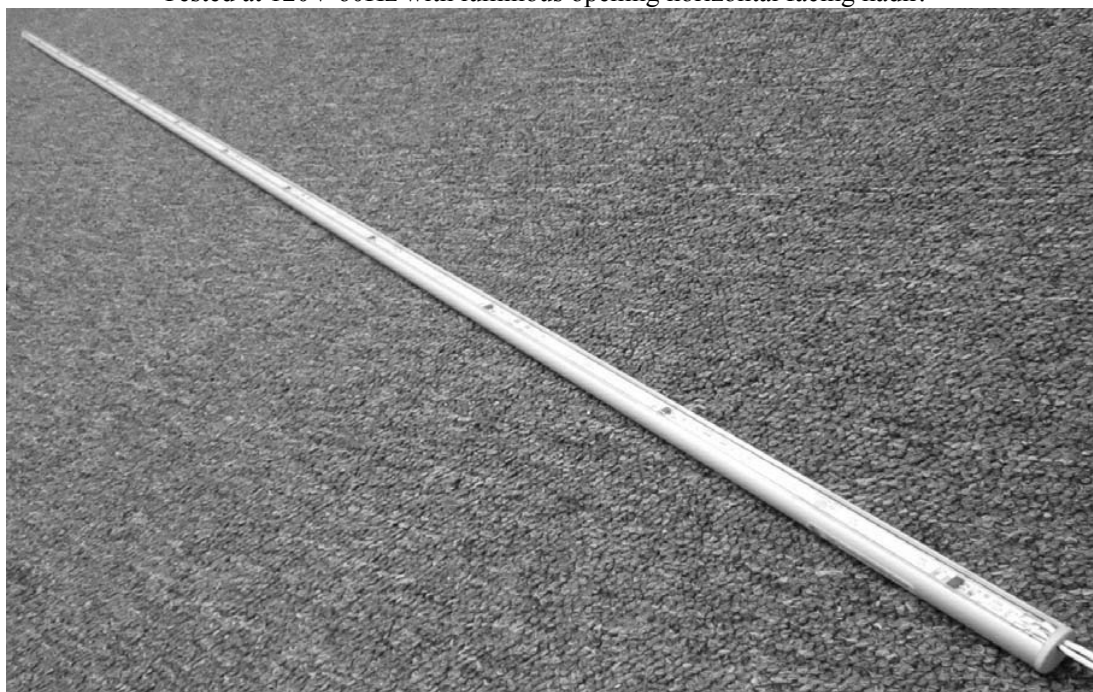


Report of Test LLI-14272-8

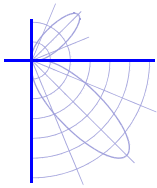
OptoLum "EcoLine" Circular Extruded Aluminum Luminaire. Cat No. EL-RD-S--358USD-A072000
Circular extruded housing with extents ~ 72.375" x 0.7" diameter.
Twelve white PCB sections marked "OptoLum EcoLine SLO R4.1" with five LEDs each on 1.187" centers.
Curved clear plastic lens. Luminous Opening ~ 72 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	1080 lm	Min Power Factor	0.65 @ 277 V
Luminaire Power	25.0 W	Max THD(i)*	28.1 % @ 277 V
Luminous Efficacy	43.2 lm/W	SC along*, across*	1.32 , 1.24
CCT	3430 K	SC Diagonal*	1.38
CIE(x,y) 1931	(0.407, 0.387)		
CRI	85		
0-60° Zonal Flux %	83.5 %		

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



Test Report No. LLI-14272-8

OptoLum "EcoLine" Circular Extruded Aluminum Luminaire. Cat No. EL-RD-S--358USD-A072000

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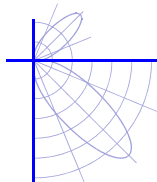
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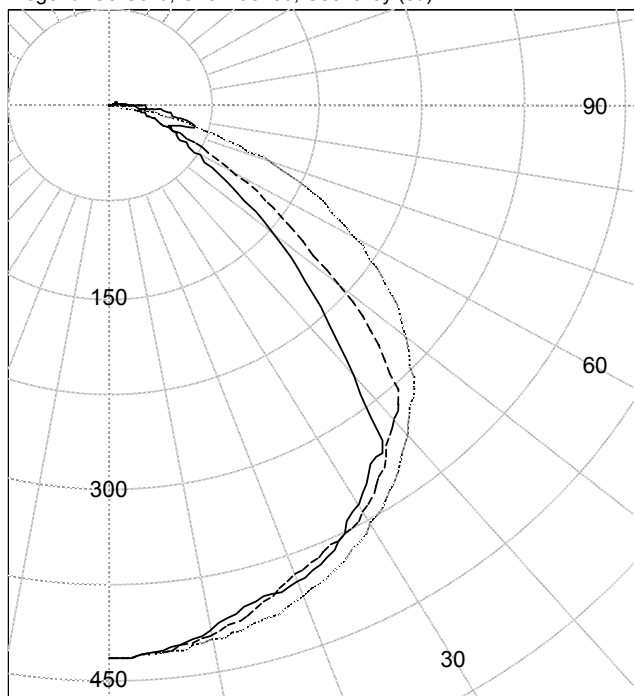
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Tested at 120V 60Hz with luminous opening horizontal facing nadir.

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



(Two plane symmetry)

C0-C90

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	431	431	431	431	431	
5.0	428	428	429	431	430	41
10.0	417	418	421	425	425	
15.0	403	402	408	415	418	116
20.0	397	394	391	404	408	
25.0	383	382	381	386	395	177
30.0	360	359	367	366	378	
35.0	335	336	345	343	358	214
40.0	276	295	320	322	335	
45.0	208	223	281	300	310	204
50.0	154	168	217	272	280	
55.0	104	116	153	229	245	150
60.0	70	76	106	185	204	
65.0	53	52	67	124	163	88
70.0	45	42	41	62	117	
75.0	64	43	29	34	71	46
80.0	49	49	21	16	33	
85.0	38	32	25	8	6	23
90.0	22	21	15	4	0	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	333	N / A	30.9
0-40	548	N / A	50.7
0-60	902	N / A	83.5
0-90	1059	N / A	98.0
40-90	512	N / A	47.4
60-90	157	N / A	14.6
90-180	21	N / A	2.0
0-180	1080	N / A	100.0

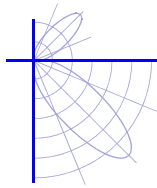
Total Light Output = 1,080 lm

Signed:

E Southgate

Eric Southgate
Authorized Signatory

Date of test 10-Oct-2014
Date of report 15-Oct-2014



Test Report No. LLI-14272-8

OptoLum "EcoLine" Circular Extruded Aluminum Luminaire. Cat No. EL-RD-S--358USD-A072000

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

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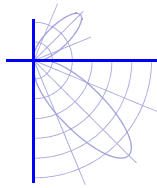
Curved clear plastic lens. Luminous Opening ~ 72 x 0.4 x 0.07".

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

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

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	431	431	431	431	431
2.5	430	430	432	432	431
5.0	428	428	429	431	430
7.5	425	425	425	427	428
10.0	417	418	421	425	425
12.5	410	410	415	421	422
15.0	403	402	408	415	418
17.5	399	396	400	411	414
20.0	397	394	391	404	408
22.5	391	390	385	395	402
25.0	383	382	381	386	395
27.5	371	372	374	375	387
30.0	360	359	367	366	378
32.5	346	348	357	354	369
35.0	335	336	345	343	358
37.5	319	330	331	331	347
40.0	276	295	320	322	335
42.5	240	261	309	312	322
45.0	208	223	281	300	310
47.5	182	193	252	286	296
50.0	154	168	217	272	280
52.5	128	141	181	253	263
55.0	104	116	153	229	245
57.5	85	94	130	207	226
60.0	70	76	106	185	204
62.5	60	62	84	159	183
65.0	53	52	67	124	163
67.5	49	47	52	87	141
70.0	45	42	41	62	117
72.5	51	39	35	47	92
75.0	64	43	29	34	71
77.5	58	53	24	23	50
80.0	49	49	21	16	33
82.5	42	40	21	12	16
85.0	38	32	25	8	6
87.5	29	28	21	5	1
90.0	22	21	15	4	0



Test Report No. LLI-14272-8

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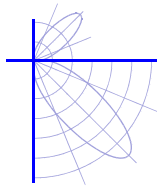
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Tested at 120V 60Hz with luminous opening horizontal facing nadir.

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	22	21	15	4	0
92.5	19	18	13	2	0
95.0	14	15	11	2	0
97.5	11	10	8	2	0
100.0	10	9	8	1	0
102.5	8	8	6	1	0
105.0	7	6	6	1	0
107.5	6	6	6	1	0
110.0	6	5	5	0	0
112.5	5	5	4	0	0
115.0	5	5	3	0	0
117.5	5	5	3	0	0
120.0	5	5	3	0	0
122.5	6	6	3	0	0
125.0	6	5	3	0	0
127.5	5	4	3	0	0
130.0	5	4	2	0	0
132.5	4	3	2	0	0
135.0	4	4	2	0	0
137.5	5	4	1	0	0
140.0	4	3	0	0	0
142.5	3	2	0	0	0
145.0	2	1	0	0	0
147.5	1	0	0	0	0
150.0	0	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



Test Report No. LLI-14272-8

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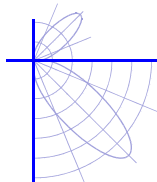
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Tested at 120V 60Hz with luminous opening horizontal facing nadir.

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	119	119	119	119		116	116	116	116		110	110	110		105	105	105		100	100	98
1	109	105	101	97		106	102	99	95		98	95	92		93	91	89		90	88	84
2	100	92	86	81		97	90	85	80		87	82	78		83	79	76		80	77	71
3	92	82	74	68		89	80	73	68		77	71	66		74	69	65		71	67	61
4	85	73	65	59		82	72	64	58		69	63	57		67	61	56		64	59	53
5	78	66	57	51		76	65	57	51		62	55	50		60	54	49		58	53	47
6	72	60	51	45		70	59	51	45		57	50	44		55	48	44		53	48	41
7	67	54	46	40		65	53	45	40		52	45	39		50	44	39		49	43	37
8	63	50	41	36		61	49	41	36		47	40	35		46	40	35		45	39	33
9	59	46	38	32		57	45	37	32		44	37	32		42	36	32		41	36	30
10	55	42	34	29		54	42	34	29		40	34	29		39	33	29		38	33	27



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

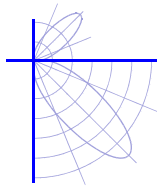
LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.407, 0.387)
	CIE 1976 (u', v') ⁽¹⁾	(0.238, 0.510)
	Correlated Color Temperature (CCT) ⁽¹⁾	3430 K
	Color Spatial Uniformity ⁽²⁾	0.0044
	Color Rendering Index (Ra) ⁽¹⁾	85
	Special CRI 9 (R _g) ^{(1),(3)}	28
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-0.0021
Scotopic/Photopic Ratio ^{(1),(3)}	1.53	

Electrical	Voltage	120 V	(Setpoint 1)
	Frequency	60 Hz	
	Current	0.2193 A	
	Power	24.997 W	
	Power Factor	0.949	
	Current THD	9.35 %	
	Voltage	277 V	(Setpoint 2)
	Frequency	60 Hz	
	Current	0.169 A	
	Power	30.37 W	
Power Factor	0.649		
Current THD	28.09 %		

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



Test Report No. LLI-14272-8

OptoLum "EcoLine" Circular Extruded Aluminum Luminaire. Cat No. EL-RD-S--358USD-A072000

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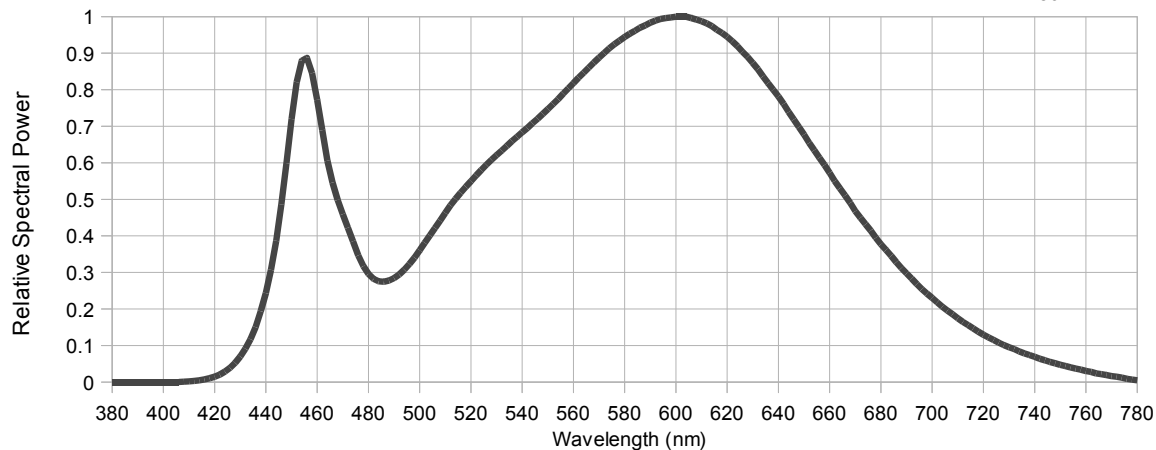
One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.

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

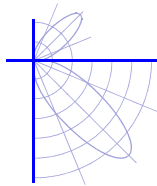
LM-79 Performance Data

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

380	2.94E-04	480	2.96E-01	580	9.44E-01	680	3.77E-01
385	1.19E-04	485	2.75E-01	585	9.65E-01	685	3.36E-01
390	7.48E-05	490	2.84E-01	590	9.83E-01	690	2.97E-01
395	3.37E-05	495	3.15E-01	595	9.95E-01	695	2.61E-01
400	0.00E+00	500	3.61E-01	600	1.00E+00	700	2.30E-01
405	1.48E-04	505	4.12E-01	605	9.98E-01	705	2.01E-01
410	1.72E-03	510	4.63E-01	610	9.87E-01	710	1.74E-01
415	5.87E-03	515	5.09E-01	615	9.69E-01	715	1.51E-01
420	1.46E-02	520	5.50E-01	620	9.45E-01	720	1.30E-01
425	3.40E-02	525	5.87E-01	625	9.12E-01	725	1.11E-01
430	6.99E-02	530	6.21E-01	630	8.74E-01	730	9.55E-02
435	1.34E-01	535	6.53E-01	635	8.27E-01	735	8.11E-02
440	2.43E-01	540	6.83E-01	640	7.82E-01	740	6.90E-02
445	4.36E-01	545	7.14E-01	645	7.29E-01	745	5.70E-02
450	7.20E-01	550	7.47E-01	650	6.77E-01	750	4.69E-02
455	8.83E-01	555	7.82E-01	655	6.24E-01	755	3.84E-02
460	7.72E-01	560	8.18E-01	660	5.73E-01	760	3.00E-02
465	5.76E-01	565	8.53E-01	665	5.20E-01	765	2.27E-02
470	4.59E-01	570	8.88E-01	670	4.68E-01	770	1.63E-02
475	3.66E-01	575	9.19E-01	675	4.23E-01	775	1.05E-02
						780	4.77E-03



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



Test Report No. LLI-14272-8

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

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	(0.238, 0.508)	(0.238, 0.508)
10	(0.238, 0.509)	(0.238, 0.508)
20	(0.238, 0.508)	(0.238, 0.508)
30	(0.238, 0.509)	(0.238, 0.509)
40	(0.239, 0.510)	(0.238, 0.510)
50	(0.239, 0.511)	(0.238, 0.510)
60	(0.239, 0.511)	(0.239, 0.511)
70	(0.240, 0.511)	(0.240, 0.514)
80	I <= 10 %	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	1.5 hour
		Total Operation Time	16.25 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°		

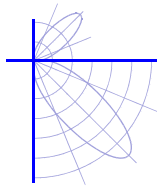
PhotoResearch PR-670 spectroradiometer (380 - 780 nm., 2 nm. per pixel) measuring at a distance from the sample deemed greater than five times the maximum observed luminous opening dimension.

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)



Test Report No. LLI-14272-8

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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.

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