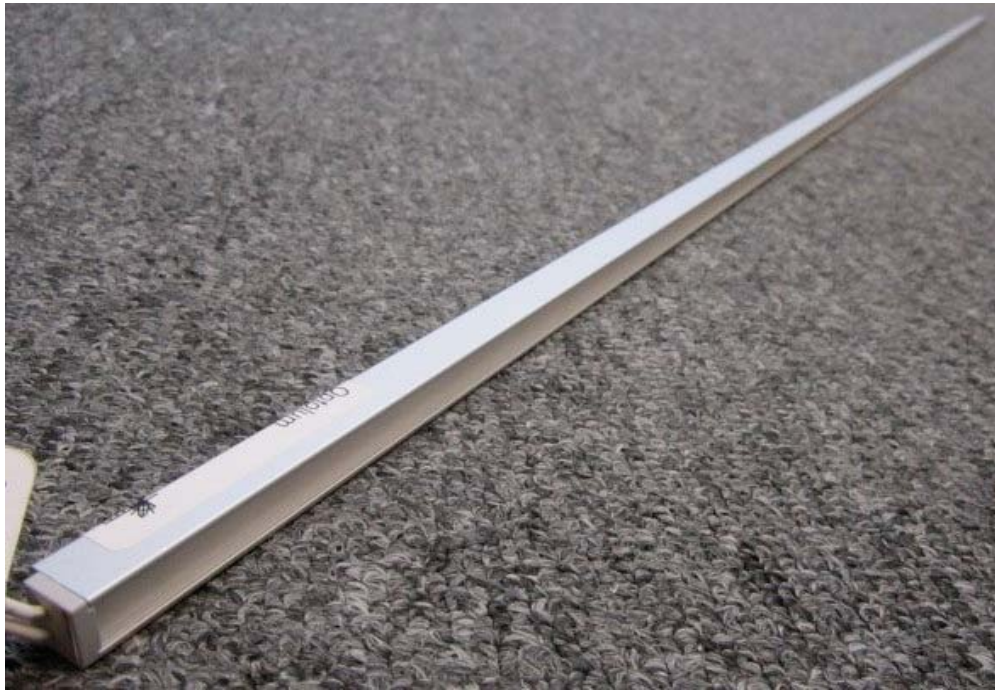


Report of Test

LLI-17266-2-R01

This test report supersedes test report number LLI-17266-2

OptoLum - 60" linear strip luminaire. Product ID: SL9---H--359--D-A059220
Extruded aluminum housing with frosted flat plastic lens.
328 LEDs mounted in single row with white reflector.
One Mean Well power supply. Model: HLG-60H-24A
Operating at 120 VAC and 60 Hz.

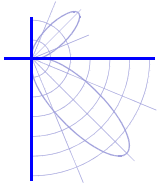


Performance Summary

Total Light Output	2586 lm	Min Power Factor	0.93 @ 277 V
Luminaire Power	40.1 W	Max THD(i)*	14.0 % @ 277 V
Luminous Efficacy	64.5 lm/W		
CCT	3410 K		
CIE(x,y) 1931	(0.408, 0.385)		
CRI	95		

PREPARED FOR : OptoLum Inc., Tempe, AZ 85281

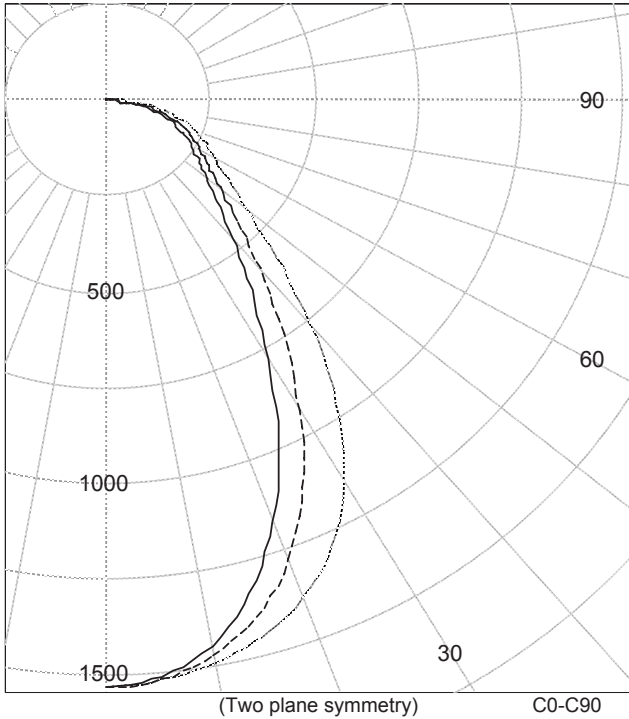




Test Report No. LLI-17266-2-R01

OptoLum - 60" linear strip luminaire. Product ID: SL9---H--359--D-A059220
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Operating at 120 VAC and 60 Hz.

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	1528	1528	1528	1528	1528	
5.0	1509	1509	1517	1522	1518	143
10.0	1448	1453	1475	1493	1493	
15.0	1335	1351	1397	1440	1450	391
20.0	1172	1200	1278	1357	1384	
25.0	978	1014	1119	1239	1287	515
30.0	779	818	934	1080	1148	
35.0	605	637	743	891	966	477
40.0	471	494	573	696	763	
45.0	377	392	444	530	578	359
50.0	312	322	357	411	441	
55.0	267	275	299	335	353	275
60.0	232	239	259	285	298	
65.0	200	206	224	247	258	224
70.0	166	171	188	210	221	
75.0	127	131	147	167	179	156
80.0	78	82	95	115	128	
85.0	28	28	33	50	65	46
90.0	0	0	0	0	0	

ZONAL FLUX AND PERCENTAGES

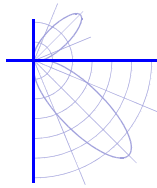
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	1048	N / A	40.5
0-40	1525	N / A	59.0
0-60	2160	N / A	83.5
0-90	2586	N / A	100.0
40-90	1061	N / A	41.0
60-90	426	N / A	16.5
90-180	0	N / A	0.0
0-180	2586	N / A	100.0

Total Light Output = 2,586 lm

Signed:

Ryder Tunney
Ryder Tunney
Authorized Signatory

Date of test 27-Sep-2017
Date of report 29-Sep-2017

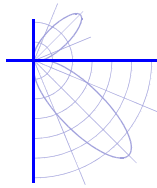


Test Report No. LLI-17266-2-R01

OptoLum - 60" linear strip luminaire. Product ID: SL9---H--359--D-A059220
 Extruded aluminum housing with frosted flat plastic lens.
 328 LEDs mounted in single row with white reflector.
 One Mean Well power supply. Model: HLG-60H-24A
 Operating at 120 VAC and 60 Hz.

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	1528	1528	1528	1528	1528
2.5	1523	1521	1527	1530	1524
5.0	1509	1509	1517	1522	1518
7.5	1484	1486	1500	1510	1508
10.0	1448	1453	1475	1493	1493
12.5	1398	1408	1441	1469	1474
15.0	1335	1351	1397	1440	1450
17.5	1259	1280	1342	1402	1421
20.0	1172	1200	1278	1357	1384
22.5	1077	1110	1203	1303	1340
25.0	978	1014	1119	1239	1287
27.5	877	916	1029	1165	1223
30.0	779	818	934	1080	1148
32.5	688	724	837	988	1062
35.0	605	637	743	891	966
37.5	533	560	653	792	865
40.0	471	494	573	696	763
42.5	419	438	503	607	666
45.0	377	392	444	530	578
47.5	341	353	396	464	503
50.0	312	322	357	411	441
52.5	288	297	325	368	392
55.0	267	275	299	335	353
57.5	249	256	278	308	323
60.0	232	239	259	285	298
62.5	216	222	241	265	277
65.0	200	206	224	247	258
67.5	183	189	207	229	239
70.0	166	171	188	210	221
72.5	147	152	168	190	200
75.0	127	131	147	167	179
77.5	104	108	122	142	154
80.0	78	82	95	115	128
82.5	51	53	64	84	98
85.0	28	28	33	50	65
87.5	10	10	10	15	27
90.0	0	0	0	0	0



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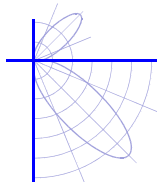
LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.408, 0.385)
	CIE 1976 (u', v') ⁽¹⁾	(0.239, 0.509)
	Correlated Color Temperature (CCT) ⁽¹⁾	3410 K
	Spatial Δ (u', v') Uniformity ⁽²⁾	0.0011
	Color Rendering Index (Ra) ⁽¹⁾	95.2
	Special CRI 9 (R ₉) ^{(1),(3)}	71.2
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-0.0028
	Scotopic/Photopic Ratio ^{(1),(3)}	1.61

Electrical	Voltage	120.0 V	(Setpoint 1)
	Frequency	60.0 Hz	
	Current	0.337 A	
	Power	40.1 W	
	Power Factor	0.990	
	Current THD	3.3 %	
	Voltage	277.0 V	(Setpoint 2)
	Frequency	60.0 Hz	
	Current	0.156 A	
	Power	40.3 W	
	Power Factor	0.933	
	Current THD	14 %	

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



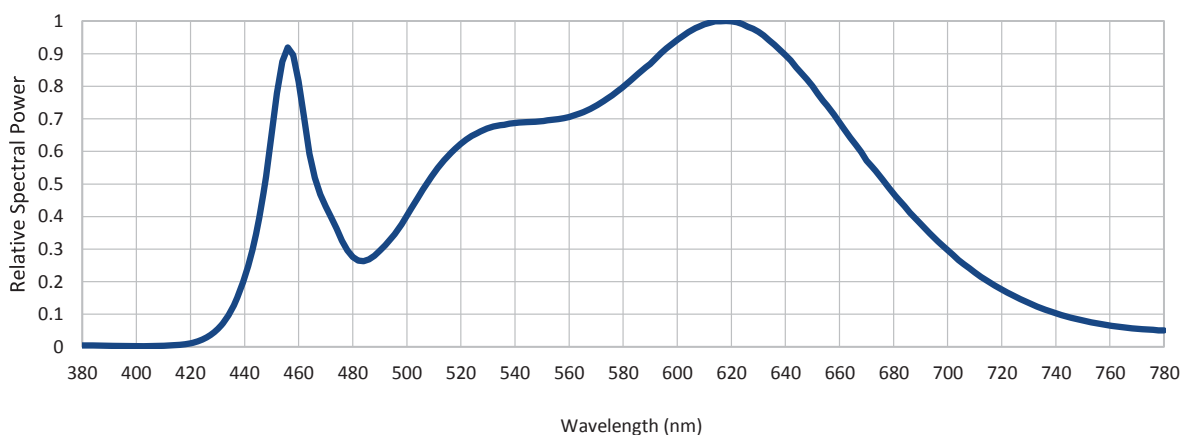
Test Report No. LLI-17266-2-R01

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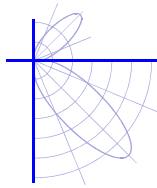
LM-79 Performance Data

Summary relative spectral irradiance distribution (wavelength – nm, irradiance – relative to peak = 1)

380	0.004	480	0.276	580	0.798	680	0.470
385	0.003	485	0.266	585	0.834	685	0.422
390	0.003	490	0.295	590	0.868	690	0.377
395	0.003	495	0.341	595	0.908	695	0.335
400	0.002	500	0.403	600	0.942	700	0.297
405	0.002	505	0.470	605	0.970	705	0.261
410	0.003	510	0.532	610	0.990	710	0.229
415	0.005	515	0.583	615	0.999	715	0.201
420	0.011	520	0.623	620	0.999	720	0.176
425	0.025	525	0.652	625	0.987	725	0.154
430	0.054	530	0.671	630	0.967	730	0.135
435	0.112	535	0.681	635	0.934	735	0.117
440	0.214	540	0.687	640	0.896	740	0.103
445	0.378	545	0.690	645	0.849	745	0.091
450	0.650	550	0.693	650	0.801	750	0.080
455	0.898	555	0.698	655	0.745	755	0.072
460	0.815	560	0.706	660	0.689	760	0.066
465	0.556	565	0.720	665	0.632	765	0.060
470	0.431	570	0.740	670	0.572	770	0.056
475	0.345	575	0.767	675	0.523	775	0.053
						780	0.051



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



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Operating at 120 VAC and 60 Hz.

LM-79 Performance Data

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0° plane	Horiz. 90° plane
0.0	(0.239, 0.509)	(0.239, 0.509)
5.0	(0.239, 0.509)	(0.239, 0.509)
10.0	(0.239, 0.509)	(0.239, 0.509)
15.0	(0.239, 0.509)	(0.239, 0.509)
20.0	(0.239, 0.509)	(0.239, 0.509)
25.0	(0.239, 0.509)	(0.239, 0.509)
30.0	(0.239, 0.509)	(0.239, 0.510)
35.0	(0.239, 0.509)	(0.239, 0.510)
40.0	(0.239, 0.509)	(0.240, 0.510)
45.0	(0.239, 0.509)	(0.240, 0.510)

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0° plane	Horiz. 90° plane
45.0	(0.239, 0.509)	(0.240, 0.510)
50.0	(0.239, 0.509)	(0.240, 0.510)
55.0	(0.239, 0.509)	(0.240, 0.510)
60.0	(0.239, 0.509)	(0.240, 0.510)
65.0	(0.239, 0.509)	(0.240, 0.510)
70.0	(0.239, 0.509)	(0.240, 0.510)
-	-	-
-	-	-
-	-	-
-	-	-

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 Horizontal Stabilization & total operation time 0.5 / 1.75 hours

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 %
Horiz., Vert. Angles	± 0.25°		

PhotoResearch PR-670 spectroradiometer (grating with 380 - 780 nm range, 2 nm / pixel, 5 nm bandwidth, incandescent/halogen calibration source). Measured at a distance from the sample deemed >5 times the maximum observed luminous opening dimension.

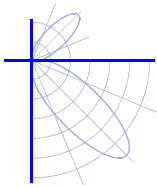
CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 2
Spatial Δ (u', v') uniformity	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Rel. Spectral Irradiance *	± 2 %	R9 *	± 2
Duv *	± 5E-04		

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.

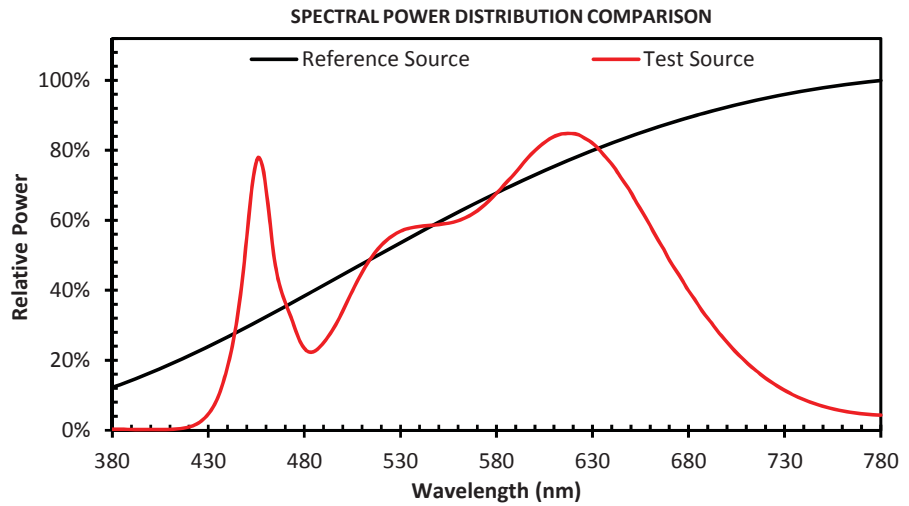
Calculator / report version 1.0.7 / 5.7 (30th Jan 2017)



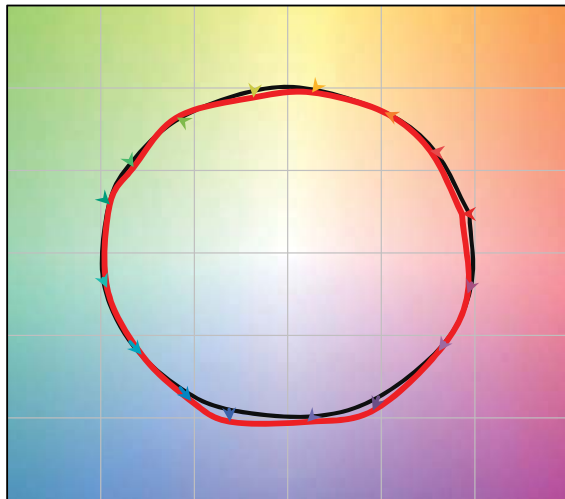
Test Report No. LLI-17266-2-R01

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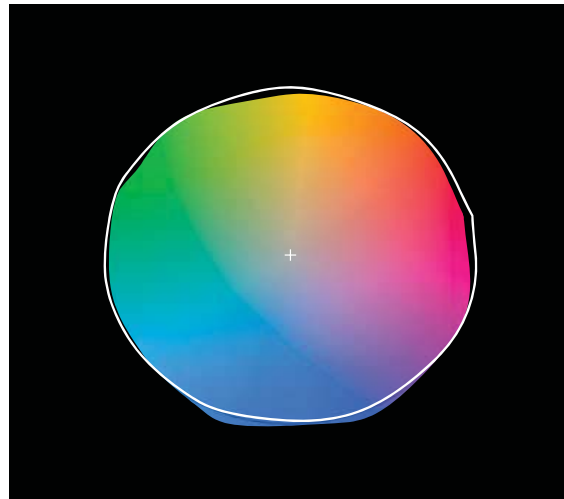
R_f	90
R_g	100



COLOR VECTOR GRAPHIC

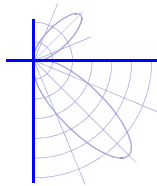


COLOR DISTORTION GRAPHIC



— Reference Illuminant — Test Source

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Test Distance 8.0 m
Test Temperature 24.8 °C

Notes The laboratory has not participated in 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.

Tested in accordance with the applicable sections of publications: IES LM-79-08 (Sec. 12), IES LM-16-93, IES LM-58-13, CIE 13.3:1995, CIE 15:2004, ANSI C78.377:2011, ANSI C82.77:2002.

The luminous intensity values, and other derived quantities, contained in this report are based on the absolute data, as measured.

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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