

# Report of Test LLI-19091-5

Optolum - Linear luminaire. Product ID: OLM-010VH-H-01EL35--014800

Extruded aluminum housing with clear plastic flat lens.

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

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

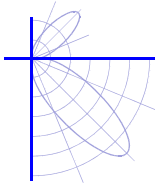
Operating at 277v AC an 60 Hz,



### Performance Summary

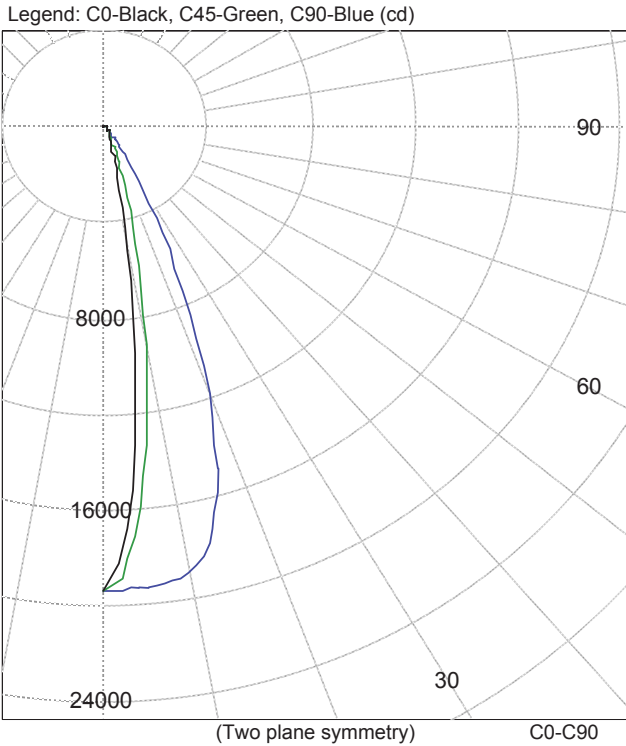
Total Light Output	4879 lm	Min Power Factor	0.86 @ 277 V
Luminaire Power	70.5 W	Max THD(i)*	13.0 % @ 277 V
Luminous Efficacy	69.2 lm/W		
CCT	3420 K		
CIE(x,y) 1931	(0.404, 0.379)		
CRI	95		

PREPARED FOR : Optolum, Tempe, AZ 85281



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**INTENSITY SUMMARY (cd)**

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	19395	19395	19395	19395	19395	
5.0	13298	14032	16004	18284	19289	1355
10.0	5245	6104	9243	15187	18950	
15.0	1793	2212	4266	10519	16657	1814
20.0	812	963	1831	5919	11772	
25.0	469	518	848	2813	6531	917
30.0	322	342	489	1298	3075	
35.0	264	269	333	655	1399	345
40.0	235	230	254	383	682	
45.0	208	200	205	257	381	188
50.0	173	170	169	190	241	
55.0	140	139	139	145	166	130
60.0	111	110	110	111	124	
65.0	85	83	83	84	94	84
70.0	59	57	59	60	67	
75.0	33	34	36	38	42	39
80.0	15	15	16	18	19	
85.0	4	5	5	5	5	7
90.0	0	0	0	0	0	

**ZONAL FLUX AND PERCENTAGES**

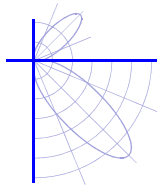
Zone	Flux (lm)	% Lamp	% Luminaire
0-30	4086	N / A	83.7
0-40	4432	N / A	90.8
0-60	4749	N / A	97.3
0-90	4879	N / A	100.0
40-90	447	N / A	9.2
60-90	130	N / A	2.7
90-180	0	N / A	0.0
0-180	4879	N / A	100.0

Total Light Output = 4,879 lm

Signed:

*Ryder Tunney*  
Ryder Tunney  
Authorized Signatory

Date of test 8-Apr-2019  
Date of report 8-Apr-2019

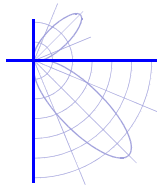


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**Intensity data (cd)**

Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	19395	19395	19395	19395	19395
2.5	17598	17864	18497	19115	19335
5.0	13298	14032	16004	18284	19289
7.5	8677	9634	12623	16965	19229
10.0	5245	6104	9243	15187	18950
12.5	3052	3701	6394	12969	18153
15.0	1793	2212	4266	10519	16657
17.5	1150	1390	2791	8093	14443
20.0	812	963	1831	5919	11772
22.5	604	699	1222	4137	9013
25.0	469	518	848	2813	6531
27.5	382	408	626	1900	4540
30.0	322	342	489	1298	3075
32.5	286	299	397	909	2070
35.0	264	269	333	655	1399
37.5	247	248	288	492	964
40.0	235	230	254	383	682
42.5	224	214	228	309	501
45.0	208	200	205	257	381
47.5	190	185	185	219	299
50.0	173	170	169	190	241
52.5	156	154	153	165	198
55.0	140	139	139	145	166
57.5	125	124	124	127	142
60.0	111	110	110	111	124
62.5	98	96	96	97	108
65.0	85	83	83	84	94
67.5	72	70	71	72	81
70.0	59	57	59	60	67
72.5	46	45	48	49	54
75.0	33	34	36	38	42
77.5	23	23	26	27	30
80.0	15	15	16	18	19
82.5	9	9	9	10	11
85.0	4	5	5	5	5
87.5	2	2	2	2	1
90.0	0	0	0	0	0



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Operating at 277v AC an 60 Hz,

**LM-79 Performance Data**

<b>Spectral</b>	CIE 1931 (x, y) <sup>(1)</sup>	(0.404, 0.379)
	CIE 1976 (u', v') <sup>(1)</sup>	(0.240, 0.506)
	Correlated Color Temperature (CCT) <sup>(1)</sup>	3420 K
	Spatial Δ (u', v') Uniformity <sup>(2)</sup>	5.68E-03
	Color Rendering Index (Ra) <sup>(1)</sup>	95.1
	Special CRI 9 (R <sub>9</sub> ) <sup>(1),(3)</sup>	77.7
	Distance from Planckian Locus (Duv) <sup>(1),(3)</sup>	-5.11E-03
	Scotopic/Photopic Ratio <sup>(1),(3)</sup>	1.63

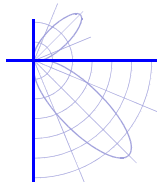
<b>Electrical</b>	Voltage	277.0 V	(Setpoint 1)
	Frequency	60.0 Hz	
	Current	0.295 A	
	Power	70.5 W	
	Power Factor	0.86	
	Current THD	13 %	
	Voltage	120.0 V	(Setpoint 2)
	Frequency	60.0 Hz	
	Current	0.614 A	
	Power	71.8 W	
	Power Factor	0.97	
	Current THD	2.2 %	

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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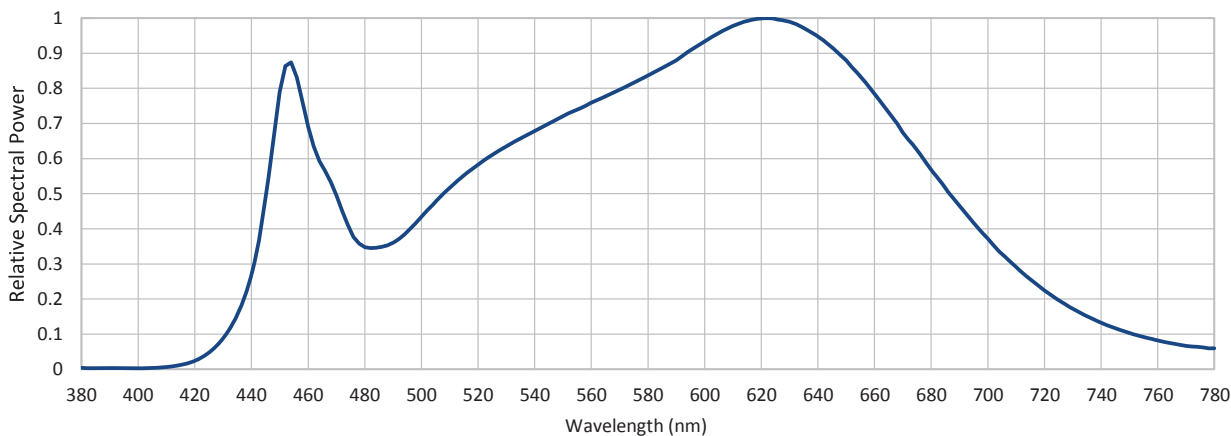
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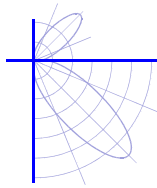
**LM-79 Performance Data**

**Relative spectral power distribution**

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

$\lambda$ (nm)	Relative Power	$\lambda$ (nm)	Relative Power	$\lambda$ (nm)	Relative Power	$\lambda$ (nm)	Relative Power	$\lambda$ (nm)	Relative Power
380	0.004	460	0.690	540	0.679	620	0.999	700	0.372
385	0.003	465	0.579	545	0.700	625	0.997	705	0.329
390	0.003	470	0.494	550	0.721	630	0.990	710	0.291
395	0.003	475	0.394	555	0.740	635	0.971	715	0.256
400	0.003	480	0.348	560	0.759	640	0.948	720	0.224
405	0.004	485	0.347	565	0.778	645	0.916	725	0.197
410	0.006	490	0.361	570	0.796	650	0.880	730	0.172
415	0.013	495	0.391	575	0.816	655	0.833	735	0.151
420	0.024	500	0.434	580	0.836	660	0.785	740	0.133
425	0.048	505	0.477	585	0.858	665	0.731	745	0.117
430	0.088	510	0.517	590	0.880	670	0.674	750	0.103
435	0.156	515	0.552	595	0.908	675	0.624	755	0.092
440	0.270	520	0.583	600	0.934	680	0.568	760	0.082
445	0.490	525	0.611	605	0.958	685	0.516	765	0.074
450	0.790	530	0.635	610	0.978	690	0.465	770	0.067
455	0.853	535	0.657	615	0.992	695	0.417	775	0.063
								780	0.060





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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	( 0.241, 0.507)	( 0.241, 0.507)
2.5	( 0.242, 0.507)	( 0.241, 0.507)
5.0	( 0.242, 0.508)	( 0.241, 0.507)
7.5	( 0.243, 0.509)	( 0.241, 0.506)
10.0	( 0.243, 0.510)	( 0.241, 0.506)
12.5	( 0.244, 0.510)	( 0.240, 0.506)
15.0	I <= 10% peak	( 0.240, 0.506)
17.5	I <= 10% peak	( 0.240, 0.506)
20.0	I <= 10% peak	( 0.239, 0.505)
22.5	I <= 10% peak	( 0.239, 0.505)

**Spatial measurements**

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0.0° plane	Horiz. ° plane
22.5	I <= 10% peak	( 0.239, 0.505)
25.0	I <= 10% peak	( 0.239, 0.505)
27.5	I <= 10% peak	( 0.239, 0.505)
30.0	I <= 10% peak	( 0.239, 0.505)
32.5	I <= 10% peak	( 0.239, 0.505)
35.0	I <= 10% peak	I <= 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 / 2.25 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		

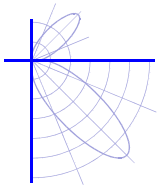
Yokogawa WT210 power meter connected in circuit to the sample electrical supply

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 1.0.10 / 5.9 (14th Dec 2017)





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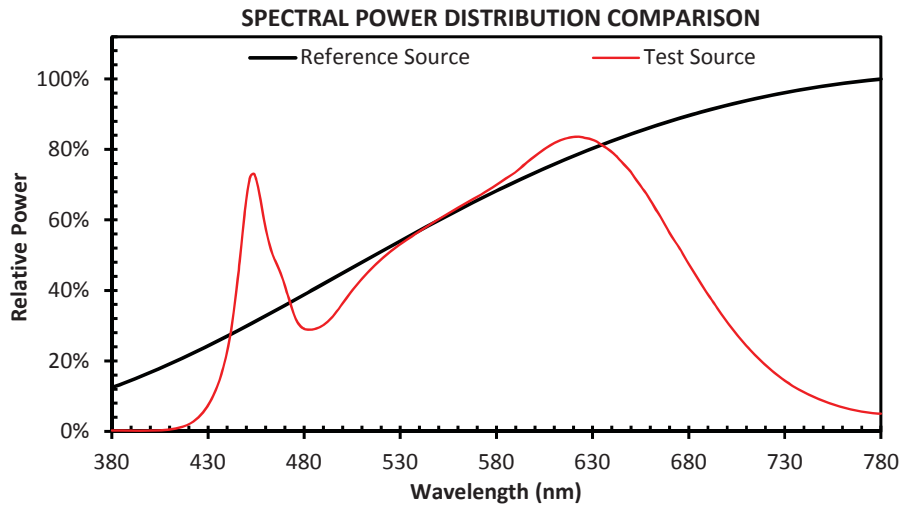
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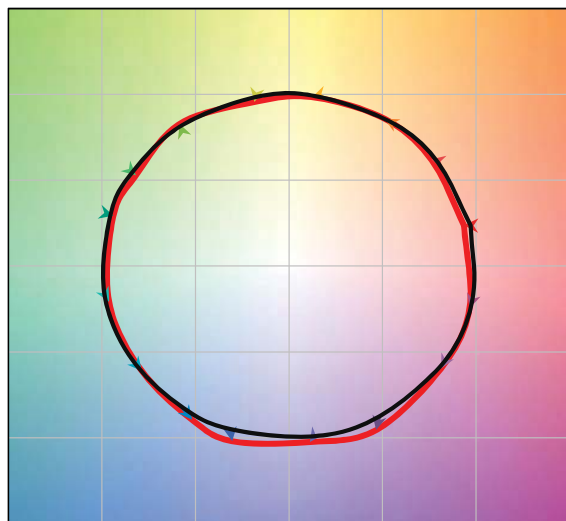
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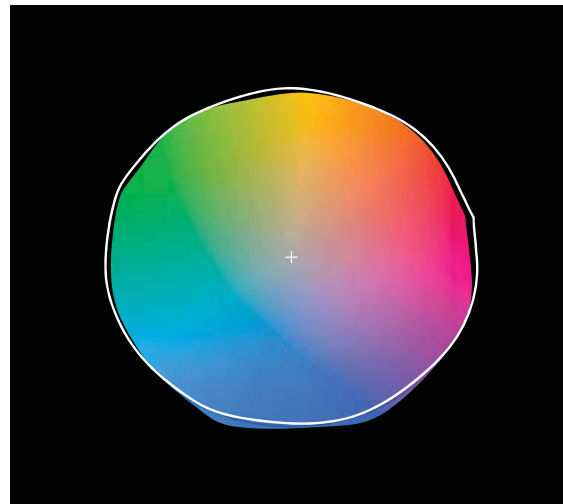
$R_f$	90
$R_g$	100

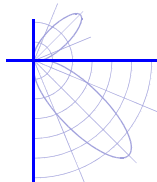


COLOR VECTOR GRAPHIC



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.

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