

# Report of Test

## LLI-14188-13D

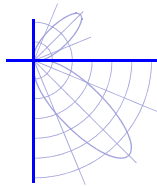
Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358USD-A072000.  
 Grey, circular arc section aluminum housing, grey plastic end-caps (extent: 72.2" x 1.0" x 0.4" high).  
 Curved profile clear lens forms luminous opening of 72" x 0.5" x 0.1" high.  
 24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" centers.  
 One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.  
 Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.



### Performance Summary

Total Light Output	747 lm	Min Power Factor	0.56 @ 277 V
Luminaire Power	15.3 W	Max THD(i)*	23.4 % @ 277 V
Luminous Efficacy	48.8 lm/W	SC along*, across*	1.30 , 1.30
CCT	3420 K	SC Diagonal*	1.42
CIE(x,y)	(0.409, 0.391)		
CRI	85		
0-60° Zonal Flux %	81.1 %		

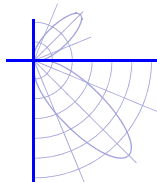
**PREPARED FOR : Optolum Inc, Tempe AZ 85281**



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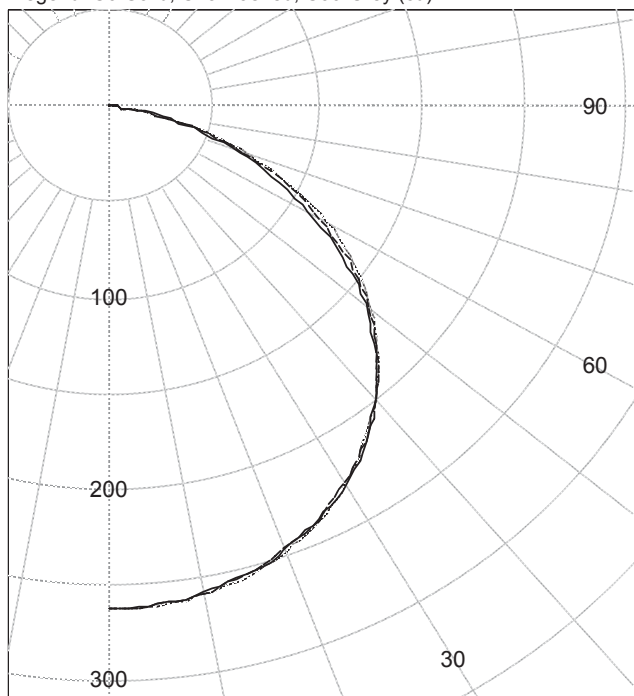
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



**INTENSITY SUMMARY (cd)**

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	263	263	263	263	263	
5.0	261	261	261	262	262	25
10.0	258	258	259	258	259	
15.0	253	253	253	253	254	72
20.0	246	247	246	247	248	
25.0	238	238	238	238	239	110
30.0	228	228	227	226	227	
35.0	215	216	214	212	214	134
40.0	199	200	200	198	199	
45.0	181	182	183	181	183	140
50.0	160	161	163	162	165	
55.0	137	139	141	143	144	125
60.0	110	112	116	121	121	
65.0	86	87	91	95	95	89
70.0	62	62	63	67	68	
75.0	38	38	40	40	42	42
80.0	16	17	20	19	18	
85.0	3	4	5	7	5	7
90.0	2	2	2	2	0	

**ZONAL FLUX AND PERCENTAGES**

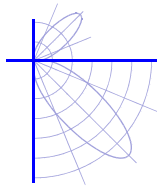
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	206	N / A	27.6
0-40	340	N / A	45.6
0-60	606	N / A	81.1
0-90	745	N / A	99.8
40-90	404	N / A	54.2
60-90	139	N / A	18.6
90-180	2	N / A	0.2
0-180	747	N / A	100.0

Total Light Output = 747 lm

Signed:

P. Lawrance  
Authorized Signatory

Date of test 22-Jul-2014  
Date of report 20-Aug-2014



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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	263	263	263	263	263
2.5	263	263	263	263	263
5.0	261	261	261	262	262
7.5	260	260	260	260	261
10.0	258	258	259	258	259
12.5	256	256	256	256	257
15.0	253	253	253	253	254
17.5	251	251	250	250	251
20.0	246	247	246	247	248
22.5	242	243	243	242	243
25.0	238	238	238	238	239
27.5	234	233	233	232	233
30.0	228	228	227	226	227
32.5	222	222	221	219	221
35.0	215	216	214	212	214
37.5	207	208	208	205	207
40.0	199	200	200	198	199
42.5	190	191	192	190	191
45.0	181	182	183	181	183
47.5	171	172	173	172	174
50.0	160	161	163	162	165
52.5	149	150	152	153	155
55.0	137	139	141	143	144
57.5	124	126	128	132	133
60.0	110	112	116	121	121
62.5	99	99	104	108	108
65.0	86	87	91	95	95
67.5	73	74	75	81	81
70.0	62	62	63	67	68
72.5	50	51	51	53	55
75.0	38	38	40	40	42
77.5	28	28	29	28	29
80.0	16	17	20	19	18
82.5	7	8	11	12	10
85.0	3	4	5	7	5
87.5	2	2	3	4	1
90.0	2	2	2	2	0







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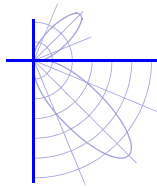
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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	2	2	2	2	0
92.5	2	2	2	1	0
95.0	1	1	1	1	0
97.5	1	1	1	0	0
100.0	1	1	1	0	0
102.5	1	1	1	0	0
105.0	1	1	0	0	0
107.5	1	1	0	0	0
110.0	1	0	0	0	0
112.5	0	0	0	0	0
115.0	0	0	0	0	0
117.5	0	0	0	0	0
120.0	0	0	0	0	0
122.5	0	0	0	0	0
125.0	0	0	0	0	0
127.5	0	0	0	0	0
130.0	0	0	0	0	0
132.5	0	0	0	0	0
135.0	0	0	0	0	0
137.5	0	0	0	0	0
140.0	0	0	0	0	0
142.5	0	0	0	0	0
145.0	0	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



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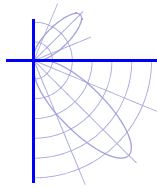
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Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.

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

RC RW	80				70				50				30				10				0
	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100	100	100	100
1	109	105	101	97	106	102	99	95	98	95	92	94	92	89	90	88	87	85	85	85	85
2	99	91	85	79	97	89	83	78	86	81	76	83	78	75	80	76	73	71	71	71	71
3	91	80	72	66	88	79	71	65	76	69	64	73	68	63	70	66	62	60	60	60	60
4	83	71	62	56	81	70	62	55	67	60	55	65	59	54	63	57	53	51	51	51	51
5	76	64	55	48	74	62	54	48	60	53	47	58	52	47	56	51	46	44	44	44	44
6	70	57	48	42	68	56	48	42	54	47	41	53	46	41	51	45	41	38	38	38	38
7	65	52	43	37	63	51	43	37	49	42	37	48	41	36	47	41	36	34	34	34	34
8	61	47	39	33	59	47	38	33	45	38	33	44	37	32	43	37	32	30	30	30	30
9	57	43	35	30	55	43	35	29	42	34	29	40	34	29	39	33	29	27	27	27	27
10	53	40	32	27	52	39	32	27	38	31	27	37	31	26	37	31	26	25	25	25	25



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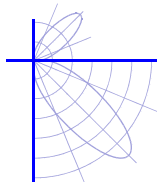
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**LM-79 Performance Data**

<b>Spectral</b>	CIE 1931 (x, y) <sup>(1)</sup>	(0.409, 0.391)
	CIE 1976 (u', v') <sup>(1)</sup>	(0.238, 0.512)
	Correlated Color Temperature (CCT) <sup>(1)</sup>	3420 K
	Color Spatial Uniformity <sup>(2)</sup>	0.0046
	Color Rendering Index (Ra) <sup>(1)</sup>	85
	Special CRI 9 (R <sub>g</sub> ) <sup>(1),(3)</sup>	27
	Distance from Planckian Locus (Duv) <sup>(1),(3)</sup>	-0.0006
	Scotopic/Photopic Ratio <sup>(1),(3)</sup>	1.53
<b>Electrical</b>	Voltage	120 V (Setpoint 1)
	Frequency	60 Hz
	Current	0.143 A
	Power	15.3 W
	Power Factor	0.89
	Current THD	10.9 %
	Voltage	240 V (Setpoint 2)
	Frequency	60 Hz
	Current	0.124 A
	Power	16.7 W
Power Factor	0.56	
Current THD	23.4 %	

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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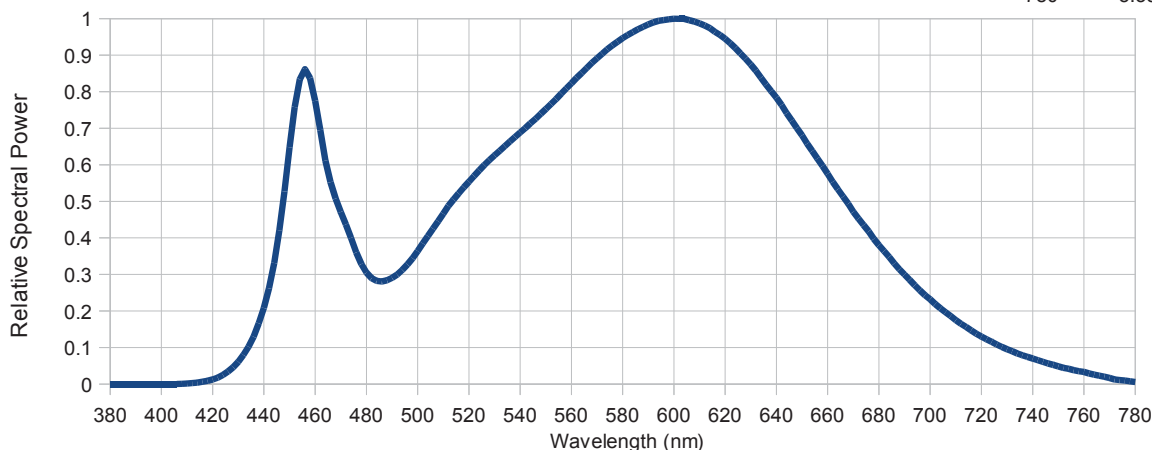
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**LM-79 Performance Data**

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

380	1.25E-04	480	3.05E-01	580	9.47E-01	680	3.80E-01
385	1.18E-04	485	2.82E-01	585	9.67E-01	685	3.39E-01
390	5.38E-05	490	2.91E-01	590	9.84E-01	690	3.00E-01
395	2.74E-05	495	3.20E-01	595	9.95E-01	695	2.63E-01
400	0.00E+00	500	3.64E-01	600	1.00E+00	700	2.32E-01
405	1.20E-04	505	4.15E-01	605	9.98E-01	705	2.02E-01
410	1.35E-03	510	4.66E-01	610	9.87E-01	710	1.75E-01
415	4.94E-03	515	5.13E-01	615	9.69E-01	715	1.52E-01
420	1.26E-02	520	5.54E-01	620	9.45E-01	720	1.30E-01
425	2.96E-02	525	5.92E-01	625	9.12E-01	725	1.12E-01
430	6.09E-02	530	6.26E-01	630	8.75E-01	730	9.54E-02
435	1.16E-01	535	6.57E-01	635	8.29E-01	735	8.13E-02
440	2.08E-01	540	6.88E-01	640	7.84E-01	740	6.99E-02
445	3.76E-01	545	7.20E-01	645	7.31E-01	745	5.85E-02
450	6.48E-01	550	7.53E-01	650	6.81E-01	750	4.85E-02
455	8.48E-01	555	7.87E-01	655	6.27E-01	755	3.98E-02
460	7.75E-01	560	8.23E-01	660	5.76E-01	760	3.29E-02
465	5.82E-01	565	8.58E-01	665	5.23E-01	765	2.42E-02
470	4.71E-01	570	8.91E-01	670	4.71E-01	770	1.66E-02
475	3.80E-01	575	9.22E-01	675	4.26E-01	775	1.04E-02
						780	5.55E-03



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





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Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.

**LM-79 Performance Data**

**Spatial measurements (lower hemisphere)**

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
0	(0.237, 0.509)	(0.237, 0.508)
10	(0.238, 0.510)	(0.237, 0.509)
20	(0.238, 0.510)	(0.237, 0.509)
30	(0.238, 0.510)	(0.237, 0.510)
40	(0.238, 0.512)	(0.238, 0.512)
50	(0.238, 0.513)	(0.238, 0.513)
60	(0.238, 0.514)	(0.239, 0.514)
70	(0.240, 0.516)	(0.239, 0.516)
80	I <= 10 %	I <= 10 %
90	I <= 10 %	I <= 10 %

**Spatial measurements (upper hemisphere)**

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	Beam to nadir	Stabilization Time	1 hour
		Total Operation Time	2.75 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.

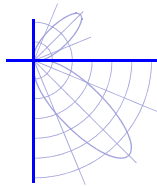
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

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 v4.7 (13th Sep 2013)





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Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.

**Test Distance:** 8.0 metres

**Test Temperature:** 24.7 degrees Celsius

**Significance:** This laboratory has no control over 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 tested.

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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Corrections have been applied to the photometric data to account for the sample luminous opening length exceeding 20% of the test distance.