

Report of Test

LLI-19091-2

Optolum - Linear luminaire. Product ID: OLM-010VH-H-011635--014800

Extruded aluminum housing with clear plastic flat lens.

48 LEDs mounted in single row with individual diffuse clear plastic focusing lenses.

Two Harvard Technology LED drivers. Model: CLS50-1400A-UNI-B-I/F

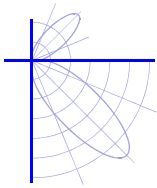
Operating at 277v AC an 60 Hz,



Performance Summary

Total Light Output	4807 lm	Min Power Factor	0.86 @ 277 V
Luminaire Power	70.4 W	Max THD(i)*	13.0 % @ 277 V
Luminous Efficacy	68.3 lm/W		
CCT	3360 K		
CIE(x,y) 1931	(0.408, 0.381)		
CRI	95		

PREPARED FOR : Optolum, Tempe, AZ 85281



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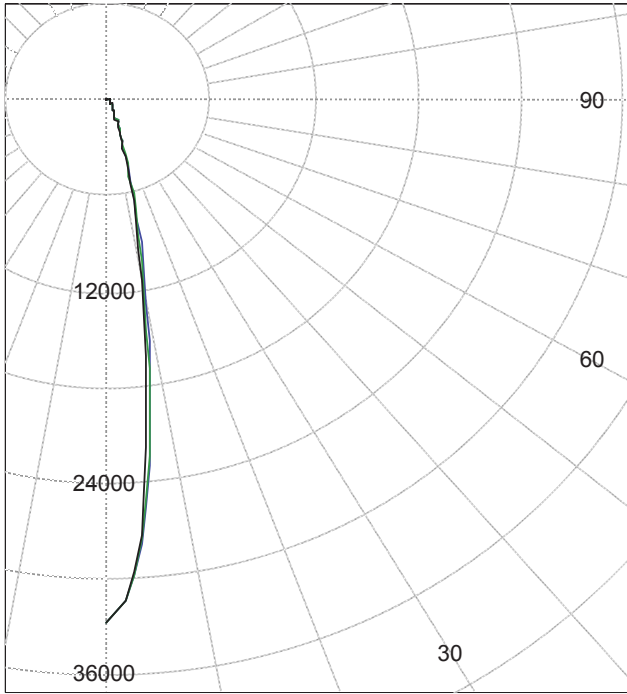
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Legend: C0-Black, C45-Green, C90-Blue (cd)



(Two plane symmetry) C0-C90

INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	32750	32750	32750	32750	32750	
5.0	24672	24849	25202	25495	25613	1957
10.0	11450	11706	12275	12776	12985	
15.0	4397	4553	4901	5122	5168	1448
20.0	2007	2062	2175	2236	2208	
25.0	1104	1091	1125	1147	1138	541
30.0	668	655	665	672	672	
35.0	460	455	459	458	456	294
40.0	355	351	352	350	345	
45.0	290	285	287	281	277	221
50.0	239	234	235	230	226	
55.0	194	191	191	185	182	169
60.0	155	151	152	146	142	
65.0	120	117	117	111	109	114
70.0	85	83	83	80	79	
75.0	52	50	51	50	48	54
80.0	24	23	23	23	23	
85.0	7	7	7	7	6	9
90.0	0	0	0	0	0	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	3946	N / A	82.1
0-40	4240	N / A	88.2
0-60	4630	N / A	96.3
0-90	4807	N / A	100.0
40-90	567	N / A	11.8
60-90	177	N / A	3.7
90-180	0	N / A	0.0
0-180	4807	N / A	100.0

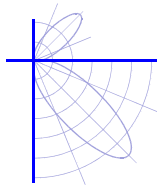
Total Light Output = 4,807 lm

Signed:

Ryder Tunney
Authorized Signatory

Date of test 5-Apr-2019

Date of report 5-Apr-2019



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Optolum - Linear luminaire. Product ID: OLM-010VH-H-011635--014800

Extruded aluminum housing with clear plastic flat lens.

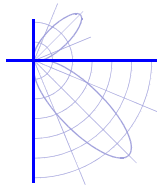
48 LEDs mounted in single row with individual diffuse clear plastic focusing lenses.

Two Harvard Technology LED drivers. Model: CLS50-1400A-UNI-B-I/F

Operating at 277v AC an 60 Hz,

Intensity data (cd)

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	32750	32750	32750	32750	32750
2.5	30514	30588	30672	30679	30665
5.0	24672	24849	25202	25495	25613
7.5	17563	17821	18375	18899	19115
10.0	11450	11706	12275	12776	12985
12.5	7098	7318	7789	8142	8270
15.0	4397	4553	4901	5122	5168
17.5	2869	2964	3177	3303	3294
20.0	2007	2062	2175	2236	2208
22.5	1472	1488	1546	1575	1551
25.0	1104	1091	1125	1147	1138
27.5	846	830	846	861	861
30.0	668	655	665	672	672
32.5	544	537	543	546	545
35.0	460	455	459	458	456
37.5	401	395	398	396	392
40.0	355	351	352	350	345
42.5	320	316	317	313	306
45.0	290	285	287	281	277
47.5	264	260	260	254	250
50.0	239	234	235	230	226
52.5	215	212	213	207	203
55.0	194	191	191	185	182
57.5	173	170	171	165	161
60.0	155	151	152	146	142
62.5	138	133	133	128	125
65.0	120	117	117	111	109
67.5	102	100	99	95	92
70.0	85	83	83	80	79
72.5	69	66	67	66	62
75.0	52	50	51	50	48
77.5	37	35	37	36	35
80.0	24	23	23	23	23
82.5	14	13	14	14	12
85.0	7	7	7	7	6
87.5	2	3	3	3	2
90.0	0	0	0	0	0



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Operating at 277v AC an 60 Hz,

LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.408, 0.381)
	CIE 1976 (u', v') ⁽¹⁾	(0.241, 0.508)
	Correlated Color Temperature (CCT) ⁽¹⁾	3360 K
	Spatial Δ (u', v') Uniformity ⁽²⁾	6.79E-04
	Color Rendering Index (Ra) ⁽¹⁾	95.1
	Special CRI 9 (R ₉) ^{(1),(3)}	77.1
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-4.82E-03
	Scotopic/Photopic Ratio ^{(1),(3)}	1.61

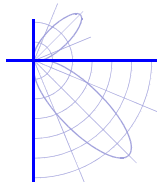
Electrical	Voltage	277.0 V	(Setpoint 1)
	Frequency	60.0 Hz	
	Current	0.294 A	
	Power	70.4 W	
	Power Factor	0.86	
	Current THD	13 %	
	Voltage	120.0 V	(Setpoint 2)
	Frequency	60.0 Hz	
	Current	0.614 A	
	Power	71.9 W	
	Power Factor	0.97	
	Current THD	2.1 %	

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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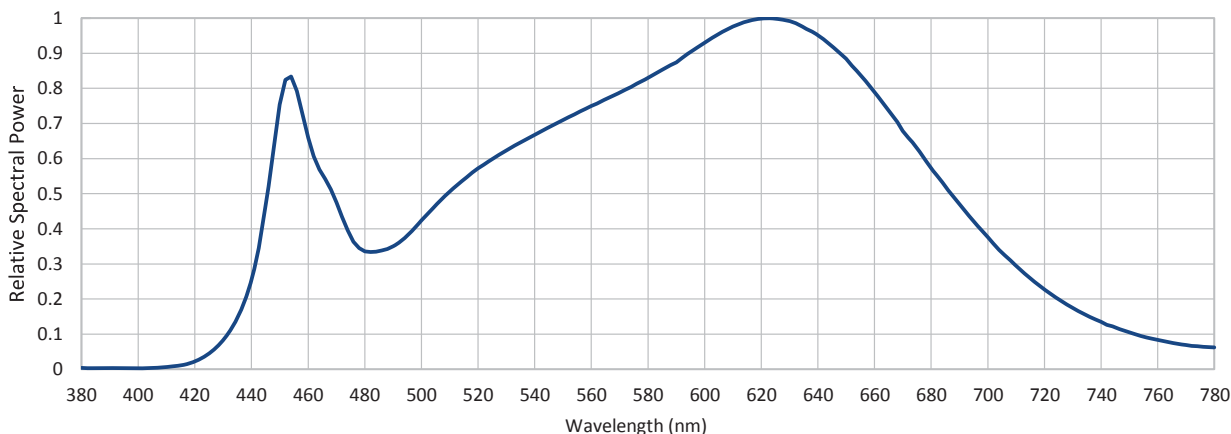
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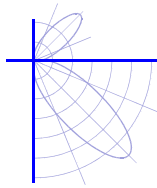
LM-79 Performance Data

Relative spectral power distribution

(Relative to peak = 1, weighted average of spatial measurements)

λ (nm)	Relative Power	λ (nm)	Relative Power	λ (nm)	Relative Power	λ (nm)	Relative Power	λ (nm)	Relative Power
380	0.004	460	0.659	540	0.668	620	0.999	700	0.376
385	0.003	465	0.555	545	0.689	625	0.998	705	0.333
390	0.003	470	0.475	550	0.710	630	0.991	710	0.294
395	0.003	475	0.380	555	0.730	635	0.973	715	0.259
400	0.003	480	0.336	560	0.750	640	0.951	720	0.227
405	0.004	485	0.336	565	0.769	645	0.920	725	0.200
410	0.006	490	0.350	570	0.788	650	0.884	730	0.175
415	0.012	495	0.381	575	0.808	655	0.838	735	0.153
420	0.023	500	0.424	580	0.830	660	0.790	740	0.135
425	0.045	505	0.466	585	0.852	665	0.737	745	0.119
430	0.083	510	0.506	590	0.874	670	0.679	750	0.105
435	0.147	515	0.541	595	0.904	675	0.629	755	0.093
440	0.255	520	0.572	600	0.930	680	0.573	760	0.084
445	0.466	525	0.599	605	0.955	685	0.521	765	0.076
450	0.754	530	0.623	610	0.976	690	0.470	770	0.069
455	0.813	535	0.646	615	0.991	695	0.421	775	0.065
								780	0.062





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Two Harvard Technology LED drivers. Model: CLS50-1400A-UNI-B-I/F

Operating at 277v AC an 60 Hz,

LM-79 Performance Data

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0.0° plane	Horiz. ° plane
0.0	(0.242, 0.508)	(0.241, 0.507)
2.0	(0.242, 0.508)	(0.241, 0.507)
4.0	(0.242, 0.508)	(0.241, 0.507)
6.0	(0.242, 0.508)	(0.241, 0.507)
8.0	(0.242, 0.508)	(0.241, 0.507)
10.0	(0.242, 0.508)	(0.241, 0.507)
12.0	(0.242, 0.508)	(0.241, 0.507)
14.0	(0.242, 0.508)	(0.241, 0.508)
16.0	(0.242, 0.508)	(0.241, 0.508)
18.0	<= 10% peak	<= 10% peak

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0.0° plane	Horiz. ° plane
18.0	<= 10% peak	<= 10% peak
20.0	<= 10% peak	<= 10% peak
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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 1.0 / 2.0 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°		

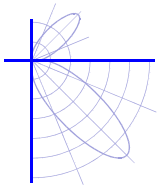
PhotoResearch PR-670 spectroradiometer (grating with 380 - 780 nm range, 2 nm / pixel, 5 nm bandwidth, incandescent/halogen calibration source). Measured at a distance from the sample deemed >5 times the maximum observed luminous opening dimension.

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.



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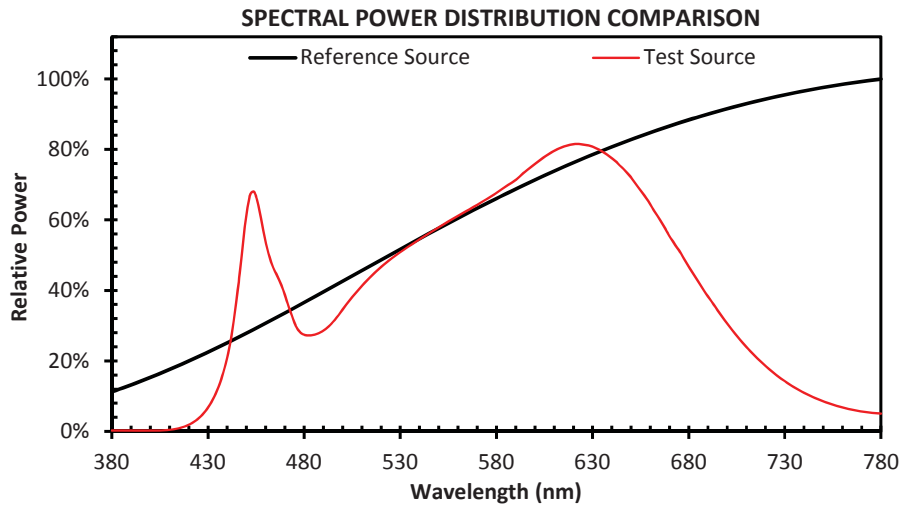
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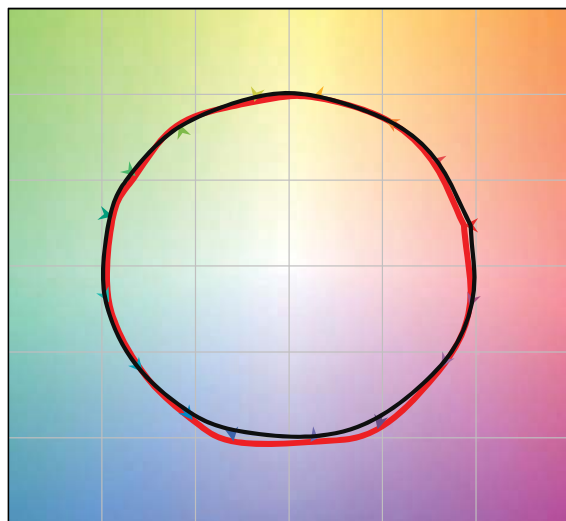
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Operating at 277v AC an 60 Hz,

R_f	90
R_g	100

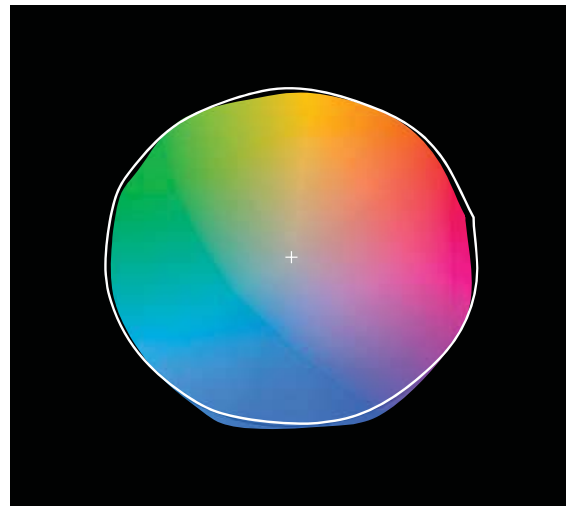


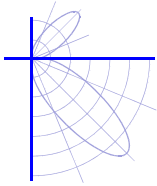
COLOR VECTOR GRAPHIC



— Test Source → Series1

COLOR DISTORTION GRAPHIC





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Test Distance 8.0 m
Test Temperature 25.3 °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 C78.377:2015, ANSI C82.77-10:2014.

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.

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

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