

# Report of Test

## LLI-14188-19D

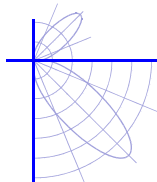
Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--358USD-A072000.  
 Grey, circular arc section aluminum housing, grey plastic end-caps (extent: 72.2" x 1.0" x 0.4" high).  
 Curved profile clear lens forms luminous opening of 72" x 0.5" x 0.1" high.  
 Twelve 6" long white PCBs marked "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	384 lm	Min Power Factor	0.47 @ 277 V
Luminaire Power	9.84 W	Max THD(i)*	29.6 % @ 277 V
Luminous Efficacy	39.0 lm/W	SC along*, across*	1.30 , 1.30
CCT	3390 K	SC Diagonal*	1.42
CIE(x,y)	(0.412, 0.394)		
CRI	85		
0-60° Zonal Flux %	81.2 %		

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



**Test Report No. LLI-14188-19D**

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

Grey, circular arc section aluminum housing, grey plastic end-caps (extent: 72.2" x 1.0" x 0.4" high).

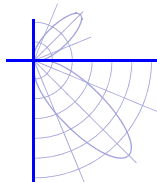
Curved profile clear lens forms luminous opening of 72" x 0.5" x 0.1" high.

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.

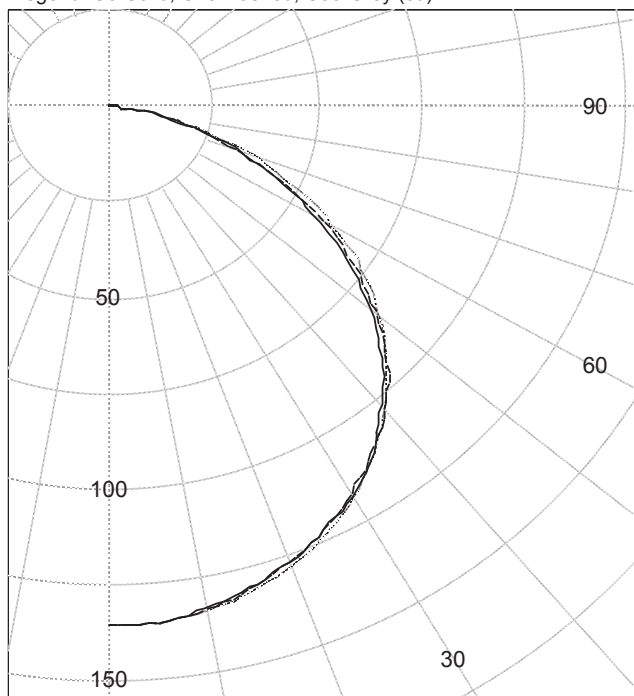




**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.  
 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.

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	136	136	136	136	136	
5.0	135	135	135	135	135	13
10.0	133	133	134	134	134	
15.0	130	130	130	131	131	37
20.0	127	127	126	128	128	
25.0	122	122	122	123	123	56
30.0	117	117	117	117	118	
35.0	111	111	110	110	111	69
40.0	102	103	103	102	103	
45.0	93	93	95	94	95	72
50.0	82	83	84	84	85	
55.0	70	71	72	74	74	64
60.0	56	58	59	63	62	
65.0	44	45	46	48	49	46
70.0	32	32	32	34	36	
75.0	19	20	21	21	22	22
80.0	8	9	10	10	10	
85.0	2	2	3	4	3	4
90.0	1	1	1	1	0	

**ZONAL FLUX AND PERCENTAGES**

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	106	N/A	27.6
0-40	175	N/A	45.6
0-60	312	N/A	81.2
0-90	383	N/A	99.8
40-90	208	N/A	54.1
60-90	71	N/A	18.6
90-180	1	N/A	0.2
0-180	384	N/A	100.0

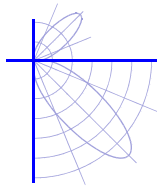
Total Light Output = 384 lm

Signed:

P. Lawrance  
Authorized Signatory

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





**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.

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

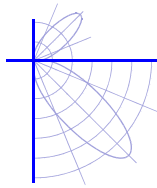
One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.

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

**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	136	136	136	136	136
2.5	136	136	136	136	136
5.0	135	135	135	135	135
7.5	135	135	135	135	135
10.0	133	133	134	134	134
12.5	132	132	132	133	133
15.0	130	130	130	131	131
17.5	129	129	129	129	130
20.0	127	127	126	128	128
22.5	125	125	124	125	126
25.0	122	122	122	123	123
27.5	120	120	120	120	121
30.0	117	117	117	117	118
32.5	114	115	114	113	114
35.0	111	111	110	110	111
37.5	106	107	107	106	107
40.0	102	103	103	102	103
42.5	97	98	99	98	99
45.0	93	93	95	94	95
47.5	88	88	89	89	90
50.0	82	83	84	84	85
52.5	76	77	78	79	80
55.0	70	71	72	74	74
57.5	64	65	66	69	68
60.0	56	58	59	63	62
62.5	51	51	53	56	55
65.0	44	45	46	48	49
67.5	38	38	38	41	42
70.0	32	32	32	34	36
72.5	26	26	26	27	29
75.0	19	20	21	21	22
77.5	14	14	15	14	15
80.0	8	9	10	10	10
82.5	4	5	6	6	6
85.0	2	2	3	4	3
87.5	1	1	2	2	1
90.0	1	1	1	1	0





**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.

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.

**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
90.0	1	1	1	1	0
92.5	1	1	1	1	0
95.0	1	1	1	0	0
97.5	1	1	1	0	0
100.0	1	1	0	0	0
102.5	0	0	0	0	0
105.0	0	0	0	0	0
107.5	0	0	0	0	0
110.0	0	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





**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.

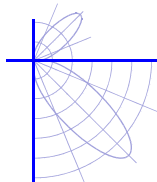
Twelve 6" long white PCBs marked "Optolum FineLine SLO Rev A1", each has six SMT LEDs at 1" centers.

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.

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	107	102	99	95	98	95	92	94	92	89	91	89	87	85	85	85	85
2	100	92	85	79	97	90	84	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	71	66	62	60	60	60	60
4	83	71	63	56	81	70	62	56	67	60	55	65	59	54	63	58	53	51	51	51	51
5	76	64	55	48	74	63	54	48	60	53	47	58	52	47	57	51	46	44	44	44	44
6	71	57	48	42	69	56	48	42	54	47	41	53	46	41	51	45	41	39	39	39	39
7	65	52	43	37	64	51	43	37	50	42	37	48	41	36	47	41	36	34	34	34	34
8	61	47	39	33	59	47	39	33	45	38	33	44	37	32	43	37	32	30	30	30	30
9	57	43	35	30	55	43	35	30	42	34	29	41	34	29	39	33	29	27	27	27	27
10	53	40	32	27	52	39	32	27	38	31	27	38	31	27	37	31	26	25	25	25	25



**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.

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.

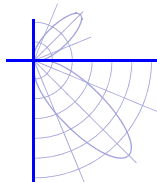
Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.

**LM-79 Performance Data**

<b>Spectral</b>	CIE 1931 (x, y) <sup>(1)</sup>	(0.412, 0.394)
	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>	0.0039
	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>	-0.0001
	Scotopic/Photopic Ratio <sup>(1),(3)</sup>	1.52
<b>Electrical</b>	Voltage	120 V (Setpoint 1)
	Frequency	60 Hz
	Current	0.102 A
	Power	9.84 W
	Power Factor	0.81
	Current THD	16.6 %
	Voltage	240 V (Setpoint 2)
	Frequency	60 Hz
	Current	0.090 A
	Power	10.1 W
Power Factor	0.47	
Current THD	29.6 %	

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



**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.

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

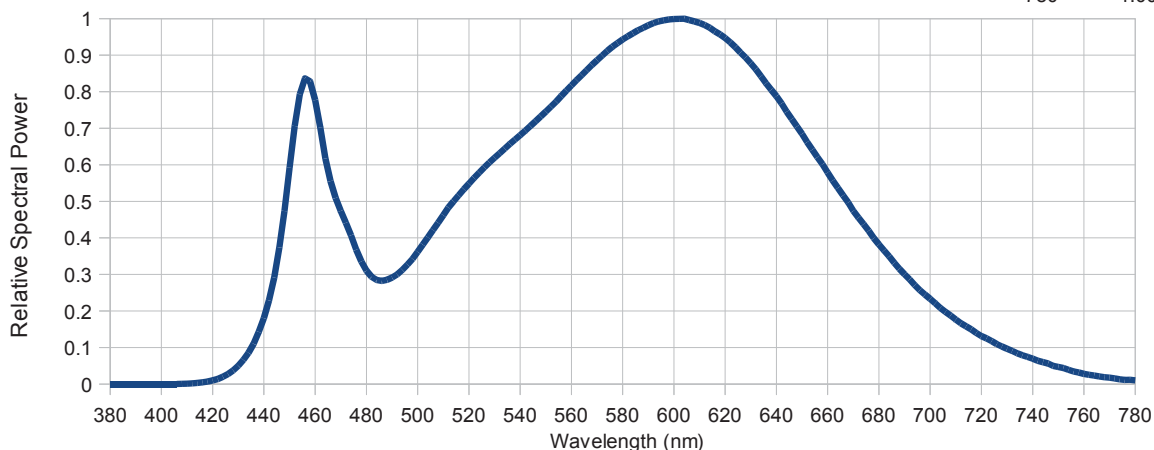
One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.

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

**LM-79 Performance Data**

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

380	4.68E-05	480	3.10E-01	580	9.43E-01	680	3.82E-01
385	7.96E-05	485	2.84E-01	585	9.64E-01	685	3.41E-01
390	3.69E-05	490	2.91E-01	590	9.82E-01	690	3.01E-01
395	0.00E+00	495	3.20E-01	595	9.94E-01	695	2.64E-01
400	1.14E-04	500	3.62E-01	600	9.99E-01	700	2.33E-01
405	2.13E-04	505	4.11E-01	605	9.98E-01	705	2.03E-01
410	9.49E-04	510	4.62E-01	610	9.88E-01	710	1.77E-01
415	3.68E-03	515	5.08E-01	615	9.70E-01	715	1.54E-01
420	9.92E-03	520	5.48E-01	620	9.47E-01	720	1.31E-01
425	2.37E-02	525	5.86E-01	625	9.15E-01	725	1.13E-01
430	5.00E-02	530	6.19E-01	630	8.78E-01	730	9.65E-02
435	9.77E-02	535	6.51E-01	635	8.33E-01	735	8.14E-02
440	1.80E-01	540	6.81E-01	640	7.88E-01	740	6.91E-02
445	3.33E-01	545	7.13E-01	645	7.35E-01	745	5.80E-02
450	5.92E-01	550	7.46E-01	650	6.84E-01	750	4.68E-02
455	8.15E-01	555	7.81E-01	655	6.31E-01	755	3.68E-02
460	7.77E-01	560	8.17E-01	660	5.79E-01	760	2.78E-02
465	5.86E-01	565	8.52E-01	665	5.27E-01	765	2.19E-02
470	4.74E-01	570	8.86E-01	670	4.74E-01	770	1.73E-02
475	3.88E-01	575	9.17E-01	675	4.28E-01	775	1.23E-02
						780	1.00E-02



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





**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.

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.

**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	(0.238, 0.511)	(0.238, 0.510)
20	(0.238, 0.511)	(0.238, 0.511)
30	(0.239, 0.513)	(0.238, 0.512)
40	(0.239, 0.513)	(0.238, 0.513)
50	(0.239, 0.516)	(0.239, 0.514)
60	(0.239, 0.516)	(0.239, 0.515)
70	(0.240, 0.517)	(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	1 hour
		Total Operation Time	6 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.

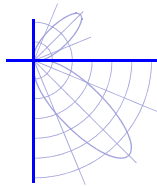
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

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)





**Test Report No. LLI-14188-19D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-S--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.

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.

**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.

This report may contain data that are not covered by the NVLAP accreditation. Quantities marked with \* are not covered.

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