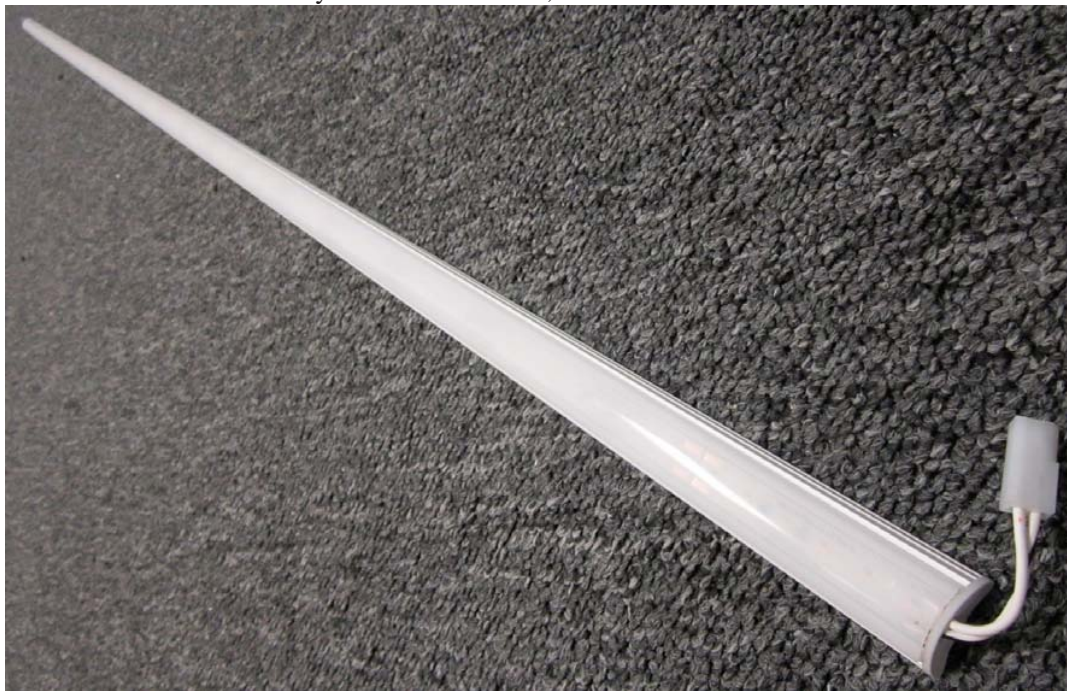


# Report of Test

## LLI-14188-14D

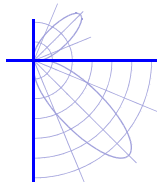
Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.  
 Grey, circular arc section aluminum housing, grey plastic end-caps (extent: 72.2" x 1.0" x 0.4" high).  
 Curved profile opal lens forms luminous opening of 72" x 0.5" x 0.1" high.  
 24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" 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	604 lm	Min Power Factor	0.57 @ 277 V
Luminaire Power	15.2 W	Max THD(i)*	21.9 % @ 277 V
Luminous Efficacy	39.7 lm/W	SC along*, across*	1.26 , 1.28
CCT	3440 K	SC Diagonal*	1.40
CIE(x,y)	(0.406, 0.385)		
CRI	87		
0-60° Zonal Flux %	75.6 %		

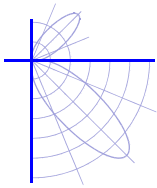
**PREPARED FOR : Optolum Inc, Tempe AZ 85281**



**Test Report No. LLI-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.  
Grey, circular arc section aluminum housing, grey plastic end-caps (extent: 72.2" x 1.0" x 0.4" high).  
Curved profile opal lens forms luminous opening of 72" x 0.5" x 0.1" high.  
24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" centers.  
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**Test Report No. LLI-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

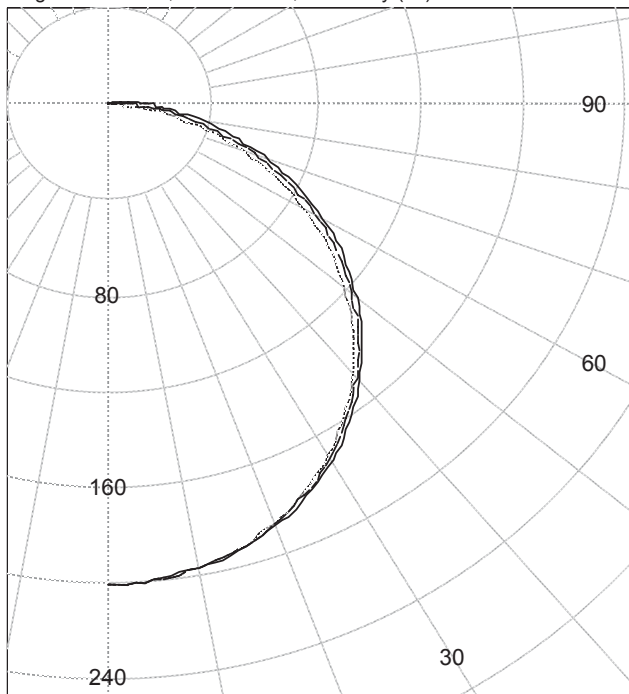
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24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" centers.

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)



(Two plane symmetry) C0-C90

**INTENSITY SUMMARY (cd)**

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	201	201	201	201	201	
5.0	200	200	200	200	200	19
10.0	197	197	197	197	197	
15.0	193	193	193	193	193	54
20.0	188	187	187	186	186	
25.0	180	180	179	179	179	83
30.0	172	172	171	170	169	
35.0	162	162	160	159	159	100
40.0	151	150	149	147	147	
45.0	138	138	136	134	133	105
50.0	125	125	122	120	119	
55.0	111	110	107	104	104	96
60.0	95	95	92	88	87	
65.0	79	78	75	72	70	74
70.0	64	62	59	55	53	
75.0	49	47	43	38	36	45
80.0	35	33	29	22	19	
85.0	24	22	17	10	6	18
90.0	15	14	9	3	0	

**ZONAL FLUX AND PERCENTAGES**

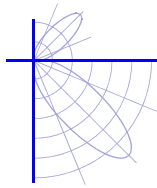
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	156	N / A	25.8
0-40	256	N / A	42.4
0-60	457	N / A	75.6
0-90	595	N / A	98.4
40-90	338	N / A	56.0
60-90	138	N / A	22.8
90-180	10	N / A	1.6
0-180	604	N / A	100.0

Total Light Output = 604 lm

Signed:

P. Lawrance  
Authorized Signatory

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



**Test Report No. LLI-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

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

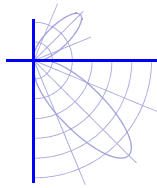
24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" centers.

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	201	201	201	201	201
2.5	200	200	200	200	200
5.0	200	200	200	200	200
7.5	198	198	199	199	199
10.0	197	197	197	197	197
12.5	196	196	195	195	195
15.0	193	193	193	193	193
17.5	190	190	190	189	190
20.0	188	187	187	186	186
22.5	185	184	183	183	183
25.0	180	180	179	179	179
27.5	176	176	175	174	174
30.0	172	172	171	170	169
32.5	167	167	166	164	164
35.0	162	162	160	159	159
37.5	157	156	155	153	153
40.0	151	150	149	147	147
42.5	145	144	142	140	140
45.0	138	138	136	134	133
47.5	132	131	129	127	126
50.0	125	125	122	120	119
52.5	118	118	115	112	111
55.0	111	110	107	104	104
57.5	103	103	100	97	96
60.0	95	95	92	88	87
62.5	87	87	84	80	79
65.0	79	78	75	72	70
67.5	72	70	67	63	61
70.0	64	62	59	55	53
72.5	56	55	51	47	44
75.0	49	47	43	38	36
77.5	42	40	36	30	27
80.0	35	33	29	22	19
82.5	29	27	22	16	12
85.0	24	22	17	10	6
87.5	19	17	12	6	2
90.0	15	14	9	3	0



**Test Report No. LLI-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

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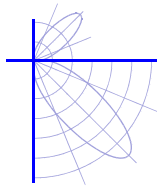
24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" centers.

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	15	14	9	3	0
92.5	12	11	6	2	0
95.0	10	8	5	1	0
97.5	8	6	3	1	0
100.0	6	5	2	1	0
102.5	5	4	2	1	0
105.0	4	3	2	1	0
107.5	3	3	1	1	0
110.0	3	2	1	0	0
112.5	2	2	1	0	0
115.0	2	2	1	0	0
117.5	2	2	1	0	0
120.0	2	2	1	0	0
122.5	2	1	1	0	0
125.0	2	1	1	0	0
127.5	1	1	1	0	0
130.0	1	1	1	0	0
132.5	1	1	0	0	0
135.0	1	1	0	0	0
137.5	1	1	0	0	0
140.0	1	1	0	0	0
142.5	1	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-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

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

24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" centers.

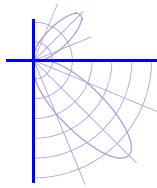
One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.

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	110	110	110	105	105	105	101	101	101	98	98	98	98
1	108	103	98	94	105	100	96	92	96	92	89	92	89	86	88	85	83	81	81	81	81
2	98	89	82	76	95	87	81	75	83	78	73	80	75	71	76	73	69	67	67	67	67
3	89	78	70	63	86	76	69	62	73	67	61	70	65	60	67	63	59	56	56	56	56
4	81	69	60	53	79	68	59	53	65	58	52	62	56	51	60	55	50	48	48	48	48
5	75	62	52	46	72	60	52	45	58	50	45	56	49	44	54	48	43	41	41	41	41
6	69	55	46	40	67	54	46	40	52	45	39	51	44	39	49	43	38	36	36	36	36
7	64	50	41	35	62	49	41	35	48	40	34	46	39	34	44	38	34	32	32	32	32
8	59	46	37	31	58	45	37	31	44	36	31	42	35	30	41	35	30	28	28	28	28
9	56	42	34	28	54	41	33	28	40	33	28	39	32	27	38	32	27	25	25	25	25
10	52	39	31	25	51	38	30	25	37	30	25	36	29	25	35	29	25	23	23	23	23





**Test Report No. LLI-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

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

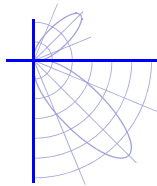
Tested horizontally in free air at 120 V, 60 Hz with beam directed to nadir.

**LM-79 Performance Data**

<b>Spectral</b>	CIE 1931 (x, y) <sup>(1)</sup>	(0.406, 0.385)
	CIE 1976 (u', v') <sup>(1)</sup>	(0.239, 0.509)
	Correlated Color Temperature (CCT) <sup>(1)</sup>	3440 K
	Color Spatial Uniformity <sup>(2)</sup>	0.0016
	Color Rendering Index (Ra) <sup>(1)</sup>	87
	Special CRI 9 (R <sub>g</sub> ) <sup>(1),(3)</sup>	36
	Distance from Planckian Locus (Duv) <sup>(1),(3)</sup>	-0.0026
	Scotopic/Photopic Ratio <sup>(1),(3)</sup>	1.58
<b>Electrical</b>	Voltage	120 V (Setpoint 1)
	Frequency	60 Hz
	Current	0.142 A
	Power	15.2 W
	Power Factor	0.89
	Current THD	10.9 %
	Voltage	240 V (Setpoint 2)
	Frequency	60 Hz
	Current	0.125 A
	Power	17.0 W
Power Factor	0.57	
Current THD	21.9 %	

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-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

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24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" centers.

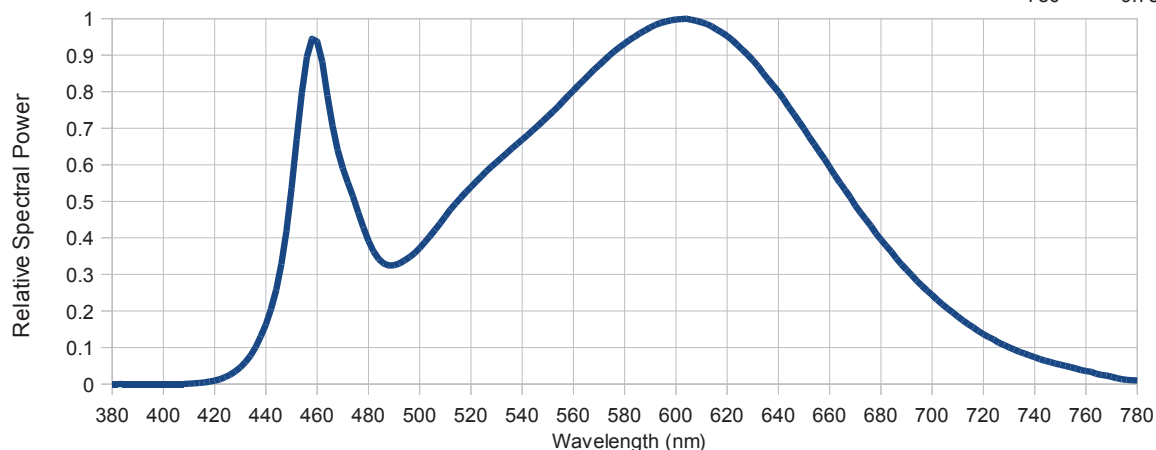
One remote "High Perfection Tech LP1090-24-GG-290 100-240Vac 47-63Hz" driver.

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

**LM-79 Performance Data**

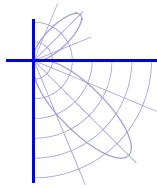
**Summary Relative Spectral Irradiance Distribution (wavelength – nm, irradiance – relative to peak = 1)**

380	0.00E+00	480	3.92E-01	580	9.32E-01	680	3.95E-01
385	4.56E-05	485	3.36E-01	585	9.56E-01	685	3.53E-01
390	4.37E-05	490	3.25E-01	590	9.76E-01	690	3.13E-01
395	8.97E-05	495	3.42E-01	595	9.90E-01	695	2.76E-01
400	7.25E-05	500	3.72E-01	600	9.98E-01	700	2.44E-01
405	1.41E-04	505	4.13E-01	605	9.98E-01	705	2.12E-01
410	8.64E-04	510	4.59E-01	610	9.90E-01	710	1.85E-01
415	3.56E-03	515	5.01E-01	615	9.74E-01	715	1.60E-01
420	9.37E-03	520	5.39E-01	620	9.52E-01	720	1.37E-01
425	2.20E-02	525	5.75E-01	625	9.22E-01	725	1.18E-01
430	4.58E-02	530	6.08E-01	630	8.87E-01	730	1.00E-01
435	8.91E-02	535	6.38E-01	635	8.43E-01	735	8.59E-02
440	1.63E-01	540	6.69E-01	640	8.00E-01	740	7.35E-02
445	2.93E-01	545	7.00E-01	645	7.49E-01	745	6.22E-02
450	5.37E-01	550	7.33E-01	650	6.99E-01	750	5.28E-02
455	8.46E-01	555	7.67E-01	655	6.46E-01	755	4.46E-02
460	9.37E-01	560	8.04E-01	660	5.94E-01	760	3.58E-02
465	7.48E-01	565	8.39E-01	665	5.41E-01	765	2.66E-02
470	5.91E-01	570	8.73E-01	670	4.88E-01	770	2.00E-02
475	4.91E-01	575	9.05E-01	675	4.42E-01	775	1.25E-02
						780	9.78E-03



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





**Test Report No. LLI-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" 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, 0.508)	(0.238, 0.508)
10	(0.238, 0.509)	(0.238, 0.508)
20	(0.238, 0.508)	(0.238, 0.508)
30	(0.238, 0.509)	(0.238, 0.508)
40	(0.238, 0.509)	(0.239, 0.509)
50	(0.239, 0.509)	(0.239, 0.509)
60	(0.238, 0.509)	(0.239, 0.510)
70	(0.238, 0.510)	(0.239, 0.510)
80	(0.239, 0.511)	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	4 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.

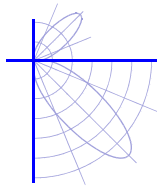
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 3
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 3

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-14188-14D**

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-LP-L--358UOD-A072000.

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

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

24 x 3" long white PCBs marked "Optolum FineLine LO Rev A1", each has six SMT LEDs at 0.5" 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.