 % @ 277 V
Luminous Efficacy	39.1 lm/W	SC along*, across*	1.30 , 1.24
CCT	3480 K	SC Diagonal*	1.36
CIE(x,y) 1931	(0.403, 0.381)		
CRI	86		
0-60° Zonal Flux %	83.2 %		

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

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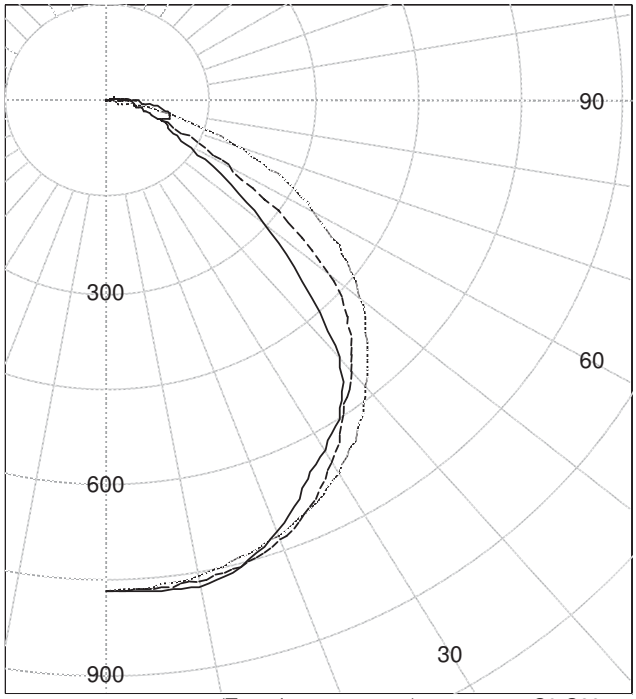
Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd)

	C-Plane					Flux
Gamma	C0	C22.5	C45	C67.5	C90	(lm)
0.0	768	768	768	768	768	
5.0	771	767	766	768	764	73
10.0	771	766	764	760	755	
15.0	755	753	754	750	742	212
20.0	719	724	734	736	724	
25.0	672	677	699	716	701	320
30.0	630	630	652	688	670	
35.0	589	590	598	647	631	382
40.0	523	537	553	596	584	
45.0	401	437	494	534	533	372
50.0	292	315	418	466	480	
55.0	202	226	301	392	417	278
60.0	132	144	200	319	346	
65.0	98	97	129	241	273	162
70.0	83	77	79	125	195	
75.0	94	75	54	65	117	81
80.0	89	78	39	33	49	
85.0	67	61	38	16	10	42
90.0	42	41	31	8	0	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	605	N / A	30.7
0-40	987	N / A	50.1
0-60	1638	N / A	83.2
0-90	1923	N / A	97.7
40-90	936	N / A	47.5
60-90	285	N / A	14.5
90-180	46	N / A	2.3
0-180	1969	N / A	100.0

Total Light Output = 1,969 lm

Signed: E Southgate

Eric Southgate
Authorized Signatory

Date of test 6-Oct-2014
Date of report 10-Oct-2014

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

Intensity data (cd)

	C-Plane				
Gamma	**C0**	**C22.5**	**C45**	**C67.5**	**C90**
0.0	768	768	768	768	768
2.5	770	767	767	770	765
5.0	771	767	766	768	764
7.5	772	767	766	764	760
10.0	771	766	764	760	755
12.5	765	763	759	756	749
15.0	755	753	754	750	742
17.5	739	739	747	743	734
20.0	719	724	734	736	724
22.5	695	700	717	726	713
25.0	672	677	699	716	701
27.5	648	652	676	702	686
30.0	630	630	652	688	670
32.5	609	610	626	669	651
35.0	589	590	598	647	631
37.5	563	568	577	622	608
40.0	523	537	553	596	584
42.5	466	499	528	568	558
45.0	401	437	494	534	533
47.5	342	375	465	499	508
50.0	292	315	418	466	480
52.5	249	268	364	427	450
55.0	202	226	301	392	417
57.5	161	182	239	356	382
60.0	132	144	200	319	346
62.5	111	118	167	281	310
65.0	98	97	129	241	273
67.5	89	85	100	189	236
70.0	83	77	79	125	195
72.5	88	71	66	81	156
75.0	94	75	54	65	117
77.5	92	78	45	47	81
80.0	89	78	39	33	49
82.5	75	74	38	24	27
85.0	67	61	38	16	10
87.5	52	52	38	11	2
90.0	42	41	31	8	0

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Intensity data (cd)

	C-Plane				
Gamma	**C0**	**C22.5**	**C45**	**C67.5**	**C90**
90.0	42	41	31	8	0
92.5	37	35	25	5	0
95.0	32	30	19	3	0
97.5	24	26	16	3	0
100.0	23	20	15	3	0
102.5	23	21	13	3	0
105.0	22	21	11	2	0
107.5	20	19	11	2	0
110.0	18	16	11	2	0
112.5	15	14	10	2	0
115.0	14	13	9	2	0
117.5	13	13	8	2	0
120.0	12	11	7	1	0
122.5	13	10	6	1	0
125.0	11	10	5	0	0
127.5	9	8	4	0	0
130.0	8	6	4	0	0
132.5	6	5	4	0	0
135.0	5	4	3	0	0
137.5	5	4	2	0	0
140.0	4	4	1	0	0
142.5	5	3	1	0	0
145.0	3	2	0	0	0
147.5	2	1	0	0	0
150.0	1	1	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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LM-79 Performance Data

Spectral	CIE 1931 (x, y) (1)	(0.403, 0.381)	
	CIE 1976 (u', v') (1)	(0.238, 0.507)	
	Correlated Color Temperature (CCT) (1)	3480	K
	Color Spatial Uniformity (2)	0.0036	
	Color Rendering Index (Ra) (1)	86	
	Special CRI 9 (R_9) (1),(3)	31	
	Distance from Planckian Locus (Duv) (1),(3)	-0.0037	
	Scotopic/Photopic Ratio (1),(3)	1.58	

Electrical	Voltage	120	V	(Setpoint 1)
	Frequency	60	Hz	
	Current	0.427	A	
	Power	50.27	W	
	Power Factor	0.980		
	Current THD	11.29	%	
	Voltage	277	V	(Setpoint 2)
	Frequency	60	Hz	
	Current	0.242	A	
	Power	54.14	W	
	Power Factor	0.809		
	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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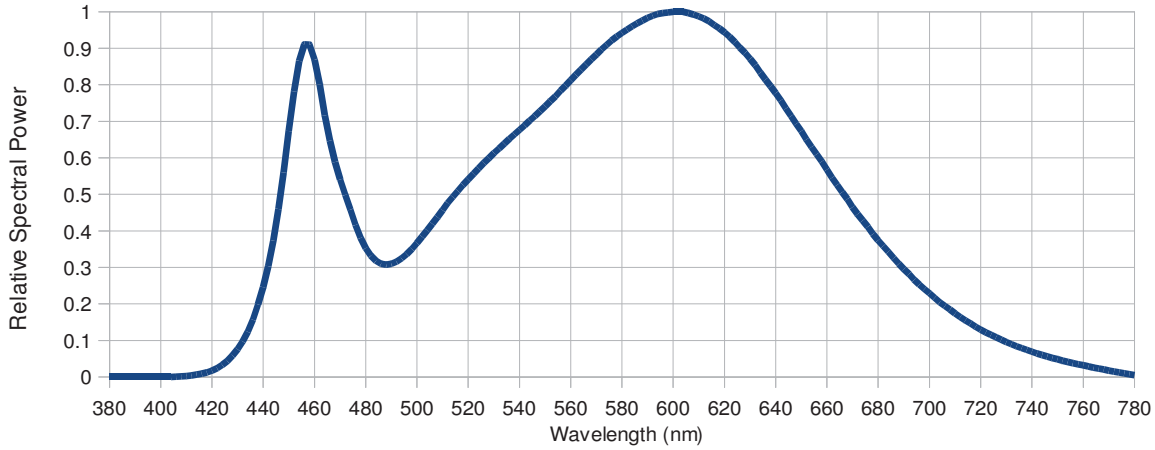
LM-79 Performance Data

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

380	0.00E+00	480	3.53E-01	580	9.42E-01	680	3.74E-01
385	0.00E+00	485	3.14E-01	585	9.64E-01	685	3.34E-01
390	0.00E+00	490	3.10E-01	590	9.83E-01	690	2.95E-01
395	0.00E+00	495	3.31E-01	595	9.95E-01	695	2.60E-01
400	1.34E-05	500	3.66E-01	600	1.00E+00	700	2.29E-01
405	5.10E-04	505	4.10E-01	605	9.98E-01	705	2.00E-01
410	2.74E-03	510	4.57E-01	610	9.87E-01	710	1.74E-01
415	7.75E-03	515	5.01E-01	615	9.69E-01	715	1.51E-01
420	1.78E-02	520	5.41E-01	620	9.44E-01	720	1.30E-01
425	3.87E-02	525	5.78E-01	625	9.09E-01	725	1.12E-01
430	7.57E-02	530	6.13E-01	630	8.71E-01	730	9.60E-02
435	1.40E-01	535	6.45E-01	635	8.24E-01	735	8.19E-02
440	2.46E-01	540	6.76E-01	640	7.77E-01	740	6.94E-02
445	4.17E-01	545	7.08E-01	645	7.24E-01	745	5.83E-02
450	6.73E-01	550	7.41E-01	650	6.73E-01	750	4.84E-02
455	8.88E-01	555	7.76E-01	655	6.20E-01	755	3.96E-02
460	8.69E-01	560	8.13E-01	660	5.68E-01	760	3.20E-02
465	6.81E-01	565	8.48E-01	665	5.16E-01	765	2.48E-02
470	5.41E-01	570	8.83E-01	670	4.64E-01	770	1.79E-02
475	4.37E-01	575	9.15E-01	675	4.20E-01	775	1.12E-02
						780	5.24E-03



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

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LM-79 Performance Data

Spatial measurements

Vertical angle (deg)	CIE 1976 (u',v') coordinates Horizontal 0 plane	Horizontal 90 plane
0	(0.237, 0.505)	(0.237, 0.505)
10	(0.238, 0.505)	(0.238, 0.505)
20	(0.238, 0.506)	(0.238, 0.506)
30	(0.238, 0.506)	(0.238, 0.506)
40	(0.237, 0.506)	(0.238, 0.507)
50	(0.238, 0.508)	(0.238, 0.508)
60	(0.238, 0.508)	(0.239, 0.508)
70	(0.238, 0.508)	(0.240, 0.510)
80	(0.237, 0.508)	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 10º 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.

		Stabilization Time	0.75 hour
Sample Orientation	Horizontal	Total Operation Time	3 hour

Equipment and uncertainties

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

Luminous Intensity	± 4 %	Temperature	± 1 ℃
Luminous Flux	± 4 %	Luminous Efficacy	± 4.5 %
Horizontal, Vertical Angles	± 0.25º		

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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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	50	30	10	10	0	0
0		118	118	118	118		115	115	115	115		110	110	110		105	105	105		100	100	100		98
1		109	105	101	97		106	102	98	95		97	95	92		93	91	89		89	87	86		83
2		100	92	86	81		97	90	84	80		86	82	77		83	79	75		80	76	73		71
3		92	82	74	68		89	80	73	68		77	71	66		74	69	65		71	67	63		61
4		84	73	65	59		82	72	64	58		69	62	57		66	61	56		64	59	55		53
5		78	66	57	51		76	65	57	51		62	55	50		60	54	49		58	53	48		46
6		72	59	51	45		70	58	50	45		56	49	44		55	48	43		53	47	43		41
7		67	54	46	40		65	53	45	40		51	44	39		50	43	39		48	43	38		36
8		62	49	41	36		61	49	41	36		47	40	35		46	39	35		44	39	34		33
9		58	45	38	32		57	45	37	32		44	37	32		42	36	32		41	35	31		29
10		55	42	34	29		53	41	34	29		40	34	29		39	33	29		38	33	28		27

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Curved clear 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.

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.

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

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