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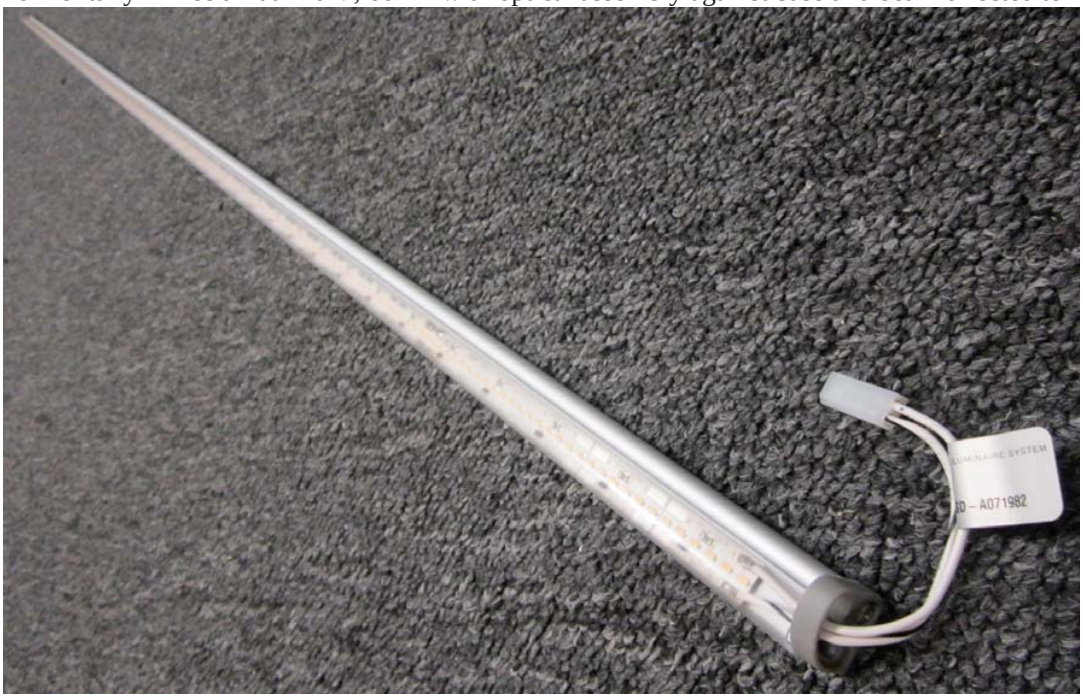
The results of the tests, calibrations and/or measurements included in this document are traceable to the SI system of units.

Report of Test

LLI-14188-8D

Optolum "FineLine" Extruded Aluminum Adjustable Luminaire. Cat No. FL-CS-H--358USD-A071982.
Grey, aluminum base with hinged optical assembly, grey plastic end-caps (extent: 72.7" x 0.85" x 0.85" high).
Curved profile clear lens about PCB strip forms luminous opening of 72.1" 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 optical assembly against base and beam directed to nadir.



Performance Summary

Total Light Output	1981 lm	Min Power Factor	0.75 @ 277 V
Luminaire Power	28.6 W	Max THD(i)*	20.3 % @ 277 V
Luminous Efficacy	69.3 lm/W	SC along*, across*	1.30 , 1.28
CCT	3420 K	SC Diagonal*	1.40
CIE(x,y)	(0.409, 0.391)		
CRI	83		
0-60° Zonal Flux %	78.3 %		

PREPARED FOR : Optolum Inc, Tempe AZ 85281

USA: LightLab International Inc.
24825 N. 16th Avenue
Suite 125
Phoenix, AZ, 85085

Ph : +1 623-434-1499
Fx : +1 623-434-1492
www.lightlabint.com
(Issuing laboratory)

Australasia & S.E.Asia: LightLab International
50 Recliffe Gardens Drive
Clontarf
Queensland, 4019, Australia

Ph : +61 7 3283 7862
Fx : +61 7 3283 8751
www.lightlab.com.au

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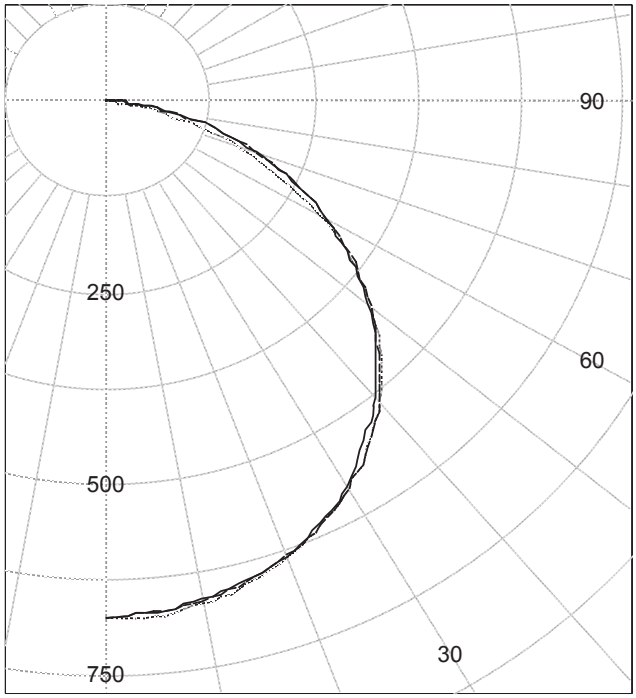
Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd)

	C-Plane					Flux
Gamma	C0	C22.5	C45	C67.5	C90	(lm)
0.0	677	677	677	677	677	
5.0	671	670	669	670	676	64
10.0	660	659	663	664	666	
15.0	648	647	649	652	654	184
20.0	633	633	631	634	634	
25.0	609	609	612	611	611	281
30.0	580	581	583	582	583	
35.0	540	543	551	550	550	342
40.0	504	505	511	512	511	
45.0	460	460	462	468	466	357
50.0	413	415	415	420	417	
55.0	358	361	364	366	361	323
60.0	306	307	308	302	298	
65.0	247	248	248	240	229	242
70.0	192	193	190	182	161	
75.0	134	135	134	122	95	134
80.0	81	81	78	72	44	
85.0	39	38	35	34	13	40
90.0	15	14	13	13	1	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	529	N / A	26.7
0-40	871	N / A	44.0
0-60	1552	N / A	78.3
0-90	1968	N / A	99.3
40-90	1097	N / A	55.4
60-90	416	N / A	21.0
90-180	13	N / A	0.7
0-180	1981	N / A	100.0

Total Light Output = 1,981 lm

Signed:

P. Lawrance
Authorized Signatory

Date of test 28-Jul-2014
Date of report 20-Aug-2014

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Intensity data (cd)

	C-Plane				
Gamma	**C0**	**C22.5**	**C45**	**C67.5**	**C90**
0.0	677	677	677	677	677
2.5	672	671	673	674	675
5.0	671	670	669	670	676
7.5	666	665	668	667	672
10.0	660	659	663	664	666
12.5	655	654	655	659	661
15.0	648	647	649	652	654
17.5	641	640	641	644	645
20.0	633	633	631	634	634
22.5	621	622	622	623	623
25.0	609	609	612	611	611
27.5	596	596	599	597	597
30.0	580	581	583	582	583
32.5	560	564	568	567	567
35.0	540	543	551	550	550
37.5	524	522	532	532	531
40.0	504	505	511	512	511
42.5	481	484	486	491	489
45.0	460	460	462	468	466
47.5	438	438	440	445	442
50.0	413	415	415	420	417
52.5	386	390	389	394	389
55.0	358	361	364	366	361
57.5	333	333	337	335	330
60.0	306	307	308	302	298
62.5	277	280	278	270	264
65.0	247	248	248	240	229
67.5	221	220	220	210	194
70.0	192	193	190	182	161
72.5	162	163	162	152	127
75.0	134	135	134	122	95
77.5	107	107	104	96	67
80.0	81	81	78	72	44
82.5	57	56	55	51	27
85.0	39	38	35	34	13
87.5	24	23	21	21	4
90.0	15	14	13	13	1

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Intensity data (cd)

	C-Plane				
Gamma	**C0**	**C22.5**	**C45**	**C67.5**	**C90**
90.0	15	14	13	13	1
92.5	9	9	8	9	0
95.0	7	6	6	7	1
97.5	5	4	5	6	1
100.0	4	4	4	5	0
102.5	3	3	4	4	0
105.0	3	3	3	3	0
107.5	3	3	3	2	0
110.0	3	3	3	2	0
112.5	3	3	3	2	0
115.0	3	2	2	1	0
117.5	2	2	2	1	0
120.0	2	2	2	1	0
122.5	1	1	1	1	0
125.0	1	1	1	1	0
127.5	1	1	1	1	0
130.0	1	1	1	1	0
132.5	1	1	1	0	0
135.0	1	1	1	0	0
137.5	1	1	1	0	0
140.0	1	1	1	0	0
142.5	1	1	1	1	0
145.0	1	1	1	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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50 Recliffe Gardens Drive
Clontarf
Queensland, 4019, Australia

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

RC			80				70				50			30			10	0
RW	70	50	30	10	70	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	101	101	101	99
1	109	104	99	95	106	101	97	94	97	94	91	93	90	88	89	87	85	83
2	99	90	83	78	96	88	82	77	85	79	75	81	77	73	78	74	71	69
3	90	79	71	64	87	78	70	64	74	68	63	72	66	61	69	64	60	58
4	82	70	61	54	80	69	60	54	66	59	53	64	57	52	61	56	52	49
5	75	63	53	47	73	61	53	46	59	52	46	57	50	45	55	49	45	43
6	70	56	47	41	68	55	47	41	53	46	40	52	45	40	50	44	39	37
7	65	51	42	36	63	50	42	36	48	41	35	47	40	35	46	39	35	33
8	60	46	38	32	58	46	38	32	44	37	32	43	36	31	42	36	31	29
9	56	43	34	29	55	42	34	29	41	34	28	40	33	28	39	33	28	26
10	53	39	31	26	51	39	31	26	38	31	26	37	30	26	36	30	25	24

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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)	3420	K	
	Color Spatial Uniformity (2)	0.0044		
	Color Rendering Index (Ra) (1)	83		
	Special CRI 9 (R_9) (1),(3)	22		
	Distance from Planckian Locus (Duv) (1),(3)	-0.0007		
	Scotopic/Photopic Ratio (1),(3)	1.48		
Electrical	Voltage	120	V	(Setpoint 1)
	Frequency	60	Hz	
	Current	0.249	A	
	Power	28.6	W	
	Power Factor	0.96		
	Current THD	9.6	%	
	Voltage	240	V	(Setpoint 2)
	Frequency	60	Hz	
	Current	0.179	A	
	Power	32.3	W	
	Power Factor	0.75		
	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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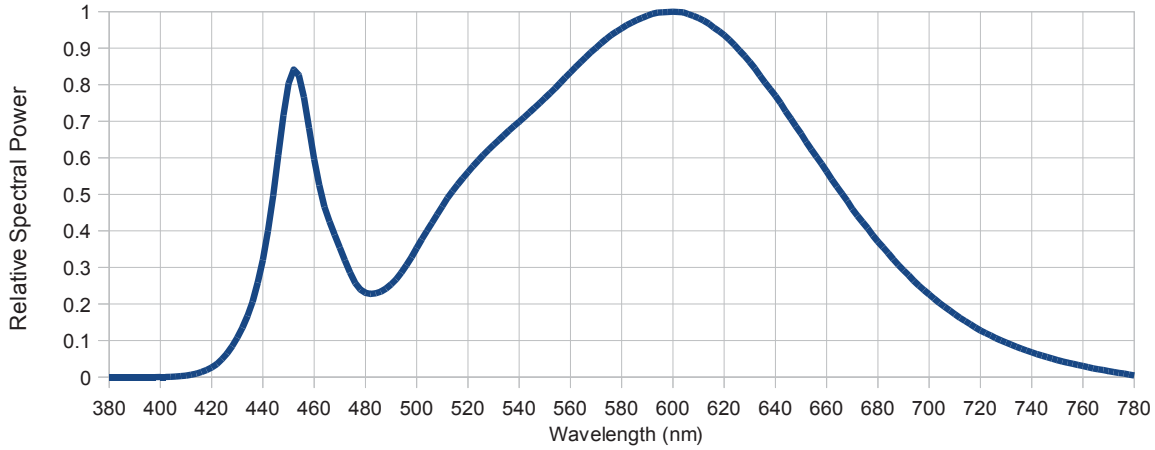
LM-79 Performance Data

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

380	0.00E+00	480	2.30E-01	580	9.54E-01	680	3.71E-01
385	0.00E+00	485	2.31E-01	585	9.74E-01	685	3.31E-01
390	0.00E+00	490	2.53E-01	590	9.89E-01	690	2.92E-01
395	0.00E+00	495	2.96E-01	595	9.98E-01	695	2.57E-01
400	1.05E-05	500	3.53E-01	600	1.00E+00	700	2.26E-01
405	9.56E-04	505	4.11E-01	605	9.96E-01	705	1.98E-01
410	4.05E-03	510	4.67E-01	610	9.83E-01	710	1.72E-01
415	1.15E-02	515	5.18E-01	615	9.62E-01	715	1.49E-01
420	2.61E-02	520	5.61E-01	620	9.36E-01	720	1.28E-01
425	5.65E-02	525	6.00E-01	625	9.01E-01	725	1.10E-01
430	1.07E-01	530	6.35E-01	630	8.62E-01	730	9.43E-02
435	1.87E-01	535	6.68E-01	635	8.15E-01	735	8.01E-02
440	3.20E-01	540	6.99E-01	640	7.70E-01	740	6.80E-02
445	5.53E-01	545	7.30E-01	645	7.17E-01	745	5.65E-02
450	8.04E-01	550	7.63E-01	650	6.66E-01	750	4.64E-02
455	7.96E-01	555	7.98E-01	655	6.13E-01	755	3.78E-02
460	5.96E-01	560	8.34E-01	660	5.63E-01	760	3.01E-02
465	4.46E-01	565	8.68E-01	665	5.11E-01	765	2.24E-02
470	3.54E-01	570	9.01E-01	670	4.60E-01	770	1.61E-02
475	2.72E-01	575	9.31E-01	675	4.16E-01	775	1.06E-02
						780	4.22E-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, 0.509)	(0.238, 0.509)
10	(0.238, 0.509)	(0.238, 0.510)
20	(0.238, 0.510)	(0.238, 0.510)
30	(0.238, 0.510)	(0.238, 0.511)
40	(0.238, 0.511)	(0.238, 0.512)
50	(0.238, 0.511)	(0.239, 0.514)
60	(0.238, 0.512)	(0.239, 0.515)
70	(0.238, 0.513)	(0.239, 0.516)
80	(0.239, 0.516)	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 10º 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.

		Stabilization Time	1 hour
Sample Orientation	Beam to nadir	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	± 0.25º		

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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Suite 125
Phoenix, AZ, 85085
Ph : +1 623-434-1499
Fx : +1 623-434-1492
www.lightlabint.com
(Issuing laboratory)

Australasia & S.E.Asia: LightLab International
50 Recliffe Gardens Drive
Clontarf
Queensland, 4019, Australia
Ph : +61 7 3283 7862
Fx : +61 7 3283 8751
www.lightlab.com.au

Test Report No. LLI-14188-8D

Optolum "FineLine" Extruded Aluminum Adjustable Luminaire. Cat No. FL-CS-H--358USD-A071982.
Grey, aluminum base with hinged optical assembly, grey plastic end-caps (extent: 72.7" x 0.85" x 0.85" high).
Curved profile clear lens about PCB strip forms luminous opening of 72.1" 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 optical assembly against base and 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.

USA: LightLab International Inc.
24825 N. 16th Avenue
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Phoenix, AZ, 85085

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