

Report of Test

LLI-14188-2D

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-RD-H--358USD-A071982.

Grey, round section aluminum housing, grey plastic end-caps (extent: 72.25" x 0.7" dia).

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.

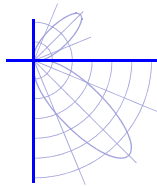
Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.



Performance Summary

Total Light Output	1797 lm	Min Power Factor	0.76 @ 277 V
Luminaire Power	28.7 W	Max THD(i)*	20.3 % @ 277 V
Luminous Efficacy	62.6 lm/W	SC along*, across*	1.28 , 1.20
CCT	3380 K	SC Diagonal*	1.34
CIE(x,y)	(0.412, 0.393)		
CRI	83		
0-60° Zonal Flux %	81.6 %		

PREPARED FOR : Optolum Inc, Tempe AZ 85281



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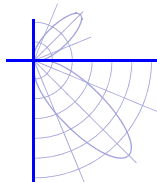
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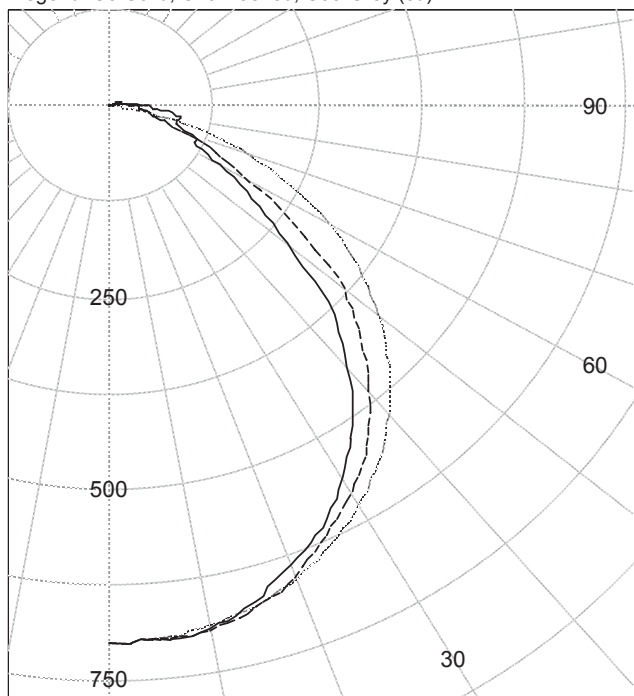
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	701	701	701	701	701	
5.0	701	700	698	698	698	67
10.0	693	695	694	689	689	
15.0	670	673	678	680	675	191
20.0	638	641	653	662	656	
25.0	607	609	617	636	631	286
30.0	560	569	583	605	601	
35.0	508	519	541	563	566	337
40.0	445	459	486	516	525	
45.0	383	394	428	466	477	330
50.0	277	299	369	413	424	
55.0	211	224	275	349	365	256
60.0	154	165	194	276	304	
65.0	112	114	140	206	238	159
70.0	100	96	91	129	170	
75.0	81	75	59	67	106	83
80.0	88	74	47	38	49	
85.0	62	61	37	18	11	43
90.0	43	41	32	9	0	

ZONAL FLUX AND PERCENTAGES

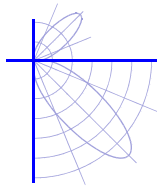
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	543	N / A	30.2
0-40	880	N / A	49.0
0-60	1466	N / A	81.6
0-90	1751	N / A	97.4
40-90	871	N / A	48.4
60-90	284	N / A	15.8
90-180	46	N / A	2.6
0-180	1797	N / A	100.0

Total Light Output = 1,797 lm

Signed:

P. Lawrance
Authorized Signatory

Date of test 24-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	701	701	701	701	701
2.5	700	700	700	700	700
5.0	701	700	698	698	698
7.5	700	700	697	694	694
10.0	693	695	694	689	689
12.5	685	685	688	685	683
15.0	670	673	678	680	675
17.5	653	659	668	672	667
20.0	638	641	653	662	656
22.5	624	625	636	651	645
25.0	607	609	617	636	631
27.5	586	591	599	620	617
30.0	560	569	583	605	601
32.5	538	542	563	586	584
35.0	508	519	541	563	566
37.5	479	489	515	541	546
40.0	445	459	486	516	525
42.5	410	424	460	491	502
45.0	383	394	428	466	477
47.5	324	360	398	441	451
50.0	277	299	369	413	424
52.5	243	257	321	382	395
55.0	211	224	275	349	365
57.5	181	194	235	312	335
60.0	154	165	194	276	304
62.5	129	138	164	239	272
65.0	112	114	140	206	238
67.5	113	99	116	168	204
70.0	100	96	91	129	170
72.5	87	86	71	93	137
75.0	81	75	59	67	106
77.5	82	70	52	50	75
80.0	88	74	47	38	49
82.5	78	75	41	26	27
85.0	62	61	37	18	11
87.5	51	49	36	13	3
90.0	43	41	32	9	0



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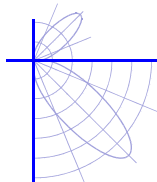
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Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	43	41	32	9	0
92.5	36	35	27	6	0
95.0	30	29	22	5	0
97.5	26	24	18	4	0
100.0	20	19	14	4	0
102.5	18	17	12	3	0
105.0	18	16	11	3	0
107.5	16	16	11	3	0
110.0	14	15	11	3	0
112.5	12	13	11	3	0
115.0	11	12	9	2	0
117.5	12	12	9	1	0
120.0	12	12	8	1	0
122.5	12	11	7	1	0
125.0	12	11	6	1	0
127.5	11	10	5	0	0
130.0	11	10	4	0	0
132.5	9	8	3	0	0
135.0	8	6	2	0	0
137.5	6	5	3	0	0
140.0	6	4	3	0	0
142.5	4	3	1	0	0
145.0	3	3	0	0	0
147.5	2	2	0	0	0
150.0	2	1	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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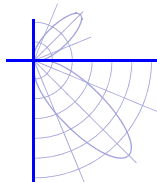
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Coefficients Of Utilization * - Zonal Cavity Method
Effective Floor Cavity Reflectance 0.20

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	118	118	118	118	115	115	115	115	110	110	110	104	104	104	100	100	100	97				
1	109	104	100	96	106	102	98	95	97	94	91	93	90	88	89	87	85	83				
2	100	92	85	80	97	90	84	79	86	81	77	82	78	74	79	75	72	70				
3	91	81	74	67	89	80	72	67	76	70	65	73	68	64	70	66	62	60				
4	84	73	64	58	82	71	63	57	68	62	56	66	60	55	63	58	54	52				
5	77	65	57	50	75	64	56	50	62	54	49	59	53	48	57	52	48	45				
6	72	59	50	44	70	58	50	44	56	49	43	54	48	43	52	47	42	40				
7	67	54	45	39	65	53	45	39	51	44	39	49	43	38	48	42	38	36				
8	62	49	41	35	60	48	40	35	47	40	35	45	39	34	44	38	34	32				
9	58	45	37	32	57	44	37	32	43	36	31	42	35	31	41	35	31	29				
10	54	42	34	29	53	41	34	29	40	33	28	39	33	28	38	32	28	26				





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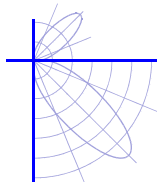
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LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.412, 0.393)	
	CIE 1976 (u', v') ⁽¹⁾	(0.239, 0.513)	
	Correlated Color Temperature (CCT) ⁽¹⁾	3380 K	
	Color Spatial Uniformity ⁽²⁾	0.0048	
	Color Rendering Index (Ra) ⁽¹⁾	83	
	Special CRI 9 (R ₉) ^{(1),(3)}	22	
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-0.0004	
	Scotopic/Photopic Ratio ^{(1),(3)}	1.47	
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	32.4 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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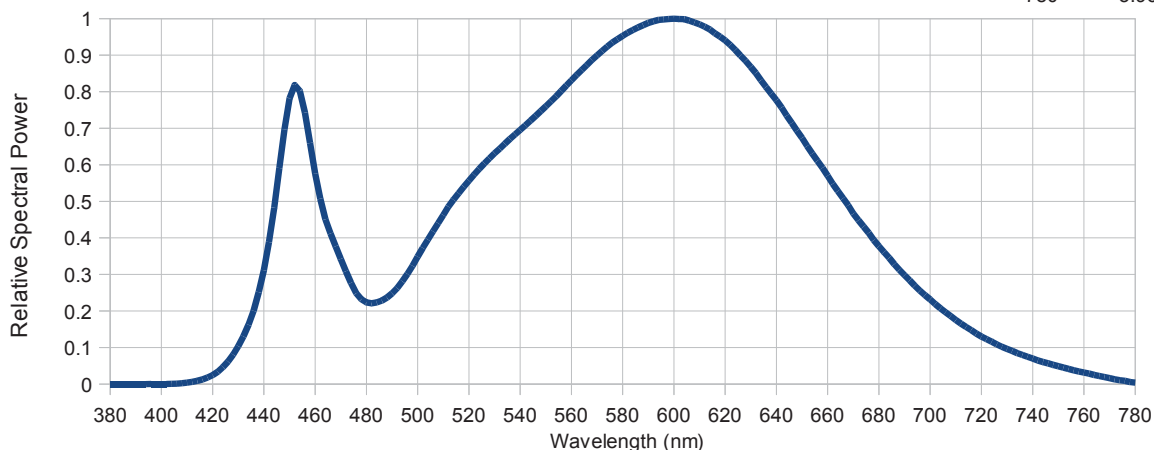
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LM-79 Performance Data

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

380	0.00E+00	480	2.23E-01	580	9.53E-01	680	3.77E-01
385	0.00E+00	485	2.26E-01	585	9.72E-01	685	3.37E-01
390	0.00E+00	490	2.48E-01	590	9.88E-01	690	2.98E-01
395	0.00E+00	495	2.91E-01	595	9.97E-01	695	2.62E-01
400	2.12E-05	500	3.48E-01	600	1.00E+00	700	2.31E-01
405	7.78E-04	505	4.07E-01	605	9.97E-01	705	2.02E-01
410	3.77E-03	510	4.62E-01	610	9.84E-01	710	1.75E-01
415	1.07E-02	515	5.13E-01	615	9.65E-01	715	1.52E-01
420	2.47E-02	520	5.56E-01	620	9.41E-01	720	1.30E-01
425	5.39E-02	525	5.96E-01	625	9.06E-01	725	1.12E-01
430	1.03E-01	530	6.31E-01	630	8.68E-01	730	9.61E-02
435	1.81E-01	535	6.64E-01	635	8.22E-01	735	8.20E-02
440	3.11E-01	540	6.96E-01	640	7.77E-01	740	6.96E-02
445	5.37E-01	545	7.27E-01	645	7.24E-01	745	5.87E-02
450	7.82E-01	550	7.60E-01	650	6.74E-01	750	4.86E-02
455	7.72E-01	555	7.95E-01	655	6.21E-01	755	3.95E-02
460	5.76E-01	560	8.31E-01	660	5.70E-01	760	3.15E-02
465	4.31E-01	565	8.66E-01	665	5.18E-01	765	2.35E-02
470	3.43E-01	570	8.99E-01	670	4.67E-01	770	1.61E-02
475	2.63E-01	575	9.29E-01	675	4.22E-01	775	9.71E-03
						780	3.96E-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	(0.239, 0.511)	(0.238, 0.511)
10	(0.239, 0.511)	(0.238, 0.511)
20	(0.239, 0.511)	(0.239, 0.511)
30	(0.239, 0.512)	(0.239, 0.512)
40	(0.239, 0.513)	(0.239, 0.513)
50	(0.239, 0.513)	(0.239, 0.515)
60	(0.239, 0.514)	(0.240, 0.516)
70	(0.239, 0.514)	(0.241, 0.517)
80	(0.239, 0.513)	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.

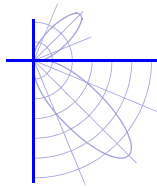
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

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.