

Report of Test

LLI-14188-4D

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-AL-H--358USD-A071982.
Grey, triangular section aluminum housing, grey plastic end-caps (extent: 72.6" x 1.0" x 0.7" high).
Flat clear lens forms luminous opening of 72.1" x 0.75".

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.

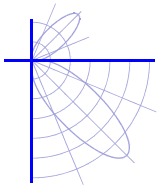
Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.



Performance Summary

Total Light Output	1818 lm	Min Power Factor	0.76 @ 277 V
Luminaire Power	28.7 W	Max THD(i)*	20.3 % @ 277 V
Luminous Efficacy	63.3 lm/W	SC along*, across*	1.30 , 1.28
CCT	3400 K	SC Diagonal*	1.40
CIE(x,y)	(0.410, 0.392)		
CRI	84		
0-60° Zonal Flux %	87.0 %		

PREPARED FOR : Optolum Inc, Tempe AZ 85281



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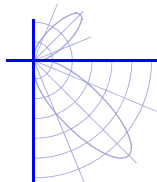
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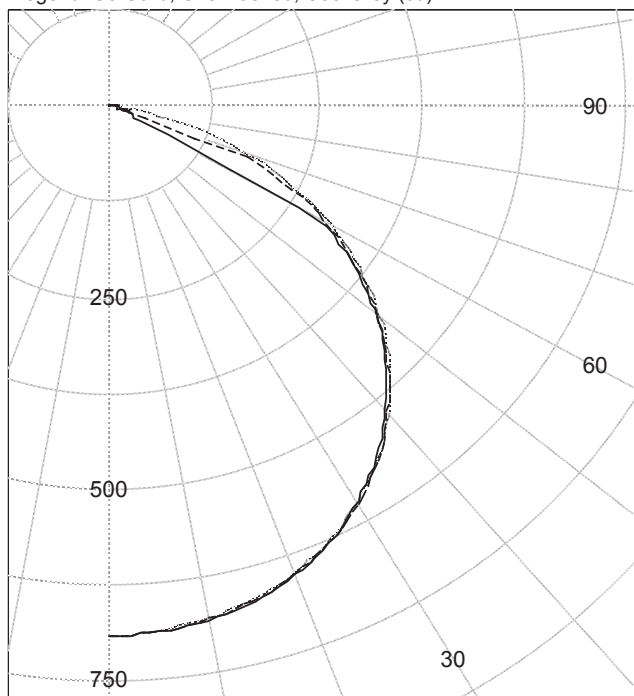
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



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	688	688	688	65
10.0	682	682	681	680	679	
15.0	670	669	668	667	666	189
20.0	653	652	650	650	649	
25.0	628	629	628	626	625	289
30.0	595	597	600	597	596	
35.0	559	560	564	564	562	351
40.0	517	516	521	525	523	
45.0	470	468	474	480	478	365
50.0	418	414	420	429	426	
55.0	357	353	363	368	368	323
60.0	266	285	299	305	307	
65.0	31	34	229	234	239	173
70.0	26	25	44	167	172	
75.0	22	20	17	101	104	53
80.0	17	16	12	10	47	
85.0	11	11	9	6	11	10
90.0	0	0	0	0	0	

ZONAL FLUX AND PERCENTAGES

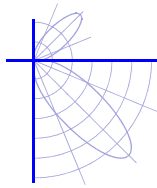
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	543	N / A	29.9
0-40	895	N / A	49.2
0-60	1582	N / A	87.0
0-90	1818	N / A	100.0
40-90	923	N / A	50.8
60-90	236	N / A	13.0
90-180	0	N / A	0.0
0-180	1818	N / A	100.0

Total Light Output = 1,818 lm

Signed:

P. Lawrance
Authorized Signatory

Date of test 12-Jul-2014
Date of report 20-Aug-2014



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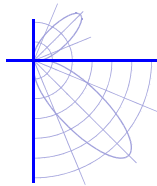
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	691	691	691	691	691
2.5	691	691	690	690	690
5.0	689	689	688	688	688
7.5	686	686	685	684	684
10.0	682	682	681	680	679
12.5	676	676	675	674	673
15.0	670	669	668	667	666
17.5	662	661	660	659	658
20.0	653	652	650	650	649
22.5	641	641	640	639	637
25.0	628	629	628	626	625
27.5	613	614	615	612	611
30.0	595	597	600	597	596
32.5	578	578	583	581	580
35.0	559	560	564	564	562
37.5	538	539	543	545	543
40.0	517	516	521	525	523
42.5	494	493	498	503	501
45.0	470	468	474	480	478
47.5	445	442	447	455	453
50.0	418	414	420	429	426
52.5	389	384	392	399	397
55.0	357	353	363	368	368
57.5	324	320	332	337	338
60.0	266	285	299	305	307
62.5	51	196	266	270	273
65.0	31	34	229	234	239
67.5	29	27	193	199	205
70.0	26	25	44	167	172
72.5	23	22	20	133	137
75.0	22	20	17	101	104
77.5	20	18	14	69	73
80.0	17	16	12	10	47
82.5	15	14	11	7	25
85.0	11	11	9	6	11
87.5	4	4	5	3	3
90.0	0	0	0	0	0



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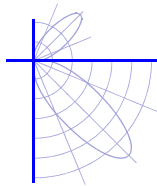
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Coefficients Of Utilization * - Zonal Cavity Method
Effective Floor Cavity Reflectance 0.20

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	110	106	102	99	108	104	100	97	100	97	94	96	93	91	92	90	89	87	87	87	87
2	101	93	87	82	98	92	86	81	88	83	79	85	81	77	82	79	76	74	74	74	74
3	93	83	75	69	90	81	74	69	78	72	67	76	70	66	73	69	65	63	63	63	63
4	85	74	65	59	83	72	65	59	70	63	58	68	62	57	65	60	56	54	54	54	54
5	78	66	57	51	76	65	57	51	63	56	50	61	55	50	59	54	49	47	47	47	47
6	72	59	51	45	70	58	50	44	57	49	44	55	49	44	53	48	43	41	41	41	41
7	67	54	45	39	65	53	45	39	52	44	39	50	44	39	49	43	38	37	37	37	37
8	62	49	41	35	61	48	41	35	47	40	35	46	39	35	45	39	34	33	33	33	33
9	58	45	37	32	57	44	37	32	43	36	31	42	36	31	41	35	31	29	29	29	29
10	55	42	34	29	53	41	34	29	40	33	28	39	33	28	38	32	28	26	26	26	26





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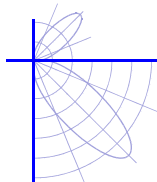
LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.409, 0.391)
	CIE 1976 (u', v') ⁽¹⁾	(0.238, 0.512)
	Correlated Color Temperature (CCT) ⁽¹⁾	3410 K
	Color Spatial Uniformity ⁽²⁾	0.0041
	Color Rendering Index (Ra) ⁽¹⁾	84
	Special CRI 9 (R ₉) ^{(1),(3)}	22
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-0.0009
	Scotopic/Photopic Ratio ^{(1),(3)}	1.48
Electrical	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	32.5 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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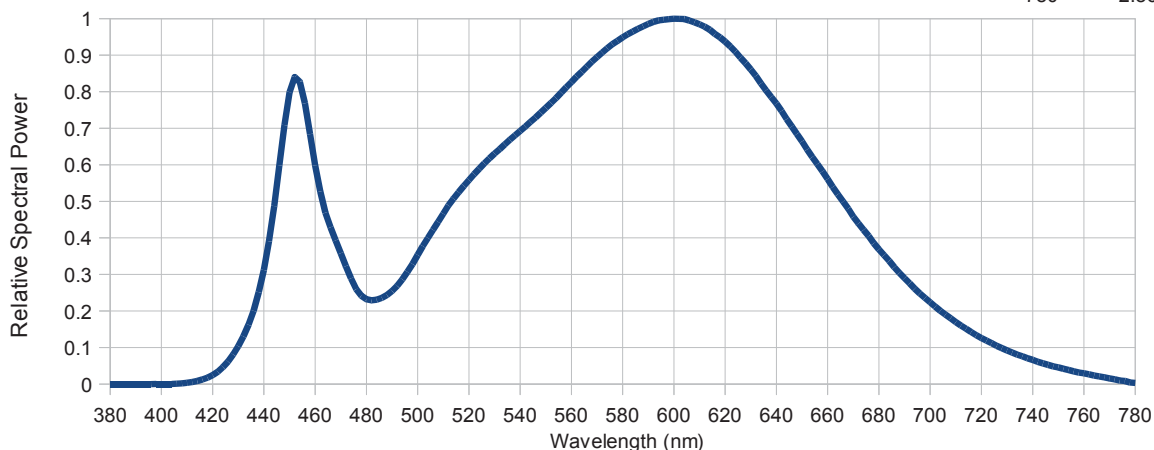
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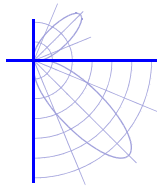
LM-79 Performance Data

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

380	0.00E+00	480	2.32E-01	580	9.49E-01	680	3.68E-01
385	0.00E+00	485	2.33E-01	585	9.69E-01	685	3.28E-01
390	0.00E+00	490	2.55E-01	590	9.85E-01	690	2.90E-01
395	0.00E+00	495	2.97E-01	595	9.96E-01	695	2.54E-01
400	0.00E+00	500	3.53E-01	600	1.00E+00	700	2.24E-01
405	5.58E-04	505	4.11E-01	605	9.97E-01	705	1.95E-01
410	3.43E-03	510	4.66E-01	610	9.85E-01	710	1.70E-01
415	1.04E-02	515	5.16E-01	615	9.64E-01	715	1.47E-01
420	2.45E-02	520	5.58E-01	620	9.37E-01	720	1.26E-01
425	5.39E-02	525	5.97E-01	625	9.01E-01	725	1.08E-01
430	1.04E-01	530	6.31E-01	630	8.61E-01	730	9.22E-02
435	1.81E-01	535	6.62E-01	635	8.13E-01	735	7.81E-02
440	3.12E-01	540	6.93E-01	640	7.67E-01	740	6.60E-02
445	5.43E-01	545	7.23E-01	645	7.15E-01	745	5.45E-02
450	7.99E-01	550	7.56E-01	650	6.64E-01	750	4.53E-02
455	7.98E-01	555	7.90E-01	655	6.12E-01	755	3.65E-02
460	5.98E-01	560	8.27E-01	660	5.61E-01	760	2.93E-02
465	4.49E-01	565	8.61E-01	665	5.09E-01	765	2.20E-02
470	3.58E-01	570	8.95E-01	670	4.58E-01	770	1.55E-02
475	2.74E-01	575	9.25E-01	675	4.14E-01	775	8.95E-03
						780	2.86E-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	(0.239, 0.510)	(0.238, 0.510)
20	(0.239, 0.510)	(0.239, 0.510)
30	(0.238, 0.511)	(0.239, 0.511)
40	(0.238, 0.511)	(0.239, 0.512)
50	(0.238, 0.512)	(0.239, 0.513)
60	(0.237, 0.511)	(0.239, 0.515)
70	I <= 10 %	(0.239, 0.516)
80	I <= 10 %	I <= 10 %
-	-	-

Spatial measurements (upper hemisphere)

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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	22 hour
		Total Operation Time	25.5 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.

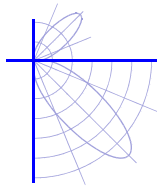
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

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.