Lab Code 200989-0

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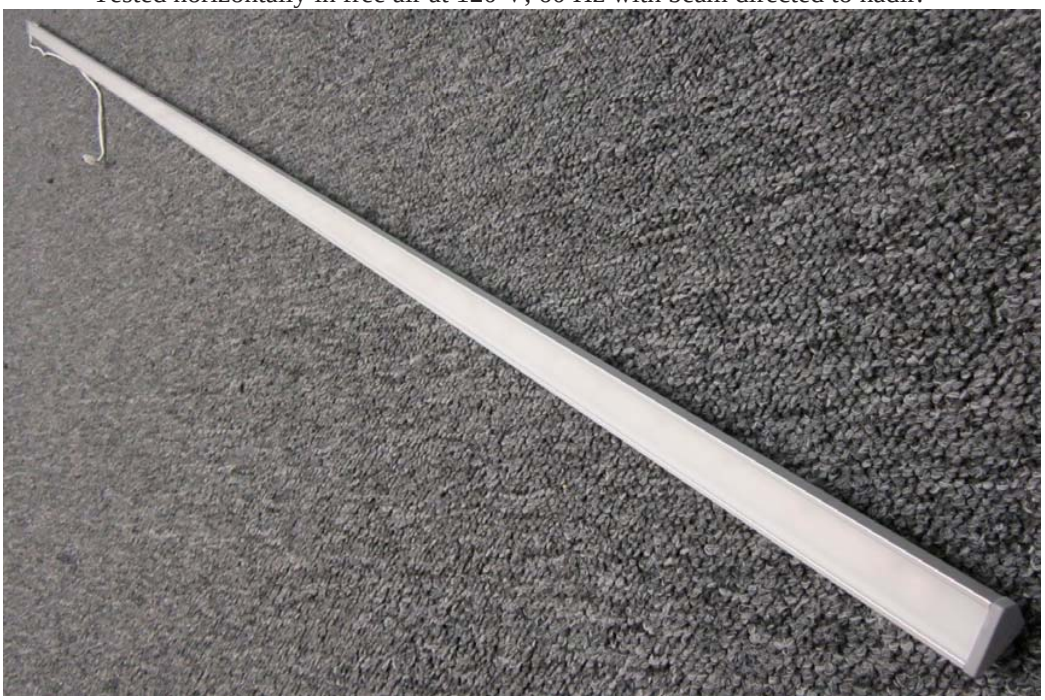
The results of the tests, calibrations and/or measurements included in this document are traceable to the SI system of units.

Report of Test

LLI-14188-5D

Optolum "FineLine" Extruded Aluminum Luminaire. Cat No. FL-AL-H--358UOD-A071982.
Grey, triangular section aluminum housing, grey plastic end-caps (extent: 72.6" x 1.0" x 0.7" high).
Flat opal lens forms luminous opening of 72.1" x 0.75".
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	1517 lm	Min Power Factor	0.75 @ 277 V
Luminaire Power	28.5 W	Max THD(i)*	20.5 % @ 277 V
Luminous Efficacy	53.2 lm/W	SC along*, across*	1.24 , 1.22
CCT	3360 K	SC Diagonal*	1.34
CIE(x,y)	(0.413, 0.394)		
CRI	83		
0-60° Zonal Flux %	81.2 %		

PREPARED FOR : Optolum Inc, Tempe AZ 85281

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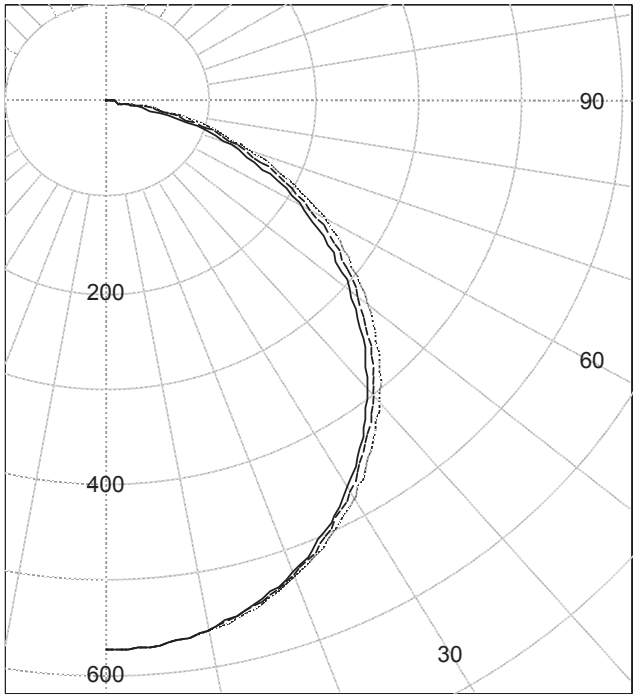
Legend: C0-Solid, C45-Dashed, C90-Grey (cd)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd)

	C-Plane					Flux
Gamma	C0	C22.5	C45	C67.5	C90	(lm)
0.0	574	574	574	574	574	
5.0	570	570	570	571	571	54
10.0	561	561	561	562	562	
15.0	545	545	546	548	548	154
20.0	524	524	526	528	529	
25.0	497	498	501	504	506	231
30.0	465	467	471	475	477	
35.0	430	432	437	442	445	273
40.0	391	394	399	405	409	
45.0	350	353	359	366	370	277
50.0	306	309	316	324	329	
55.0	260	264	272	280	285	243
60.0	214	218	226	235	240	
65.0	167	171	180	188	193	178
70.0	118	124	134	142	147	
75.0	70	76	87	96	99	91
80.0	28	30	43	52	54	
85.0	10	10	10	16	17	16
90.0	0	0	0	0	0	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	439	N / A	28.9
0-40	712	N / A	46.9
0-60	1232	N / A	81.2
0-90	1517	N / A	100.0
40-90	805	N / A	53.1
60-90	285	N / A	18.8
90-180	0	N / A	0.0
0-180	1517	N / A	100.0

Total Light Output = 1,517 lm

Signed:

P. Lawrance
Authorized Signatory

Date of test 16-Jul-2014
Date of report 20-Aug-2014

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

Intensity data (cd)

	C-Plane				
Gamma	**C0**	**C22.5**	**C45**	**C67.5**	**C90**
0.0	574	574	574	574	574
2.5	573	573	573	573	573
5.0	570	570	570	571	571
7.5	566	566	566	567	567
10.0	561	561	561	562	562
12.5	554	554	555	555	556
15.0	545	545	546	548	548
17.5	535	536	537	539	539
20.0	524	524	526	528	529
22.5	511	512	514	517	518
25.0	497	498	501	504	506
27.5	482	483	486	490	492
30.0	465	467	471	475	477
32.5	448	450	454	459	461
35.0	430	432	437	442	445
37.5	411	413	418	424	428
40.0	391	394	399	405	409
42.5	371	373	380	386	390
45.0	350	353	359	366	370
47.5	328	331	338	345	350
50.0	306	309	316	324	329
52.5	283	287	294	302	307
55.0	260	264	272	280	285
57.5	237	242	249	258	263
60.0	214	218	226	235	240
62.5	190	195	203	211	217
65.0	167	171	180	188	193
67.5	143	147	157	164	170
70.0	118	124	134	142	147
72.5	94	100	110	119	123
75.0	70	76	87	96	99
77.5	47	52	65	73	76
80.0	28	30	43	52	54
82.5	18	18	22	33	34
85.0	10	10	10	16	17
87.5	3	3	3	4	5
90.0	0	0	0	0	0

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Test Report No. LLI-14188-5D

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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.

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	102	102	102	100
1	109	105	101	97	107	102	99	95	98	95	92	94	92	90	91	89	87	85
2	100	92	85	79	97	90	84	79	86	81	77	83	79	75	80	76	73	71
3	91	81	73	66	89	79	72	66	76	70	65	73	68	63	71	66	62	60
4	83	72	63	56	81	70	62	56	68	61	55	65	59	54	63	58	54	52
5	77	64	55	49	75	63	55	48	61	53	48	59	52	47	57	51	47	45
6	71	58	49	43	69	57	48	42	55	48	42	53	47	42	52	46	41	39
7	66	52	44	38	64	52	43	38	50	43	37	49	42	37	47	41	37	35
8	61	48	39	34	60	47	39	34	46	39	33	45	38	33	43	37	33	31
9	57	44	36	30	56	43	36	30	42	35	30	41	35	30	40	34	30	28
10	54	41	33	28	52	40	33	27	39	32	27	38	32	27	37	31	27	25

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LM-79 Performance Data

Spectral	CIE 1931 (x, y) (1)	(0.413, 0.394)	
	CIE 1976 (u', v') (1)	(0.239, 0.514)	
	Correlated Color Temperature (CCT) (1)	3360	K
	Color Spatial Uniformity (2)	0.0012	
	Color Rendering Index (Ra) (1)	83	
	Special CRI 9 (R_9) (1),(3)	19	
	Distance from Planckian Locus (Duv) (1),(3)	0.0000	
	Scotopic/Photopic Ratio (1),(3)	1.46	

Electrical	Voltage	120	V	(Setpoint 1)
	Frequency	60	Hz	
	Current	0.248	A	
	Power	28.5	W	
	Power Factor	0.96		
	Current THD	9.6	%	
	Voltage	240	V	(Setpoint 2)
	Frequency	60	Hz	
	Current	0.178	A	
	Power	32.2	W	
	Power Factor	0.75		
	Current THD	20.5	%	

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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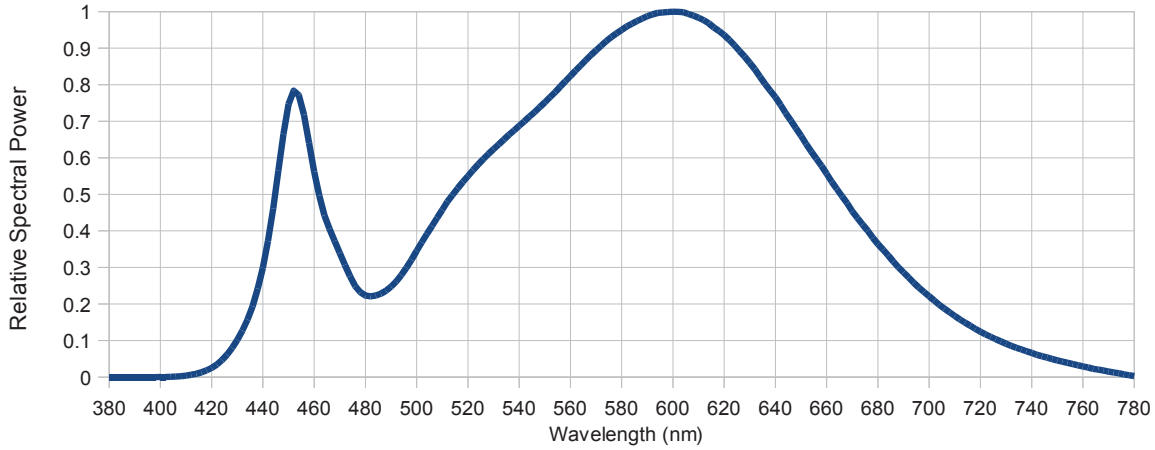
LM-79 Performance Data

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

380	0.00E+00	480	2.23E-01	580	9.50E-01	680	3.64E-01
385	0.00E+00	485	2.25E-01	585	9.71E-01	685	3.25E-01
390	0.00E+00	490	2.47E-01	590	9.87E-01	690	2.86E-01
395	0.00E+00	495	2.89E-01	595	9.97E-01	695	2.51E-01
400	1.71E-05	500	3.45E-01	600	1.00E+00	700	2.21E-01
405	8.28E-04	505	4.02E-01	605	9.96E-01	705	1.92E-01
410	3.92E-03	510	4.57E-01	610	9.83E-01	710	1.67E-01
415	1.10E-02	515	5.07E-01	615	9.63E-01	715	1.45E-01
420	2.51E-02	520	5.50E-01	620	9.36E-01	720	1.24E-01
425	5.37E-02	525	5.89E-01	625	9.00E-01	725	1.07E-01
430	1.02E-01	530	6.24E-01	630	8.60E-01	730	9.13E-02
435	1.75E-01	535	6.56E-01	635	8.12E-01	735	7.78E-02
440	2.99E-01	540	6.87E-01	640	7.66E-01	740	6.59E-02
445	5.13E-01	545	7.19E-01	645	7.12E-01	745	5.51E-02
450	7.47E-01	550	7.52E-01	650	6.61E-01	750	4.52E-02
455	7.45E-01	555	7.87E-01	655	6.07E-01	755	3.73E-02
460	5.62E-01	560	8.24E-01	660	5.57E-01	760	2.91E-02
465	4.24E-01	565	8.60E-01	665	5.05E-01	765	2.12E-02
470	3.40E-01	570	8.94E-01	670	4.53E-01	770	1.50E-02
475	2.62E-01	575	9.25E-01	675	4.09E-01	775	8.88E-03
						780	2.55E-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, 0.514)	(0.239, 0.513)
10	(0.239, 0.514)	(0.239, 0.514)
20	(0.239, 0.514)	(0.239, 0.514)
30	(0.239, 0.514)	(0.239, 0.514)
40	(0.239, 0.514)	(0.239, 0.514)
50	(0.239, 0.514)	(0.240, 0.514)
60	(0.239, 0.514)	(0.240, 0.515)
70	(0.239, 0.514)	(0.240, 0.515)
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 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	2.75 hour
Sample Orientation	Beam to nadir	Total Operation Time	5 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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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.

20-Aug-14 16:10:46 REPORT program version: 3.804a

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