

Report of Test LLI-14272-9

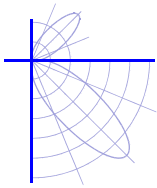
OptoLum "EcoLine" Circular Extruded Aluminum Luminaire. Cat No. EL-RD-S--358UOD-A072000
Circular extruded housing with extents ~ 72.375" x 0.7" diameter.
Twelve white PCB sections marked "OptoLum EcoLine SLO R4.1" with five LEDs each on 1.187" centers.
Curved opal plastic lens. Luminous Opening ~ 72 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	891 lm	Min Power Factor	0.65 @ 277 V
Luminaire Power	25.2 W	Max THD(i)*	22.0 % @ 277 V
Luminous Efficacy	35.4 lm/W	SC along*, across*	1.26 , 1.28
CCT	3280 K	SC Diagonal*	1.40
CIE(x,y) 1931	(0.416, 0.391)		
CRI	85		
0-60° Zonal Flux %	75.8 %		

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



Test Report No. LLI-14272-9

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

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

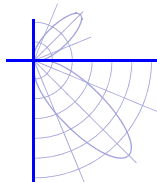
Twelve white PCB sections marked "OptoLum EcoLine SLO R4.1" with five LEDs each on 1.187" centers.

Curved 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.





Test Report No. LLI-14272-9

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

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

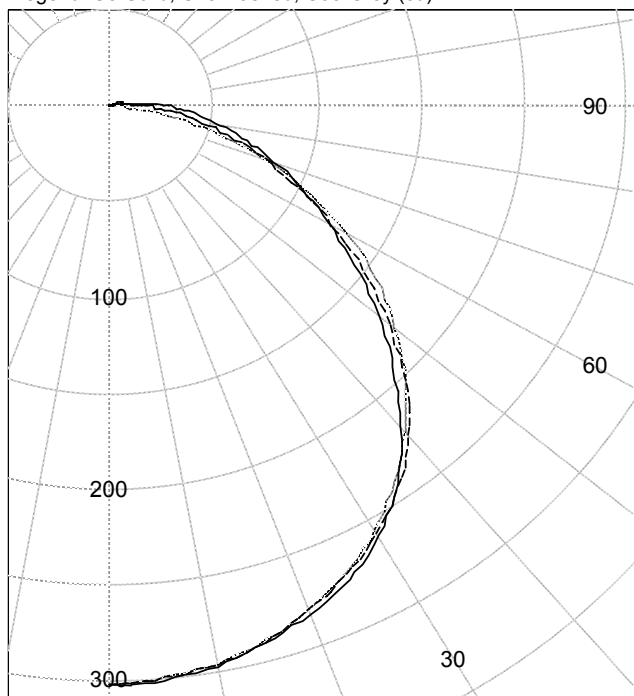
Twelve white PCB sections marked "OptoLum EcoLine SLO R4.1" with five LEDs each on 1.187" centers.

Curved 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.

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	302	302	302	302	302	
5.0	301	300	300	301	300	29
10.0	297	296	296	298	296	
15.0	290	289	290	291	290	82
20.0	283	282	281	283	281	
25.0	273	271	270	271	269	125
30.0	259	259	258	257	256	
35.0	241	242	243	241	240	151
40.0	218	220	225	223	222	
45.0	193	195	202	204	202	154
50.0	169	170	175	183	180	
55.0	145	145	149	160	157	135
60.0	123	122	124	133	132	
65.0	103	101	100	104	106	102
70.0	85	83	78	76	80	
75.0	69	66	59	52	53	63
80.0	54	51	42	32	28	
85.0	41	38	29	16	8	30
90.0	29	26	18	7	0	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	235	N / A	26.4
0-40	386	N / A	43.4
0-60	675	N / A	75.8
0-90	870	N / A	97.7
40-90	484	N / A	54.3
60-90	195	N / A	21.9
90-180	21	N / A	2.3
0-180	891	N / A	100.0

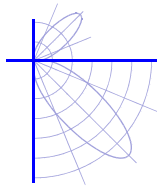
Total Light Output = 891 lm

Signed:

E Southgate

Eric Southgate
Authorized Signatory

Date of test 10-Oct-2014
Date of report 17-Oct-2014



Test Report No. LLI-14272-9

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

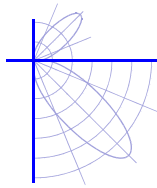
Curved opal plastic lens. Luminous Opening ~ 72 x 0.4 x 0.07".

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

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

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	302	302	302	302	302
2.5	302	301	301	302	300
5.0	301	300	300	301	300
7.5	299	298	298	300	298
10.0	297	296	296	298	296
12.5	294	293	294	295	293
15.0	290	289	290	291	290
17.5	287	286	286	287	285
20.0	283	282	281	283	281
22.5	278	277	276	277	275
25.0	273	271	270	271	269
27.5	267	266	264	264	263
30.0	259	259	258	257	256
32.5	251	251	250	249	248
35.0	241	242	243	241	240
37.5	231	232	234	232	231
40.0	218	220	225	223	222
42.5	206	207	214	214	212
45.0	193	195	202	204	202
47.5	181	182	188	193	191
50.0	169	170	175	183	180
52.5	157	158	162	172	169
55.0	145	145	149	160	157
57.5	134	133	136	147	144
60.0	123	122	124	133	132
62.5	112	112	111	118	119
65.0	103	101	100	104	106
67.5	93	92	89	89	93
70.0	85	83	78	76	80
72.5	76	74	68	63	66
75.0	69	66	59	52	53
77.5	61	58	50	41	39
80.0	54	51	42	32	28
82.5	47	44	35	23	17
85.0	41	38	29	16	8
87.5	35	32	23	11	2
90.0	29	26	18	7	0



Test Report No. LLI-14272-9

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

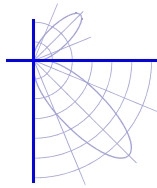
Curved opal plastic lens. Luminous Opening ~ 72 x 0.4 x 0.07".

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

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

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	29	26	18	7	0
92.5	24	21	14	4	0
95.0	20	17	10	2	0
97.5	16	13	7	2	0
100.0	12	10	5	1	0
102.5	10	8	5	1	1
105.0	8	7	4	1	0
107.5	7	6	4	1	0
110.0	7	6	4	1	0
112.5	6	5	3	0	0
115.0	6	5	3	0	0
117.5	5	5	3	0	0
120.0	5	4	2	0	0
122.5	5	4	2	0	0
125.0	4	3	2	0	0
127.5	4	3	1	0	0
130.0	3	2	1	0	0
132.5	3	2	1	0	0
135.0	2	2	1	0	0
137.5	2	2	0	0	0
140.0	2	1	0	0	0
142.5	1	1	0	0	0
145.0	1	0	0	0	0
147.5	0	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-14272-9

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

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		105	105	105		100	100	98
1	108	103	98	94		105	100	96	92		95	92	89		91	88	86		87	85	81
2	98	89	82	76		95	87	81	75		83	78	73		80	75	71		76	72	67
3	89	78	70	63		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	35		48	40	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	28		40	33	28		39	33	28		38	32	26
10	52	39	31	26		51	38	31	26		37	30	26		36	30	25		35	29	23



Test Report No. LLI-14272-9

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

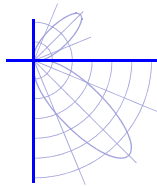
Tested at 120V 60Hz with luminous opening horizontal facing nadir.

LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.416, 0.391)	
	CIE 1976 (u', v') ⁽¹⁾	(0.242, 0.513)	
	Correlated Color Temperature (CCT) ⁽¹⁾	3280 K	
	Color Spatial Uniformity ⁽²⁾	0.0051	
	Color Rendering Index (Ra) ⁽¹⁾	85	
	Special CRI 9 (R _g) ^{(1),(3)}	29	
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-0.0019	
	Scotopic/Photopic Ratio ^{(1),(3)}	1.48	
Electrical		Voltage	120 V (Setpoint 1)
		Frequency	60 Hz
		Current	0.2209 A
		Power	25.17 W
		Power Factor	0.95
		Current THD	9.34 %
		Voltage	277 V (Setpoint 2)
		Frequency	60 Hz
		Current	0.1682 A
		Power	30.1 W
		Power Factor	0.646
		Current THD	22 %

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-14272-9

OptoLum "EcoLine" Circular Extruded Aluminum Luminaire. Cat No. EL-RD-S--358UOD-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 opal plastic lens. Luminous Opening ~ 72 x 0.4 x 0.07".

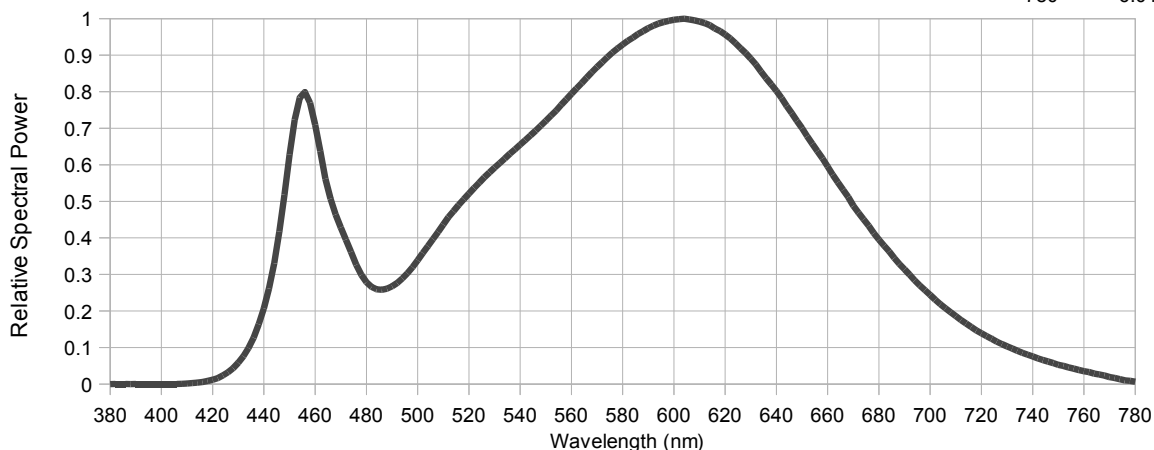
One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.

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

LM-79 Performance Data

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

380	0.00E+00	480	2.79E-01	580	9.29E-01	680	3.95E-01
385	0.00E+00	485	2.59E-01	585	9.53E-01	685	3.54E-01
390	0.00E+00	490	2.67E-01	590	9.74E-01	690	3.14E-01
395	1.11E-05	495	2.96E-01	595	9.89E-01	695	2.77E-01
400	2.58E-05	500	3.39E-01	600	9.97E-01	700	2.44E-01
405	1.39E-04	505	3.87E-01	605	9.99E-01	705	2.13E-01
410	1.37E-03	510	4.36E-01	610	9.92E-01	710	1.86E-01
415	4.62E-03	515	4.81E-01	615	9.78E-01	715	1.61E-01
420	1.17E-02	520	5.21E-01	620	9.57E-01	720	1.39E-01
425	2.77E-02	525	5.58E-01	625	9.26E-01	725	1.20E-01
430	5.80E-02	530	5.92E-01	630	8.91E-01	730	1.03E-01
435	1.12E-01	535	6.24E-01	635	8.46E-01	735	8.83E-02
440	2.07E-01	540	6.55E-01	640	8.02E-01	740	7.54E-02
445	3.74E-01	545	6.87E-01	645	7.51E-01	745	6.36E-02
450	6.28E-01	550	7.21E-01	650	7.00E-01	750	5.27E-02
455	7.91E-01	555	7.56E-01	655	6.47E-01	755	4.38E-02
460	7.10E-01	560	7.94E-01	660	5.95E-01	760	3.52E-02
465	5.34E-01	565	8.31E-01	665	5.42E-01	765	2.72E-02
470	4.28E-01	570	8.67E-01	670	4.88E-01	770	1.91E-02
475	3.44E-01	575	9.01E-01	675	4.42E-01	775	1.16E-02
						780	6.01E-03



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



Test Report No. LLI-14272-9

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

LM-79 Performance Data

Spatial measurements

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
0	(0.243, 0.513)	(0.243, 0.513)
10	(0.243, 0.513)	(0.243, 0.513)
20	(0.243, 0.513)	(0.243, 0.513)
30	(0.243, 0.513)	(0.243, 0.513)
40	(0.243, 0.514)	(0.243, 0.514)
50	(0.242, 0.513)	(0.244, 0.514)
60	(0.240, 0.512)	(0.243, 0.514)
70	(0.238, 0.511)	(0.243, 0.513)
80	(0.239, 0.512)	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	2 hour
		Total Operation Time	4.5 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°		

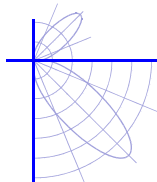
PhotoResearch PR-670 spectroradiometer (380 - 780 nm., 2 nm. per pixel) measuring at a distance from the sample deemed greater than five times the maximum observed luminous opening dimension.

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)



Test Report No. LLI-14272-9

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

Test Distance: 8.0 metres

Test Temperature: 24.7 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.