

# Report of Test

## LLI-14188-6D

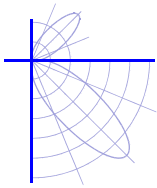
Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-H--358USD-A071982.  
 Grey, circular arc section aluminum housing, grey plastic end-caps (extent: 72.2" x 1.0" x 0.4" high).  
 Curved profile clear lens forms luminous opening of 72" x 0.5" x 0.1" high.  
 53 x ~1.3" long white PCBs marked "Optolum FineLine Rev B1", each has six SMT LEDs at ~0.2" 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	1980 lm	Min Power Factor	0.76 @ 277 V
Luminaire Power	28.7 W	Max THD(i)*	20.3 % @ 277 V
Luminous Efficacy	69.0 lm/W	SC along*, across*	1.30 , 1.30
CCT	3420 K	SC Diagonal*	1.42
CIE(x,y)	(0.409, 0.391)		
CRI	83		
0-60° Zonal Flux %	80.9 %		

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



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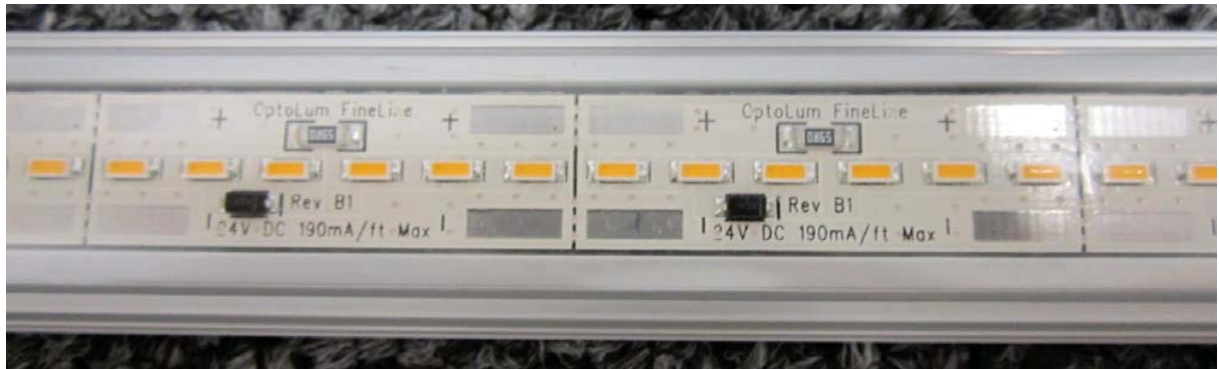
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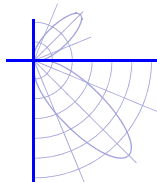
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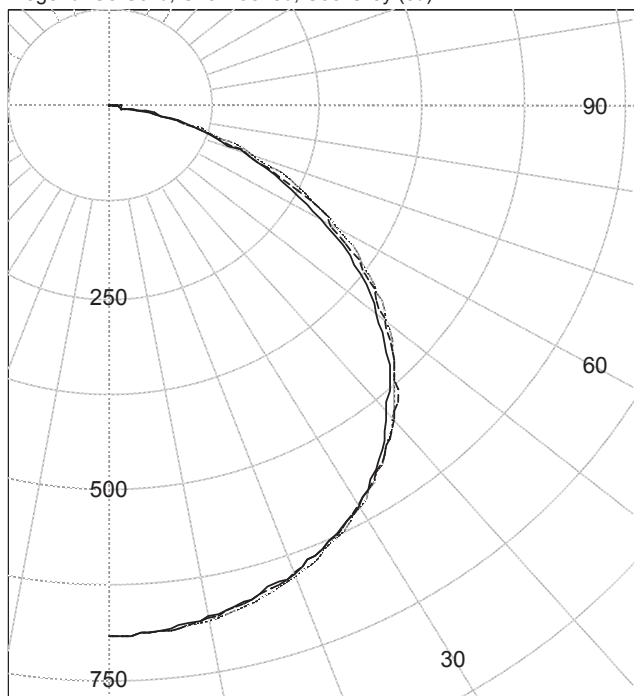
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



**INTENSITY SUMMARY (cd)**

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	691	691	691	691	691	
5.0	689	689	689	688	689	65
10.0	677	677	679	682	682	
15.0	665	665	665	669	670	188
20.0	649	649	649	650	653	
25.0	626	628	626	627	631	289
30.0	601	603	601	598	603	
35.0	565	570	569	566	570	355
40.0	520	527	534	525	531	
45.0	475	479	487	483	486	371
50.0	421	426	431	433	437	
55.0	361	370	373	381	381	332
60.0	292	300	309	321	317	
65.0	230	236	239	248	250	237
70.0	167	169	169	175	181	
75.0	104	104	104	106	110	114
80.0	47	50	53	51	49	
85.0	9	10	13	18	13	20
90.0	6	7	7	6	0	

**ZONAL FLUX AND PERCENTAGES**

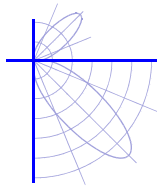
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	543	N / A	27.4
0-40	898	N / A	45.4
0-60	1602	N / A	80.9
0-90	1972	N / A	99.6
40-90	1074	N / A	54.2
60-90	370	N / A	18.7
90-180	8	N / A	0.4
0-180	1980	N / A	100.0

Total Light Output = 1,980 lm

Signed:

P. Lawrance  
Authorized Signatory

Date of test 17-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	691	691	691	691	691
2.5	690	690	690	690	691
5.0	689	689	689	688	689
7.5	682	683	685	686	686
10.0	677	677	679	682	682
12.5	671	672	673	677	677
15.0	665	665	665	669	670
17.5	655	657	658	660	662
20.0	649	649	649	650	653
22.5	638	640	638	639	643
25.0	626	628	626	627	631
27.5	614	616	615	612	618
30.0	601	603	601	598	603
32.5	584	588	585	583	588
35.0	565	570	569	566	570
37.5	543	550	552	546	551
40.0	520	527	534	525	531
42.5	498	503	512	505	509
45.0	475	479	487	483	486
47.5	448	454	461	459	463
50.0	421	426	431	433	437
52.5	395	399	402	408	409
55.0	361	370	373	381	381
57.5	327	335	340	352	350
60.0	292	300	309	321	317
62.5	265	265	277	285	284
65.0	230	236	239	248	250
67.5	197	201	199	209	215
70.0	167	169	169	175	181
72.5	134	137	135	140	145
75.0	104	104	104	106	110
77.5	78	77	76	74	78
80.0	47	50	53	51	49
82.5	16	19	29	32	28
85.0	9	10	13	18	13
87.5	7	8	9	10	4
90.0	6	7	7	6	0





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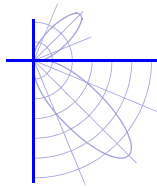
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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	6	7	7	6	0
92.5	6	6	6	4	0
95.0	5	5	5	2	0
97.5	5	5	4	2	0
100.0	4	4	3	1	0
102.5	3	3	2	1	0
105.0	3	3	2	1	0
107.5	2	2	2	1	0
110.0	2	2	1	1	0
112.5	2	2	1	1	0
115.0	2	1	1	1	0
117.5	2	1	1	0	0
120.0	1	1	1	0	0
122.5	1	1	1	0	0
125.0	1	1	1	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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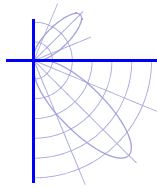
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Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.

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	100	97	106	102	99	95	98	95	92	94	92	89	90	88	87	84	84	84	84
2	99	91	85	79	97	89	83	78	86	81	76	83	78	74	79	76	73	71	71	71	71
3	91	80	72	66	88	79	71	65	76	69	64	73	67	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	63	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	40	38	38	38	38
7	65	52	43	37	63	51	43	37	49	42	36	48	41	36	46	40	36	34	34	34	34
8	61	47	39	33	59	46	38	33	45	38	32	44	37	32	43	37	32	30	30	30	30
9	57	43	35	29	55	43	35	29	41	34	29	40	34	29	39	33	29	27	27	27	27
10	53	40	32	27	52	39	32	27	38	31	26	37	31	26	36	30	26	24	24	24	24





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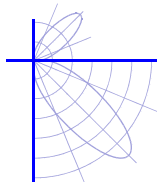
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**LM-79 Performance Data**

<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>	0.0037	
	Color Rendering Index (Ra) <sup>(1)</sup>	83	
	Special CRI 9 (R <sub>g</sub> ) <sup>(1),(3)</sup>	21	
	Distance from Planckian Locus (Duv) <sup>(1),(3)</sup>	-0.0008	
	Scotopic/Photopic Ratio <sup>(1),(3)</sup>	1.48	
<b>Electrical</b>	Voltage	120 V	(Setpoint 1)
	Frequency	60 Hz	
	Current	0.250 A	
	Power	28.7 W	
	Power Factor	0.96	
	Current THD	9.6 %	
	Voltage	240 V	(Setpoint 2)
	Frequency	60 Hz	
	Current	0.179 A	
	Power	32.4 W	
Power Factor	0.76		
Current THD	20.3 %		

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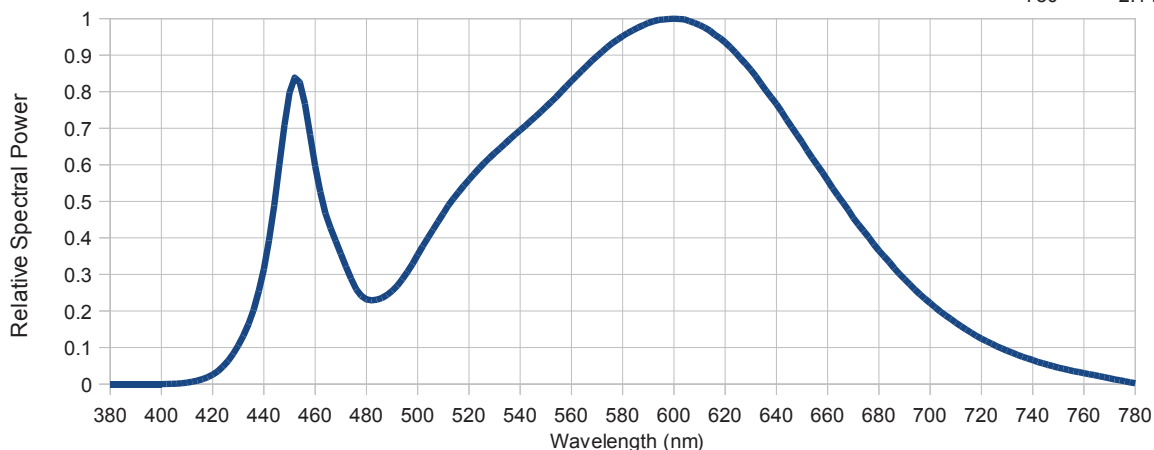
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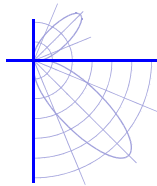
**Summary Relative Spectral Irradiance Distribution (wavelength – nm, irradiance – relative to peak = 1)**

380	0.00E+00	480	2.32E-01	580	9.52E-01	680	3.65E-01
385	0.00E+00	485	2.33E-01	585	9.72E-01	685	3.26E-01
390	0.00E+00	490	2.55E-01	590	9.88E-01	690	2.87E-01
395	0.00E+00	495	2.97E-01	595	9.97E-01	695	2.52E-01
400	0.00E+00	500	3.54E-01	600	1.00E+00	700	2.22E-01
405	7.67E-04	505	4.11E-01	605	9.96E-01	705	1.93E-01
410	3.93E-03	510	4.67E-01	610	9.82E-01	710	1.68E-01
415	1.12E-02	515	5.17E-01	615	9.62E-01	715	1.45E-01
420	2.56E-02	520	5.59E-01	620	9.35E-01	720	1.24E-01
425	5.54E-02	525	5.98E-01	625	9.00E-01	725	1.07E-01
430	1.06E-01	530	6.32E-01	630	8.60E-01	730	9.12E-02
435	1.83E-01	535	6.64E-01	635	8.13E-01	735	7.73E-02
440	3.14E-01	540	6.95E-01	640	7.66E-01	740	6.56E-02
445	5.44E-01	545	7.26E-01	645	7.13E-01	745	5.46E-02
450	7.98E-01	550	7.59E-01	650	6.62E-01	750	4.48E-02
455	7.96E-01	555	7.93E-01	655	6.09E-01	755	3.70E-02
460	5.97E-01	560	8.29E-01	660	5.58E-01	760	2.97E-02
465	4.47E-01	565	8.64E-01	665	5.06E-01	765	2.28E-02
470	3.57E-01	570	8.97E-01	670	4.54E-01	770	1.57E-02
475	2.74E-01	575	9.28E-01	675	4.10E-01	775	9.00E-03
						780	2.14E-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 (lower hemisphere)**

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
0	(0.238, 0.510)	(0.238, 0.510)
10	(0.238, 0.510)	(0.238, 0.510)
20	(0.238, 0.510)	(0.238, 0.510)
30	(0.238, 0.511)	(0.238, 0.511)
40	(0.238, 0.511)	(0.238, 0.512)
50	(0.238, 0.512)	(0.238, 0.513)
60	(0.238, 0.513)	(0.239, 0.514)
70	(0.238, 0.514)	(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	2 hour
		Total Operation Time	4.25 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.

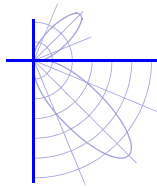
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

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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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.

**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.