

# Report of Test

## LLI-14188-15D

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-RD-S--358USD-A072000.

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.

Twelve 6" long white PCBs marked "Optolum FineLine SLO Rev A1", each has six SMT LEDs at 1" centers.

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

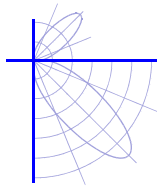
Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.



### Performance Summary

Total Light Output	356 lm	Min Power Factor	0.46 @ 277 V
Luminaire Power	9.80 W	Max THD(i)*	28.0 % @ 277 V
Luminous Efficacy	36.3 lm/W	SC along*, across*	1.28 , 1.26
CCT	3390 K	SC Diagonal*	1.38
CIE(x,y)	(0.411, 0.393)		
CRI	85		
0-60° Zonal Flux %	82.5 %		

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



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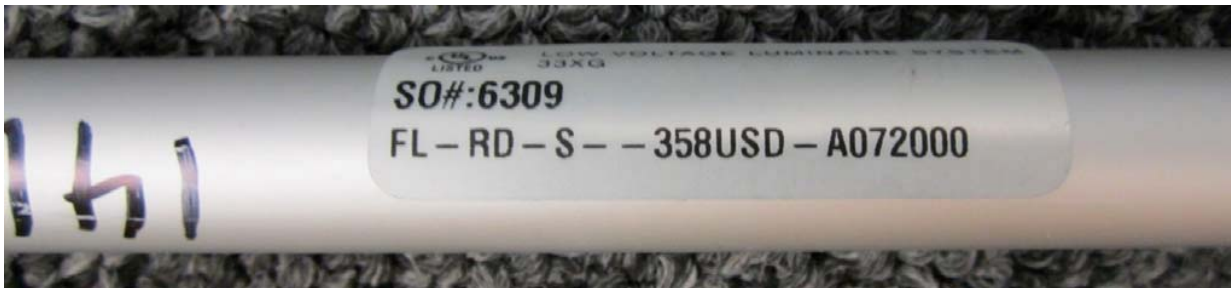
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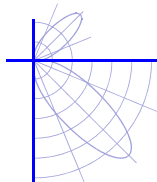
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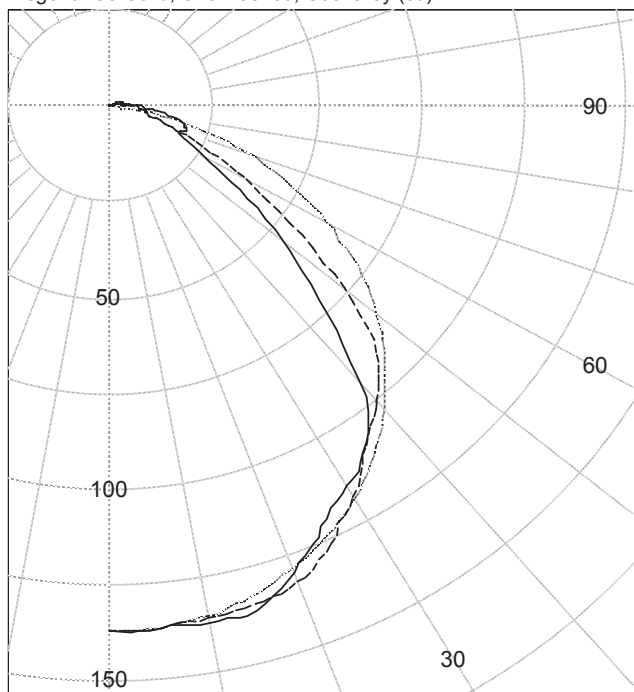
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Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

**INTENSITY SUMMARY (cd)**

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	137	137	137	137	137	
5.0	137	137	137	137	137	13
10.0	137	137	136	135	135	
15.0	136	136	135	133	132	38
20.0	129	131	132	130	129	
25.0	121	123	126	126	124	57
30.0	115	114	117	121	118	
35.0	107	108	108	115	111	69
40.0	93	98	101	106	103	
45.0	71	77	91	94	94	66
50.0	54	58	74	82	84	
55.0	38	42	53	70	73	50
60.0	26	28	37	58	60	
65.0	19	20	24	43	48	30
70.0	19	15	16	23	35	
75.0	18	16	11	12	21	16
80.0	15	15	9	7	10	
85.0	11	11	8	3	2	8
90.0	7	7	6	2	0	

**ZONAL FLUX AND PERCENTAGES**

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	108	N/A	30.4
0-40	177	N/A	49.8
0-60	293	N/A	82.5
0-90	347	N/A	97.5
40-90	170	N/A	47.8
60-90	54	N/A	15.1
90-180	9	N/A	2.5
0-180	356	N/A	100.0

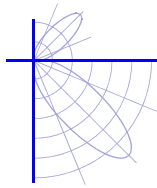
Total Light Output = 356 lm

Signed:

P. Lawrance  
Authorized Signatory

Date of test 25-Jul-2014  
Date of report 20-Aug-2014





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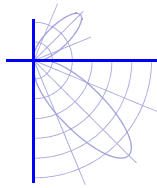
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Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.

**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	137	137	137	137	137
2.5	138	138	137	137	137
5.0	137	137	137	137	137
7.5	137	137	136	136	136
10.0	137	137	136	135	135
12.5	137	137	135	134	134
15.0	136	136	135	133	132
17.5	133	134	134	131	131
20.0	129	131	132	130	129
22.5	126	127	130	128	127
25.0	121	123	126	126	124
27.5	117	118	122	123	121
30.0	115	114	117	121	118
32.5	111	112	113	118	115
35.0	107	108	108	115	111
37.5	102	104	104	110	107
40.0	93	98	101	106	103
42.5	82	88	96	100	98
45.0	71	77	91	94	94
47.5	62	67	83	88	89
50.0	54	58	74	82	84
52.5	46	50	63	76	79
55.0	38	42	53	70	73
57.5	31	34	44	64	67
60.0	26	28	37	58	60
62.5	22	24	31	52	54
65.0	19	20	24	43	48
67.5	18	17	19	32	41
70.0	19	15	16	23	35
72.5	19	16	13	16	27
75.0	18	16	11	12	21
77.5	18	15	9	9	16
80.0	15	15	9	7	10
82.5	13	12	8	5	6
85.0	11	11	8	3	2
87.5	9	9	7	2	1
90.0	7	7	6	2	0



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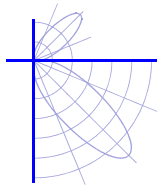
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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	7	7	6	2	0
92.5	6	6	5	1	0
95.0	5	5	3	1	0
97.5	4	4	3	1	0
100.0	4	4	3	1	0
102.5	3	3	2	1	0
105.0	4	3	2	1	0
107.5	4	3	2	1	0
110.0	3	3	2	1	0
112.5	4	3	2	1	0
115.0	4	3	2	0	0
117.5	3	3	2	0	0
120.0	3	3	2	0	0
122.5	2	2	1	0	0
125.0	2	2	1	0	0
127.5	2	2	1	0	0
130.0	2	2	1	0	0
132.5	2	1	1	0	0
135.0	1	1	1	0	0
137.5	1	1	0	0	0
140.0	1	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



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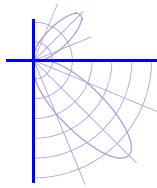
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Coefficients Of Utilization \* - Zonal Cavity Method  
Effective Floor Cavity Reflectance 0.20

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	97	97	97
1	109	104	100	97	106	102	98	95	97	94	91	93	90	88	89	87	85	83	83	83	83
2	100	92	86	80	97	90	84	79	86	81	77	82	78	75	79	76	73	71	71	71	71
3	91	82	74	68	89	80	73	67	77	71	66	74	68	64	71	66	63	61	61	61	61
4	84	73	65	58	82	71	64	58	69	62	57	66	60	56	64	59	55	52	52	52	52
5	78	65	57	51	75	64	56	50	62	55	49	60	54	49	58	52	48	46	46	46	46
6	72	59	51	44	70	58	50	44	56	49	44	54	48	43	52	47	43	40	40	40	40
7	67	54	45	40	65	53	45	39	51	44	39	50	43	38	48	42	38	36	36	36	36
8	62	49	41	35	61	48	41	35	47	40	35	46	39	35	44	38	34	32	32	32	32
9	58	45	37	32	57	45	37	32	43	36	32	42	36	31	41	35	31	29	29	29	29
10	55	42	34	29	53	41	34	29	40	33	29	39	33	28	38	32	28	26	26	26	26





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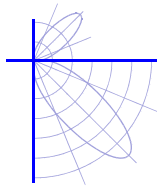
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**LM-79 Performance Data**

<b>Spectral</b>	CIE 1931 (x, y) <sup>(1)</sup>	(0.411, 0.393)
	CIE 1976 (u', v') <sup>(1)</sup>	(0.239, 0.513)
	Correlated Color Temperature (CCT) <sup>(1)</sup>	3390 K
	Color Spatial Uniformity <sup>(2)</sup>	0.0040
	Color Rendering Index (Ra) <sup>(1)</sup>	85
	Special CRI 9 (R <sub>g</sub> ) <sup>(1),(3)</sup>	28
	Distance from Planckian Locus (Duv) <sup>(1),(3)</sup>	-0.0004
	Scotopic/Photopic Ratio <sup>(1),(3)</sup>	1.52
<b>Electrical</b>	Voltage	120 V (Setpoint 1)
	Frequency	60 Hz
	Current	0.101 A
	Power	9.80 W
	Power Factor	0.81
	Current THD	16.7 %
	Voltage	240 V (Setpoint 2)
	Frequency	60 Hz
	Current	0.088 A
	Power	9.70 W
Power Factor	0.46	
Current THD	28.0 %	

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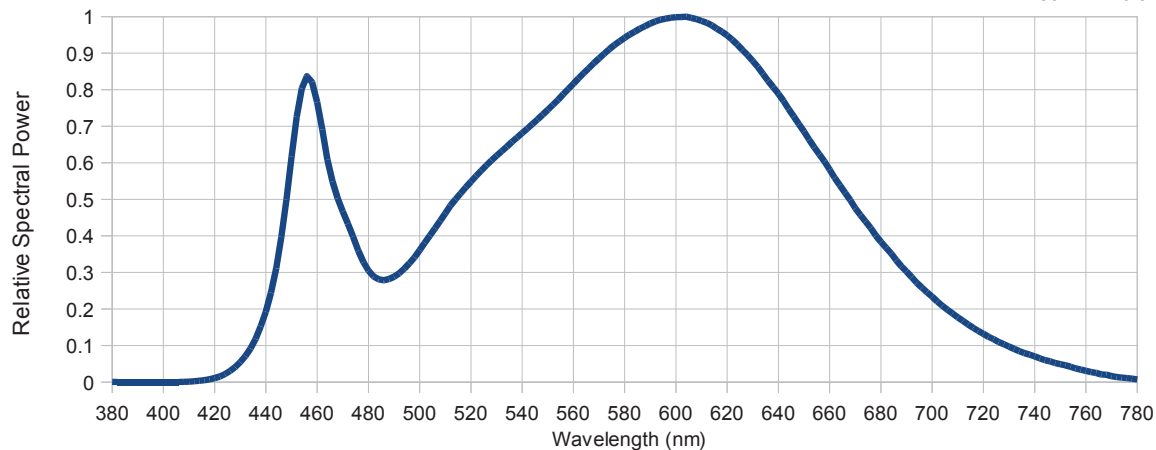
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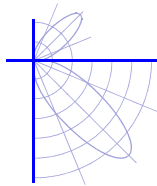
**Summary Relative Spectral Irradiance Distribution (wavelength – nm, irradiance – relative to peak = 1)**

380	6.38E-04	480	3.05E-01	580	9.42E-01	680	3.84E-01
385	1.84E-04	485	2.80E-01	585	9.63E-01	685	3.43E-01
390	1.55E-04	490	2.88E-01	590	9.81E-01	690	3.02E-01
395	1.09E-04	495	3.18E-01	595	9.93E-01	695	2.65E-01
400	9.59E-05	500	3.61E-01	600	9.99E-01	700	2.34E-01
405	2.02E-04	505	4.11E-01	605	9.98E-01	705	2.03E-01
410	1.01E-03	510	4.62E-01	610	9.89E-01	710	1.77E-01
415	4.16E-03	515	5.08E-01	615	9.72E-01	715	1.53E-01
420	1.09E-02	520	5.48E-01	620	9.49E-01	720	1.32E-01
425	2.59E-02	525	5.86E-01	625	9.16E-01	725	1.13E-01
430	5.43E-02	530	6.19E-01	630	8.79E-01	730	9.70E-02
435	1.05E-01	535	6.51E-01	635	8.34E-01	735	8.21E-02
440	1.93E-01	540	6.81E-01	640	7.89E-01	740	7.02E-02
445	3.54E-01	545	7.13E-01	645	7.37E-01	745	5.83E-02
450	6.17E-01	550	7.45E-01	650	6.86E-01	750	4.86E-02
455	8.20E-01	555	7.80E-01	655	6.33E-01	755	3.95E-02
460	7.66E-01	560	8.17E-01	660	5.81E-01	760	3.04E-02
465	5.79E-01	565	8.52E-01	665	5.28E-01	765	2.29E-02
470	4.67E-01	570	8.86E-01	670	4.75E-01	770	1.62E-02
475	3.79E-01	575	9.17E-01	675	4.30E-01	775	1.17E-02
						780	6.97E-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, 0.511)	(0.238, 0.510)
10	(0.239, 0.512)	(0.238, 0.510)
20	(0.238, 0.510)	(0.238, 0.511)
30	(0.238, 0.512)	(0.238, 0.512)
40	(0.238, 0.512)	(0.239, 0.513)
50	(0.239, 0.514)	(0.240, 0.515)
60	(0.238, 0.513)	(0.240, 0.516)
70	(0.238, 0.513)	(0.241, 0.517)
80	(0.240, 0.515)	l <= 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	1 hour
		Total Operation Time	3.25 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.

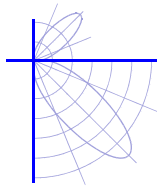
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

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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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.