

Report of Test LLI-17133-1-R01

This test report supersedes test report number LLI-17133-1

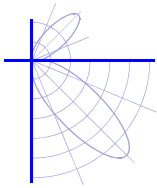
Leotek Electronics - Cobra head roadway luminaire. Product ID: GCJ0-15H-MV-WW-2R-XX-300
Grey painted cast aluminum housing with plastic driver door. Fixture extends ~ 9.5" x 18.25" x 4.5"
15 LEDs in 3 x 5 array with clear plastic sheet of individual lenses.
One Liteon LED Driver. Model: PA-1600-31SL
Operating at 120 VAC and 60 Hz with dimming set to 300mA.



Performance Summary

Total Light Output	1788 lm	Min Power Factor	0.76 @ 277 V
Luminaire Power	14.4 W	Max THD(i)*	17.0 % @ 277 V
Luminous Efficacy	124.2 lm/W	0-90° Zonal Flux %	100.0 %
CCT	3030 K	80-90° Zonal Flux %	0.6 %
CIE(x,y) 1931	(0.435, 0.404)	BUG Rating*	B0-U0-G0
CRI	74	Street Classification*	Type II Medium

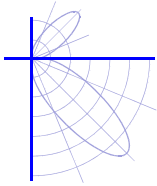
PREPARED FOR : Leotek Electronics USA Corp, San Jose CA 95131.



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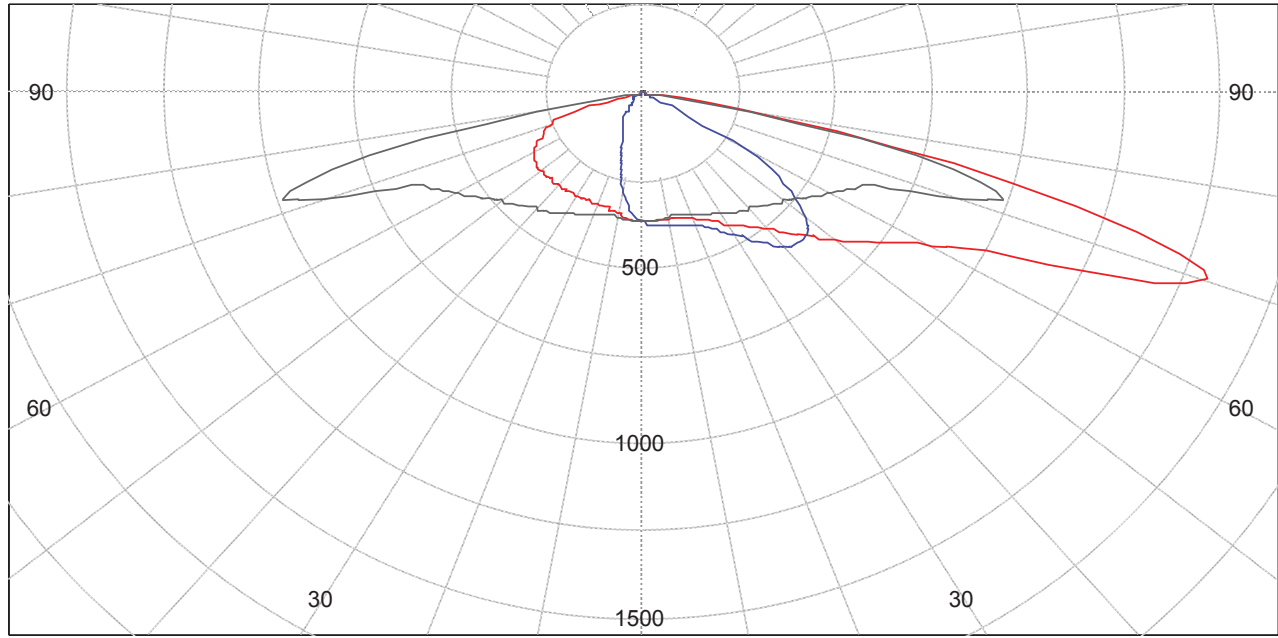




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Polar Light Distribution Curves



House side / L270

L90 / 270 - Black, Plane of maximum - Red, L0 / 180 - Blue (cd)

Street side / L90

Percentage Outputs

	Upward	Downward	Total
Street Side	0.0 %	79.2 %	79.2 %
House Side	0.0 %	20.8 %	20.8 %
	0.0 %	100.0 %	100.0 %

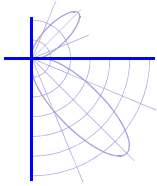
Report data based on absolute values as measured.

Signed:

Ryder Tunney
Ryder Tunney
Authorized Signatory

Date of test
Date of report

23-May-2017
15-Mar-2018



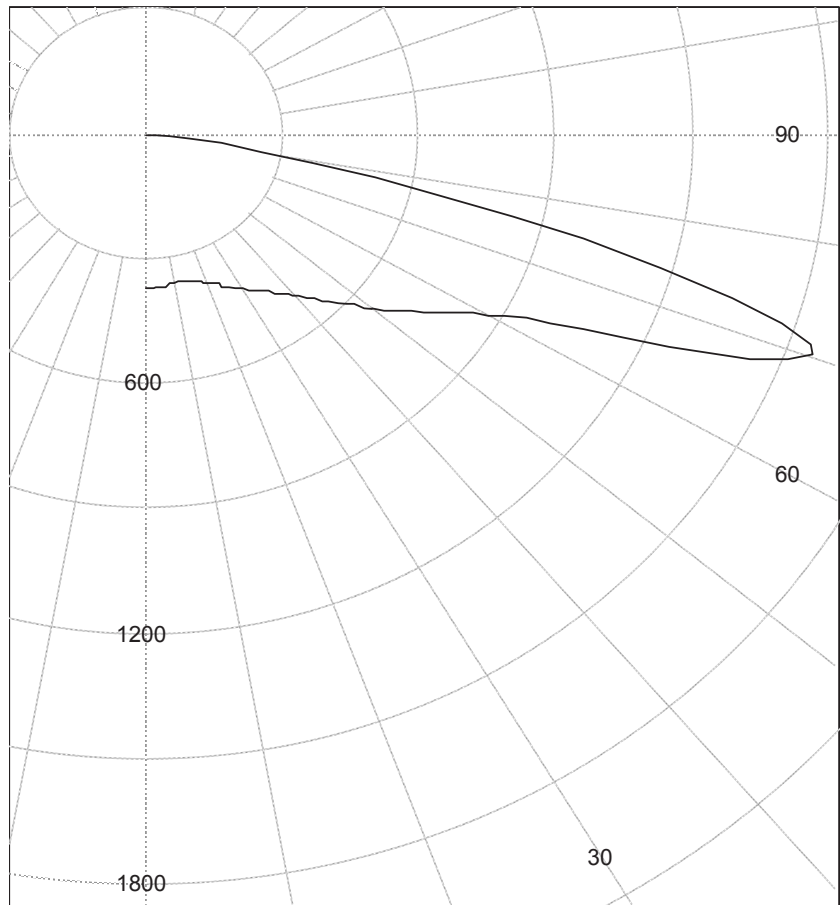
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Intensity in principal plane
(based on overall max intensity)

Vertical Angle (°)	Intensity (cd)
0.0	370.0
10.0	363.8
20.0	380.7
30.0	432.3
35.0	461.1
40.0	506.5
45.0	570.8
47.5	610.0
50.0	652.4
52.5	697.8
55.0	745.2
57.5	800.3
60.0	869.0
62.5	968.3
65.0	1159.6
67.5	1394.3
70.0	1558.5
72.5	1414.8
75.0	995.7
77.5	597.0
80.0	261.0
82.5	75.4
85.0	11.0
87.5	1.5
90.0	0.0
92.5	0.0
95.0	0.0
97.5	0.0
100.0	0.0
102.5	0.0
105.0	0.0
120.0	0.0
135.0	0.0
150.0	0.0
165.0	0.0
180.0	0.0

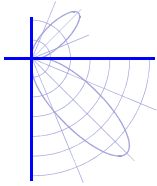
Principal Vertical Plane



Plane of maximum intensity (cd)

House side max intensity	Street side max intensity
982.5 cd @ (90.0°, 72.0°)	1560.2 cd @ (77.5°, 70.5°)

Coordinates expressed in the C Type coordinate system
Data for the two symmetric halves of the luminaire has been averaged.



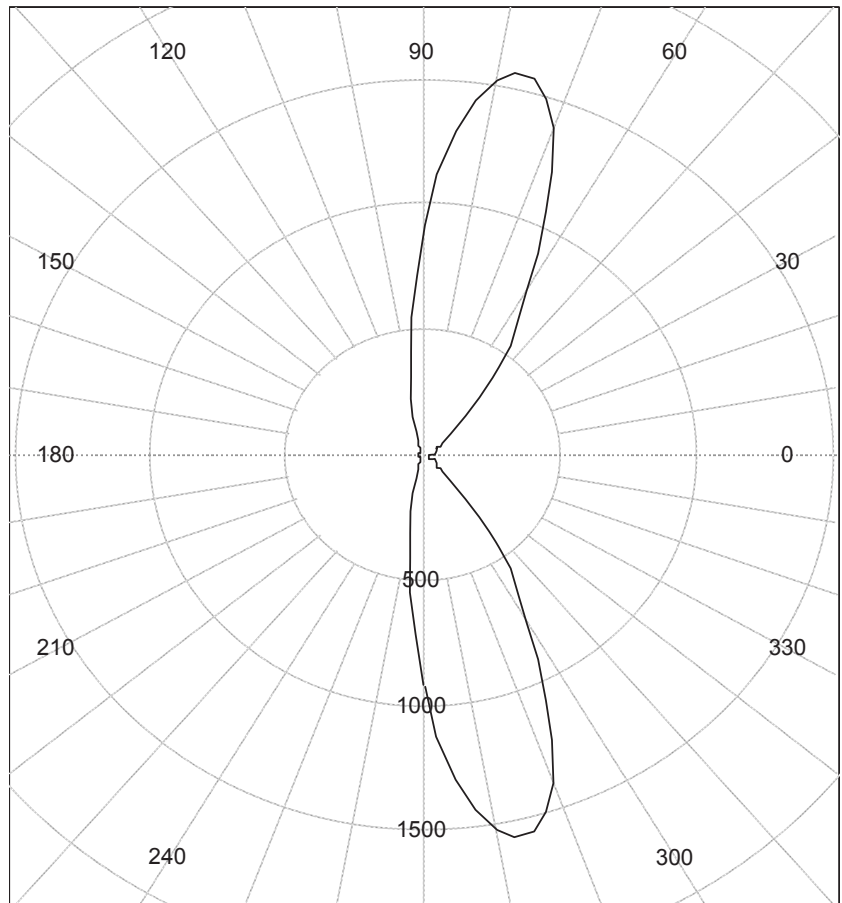
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Intensity in principal cone
(based on overall max intensity)

Lateral Plane (°)	(V70.5) (cd)
0	19.3
15	21.8
30	54.3
40	80.7
45	177.5
50	360.1
55	542.7
60	756.3
65	1077.2
70	1398.7
75	1555.2
80	1518.6
85	1296.4
90	917.1
95	550.8
100	312.8
105	155.8
110	58.4
115	31.6
120	27.8
125	23.8
130	19.4
135	18.5
140	19.1
150	24.0
165	22.7
180	25.4

Principal Conical Surface



House side

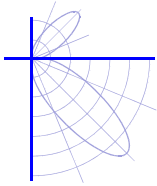
Cone of maximum intensity (cd)

Street side

House side max intensity
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Street side max intensity
1560.2 cd @ (77.5°, 70.5°)

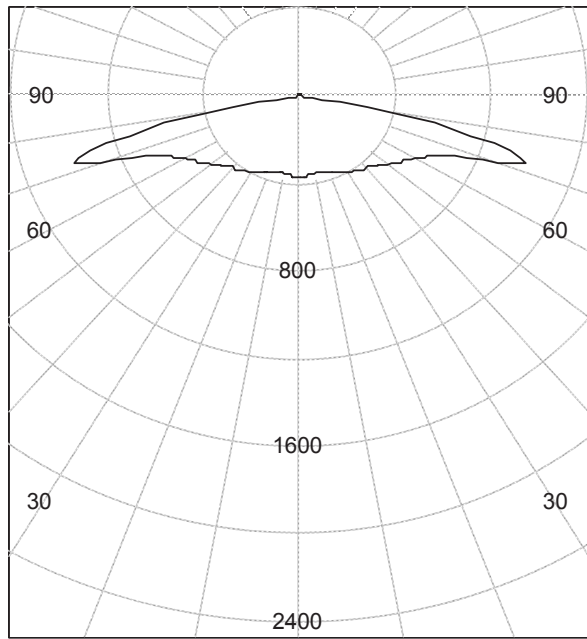
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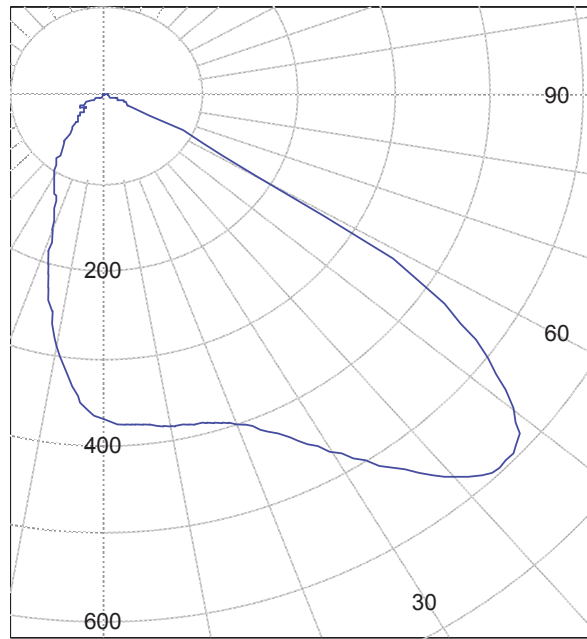
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Polar curve through L90 / L270

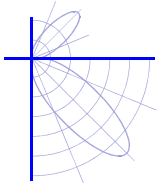


(L90) (cd) (L270)

Polar curve through L0 / L180



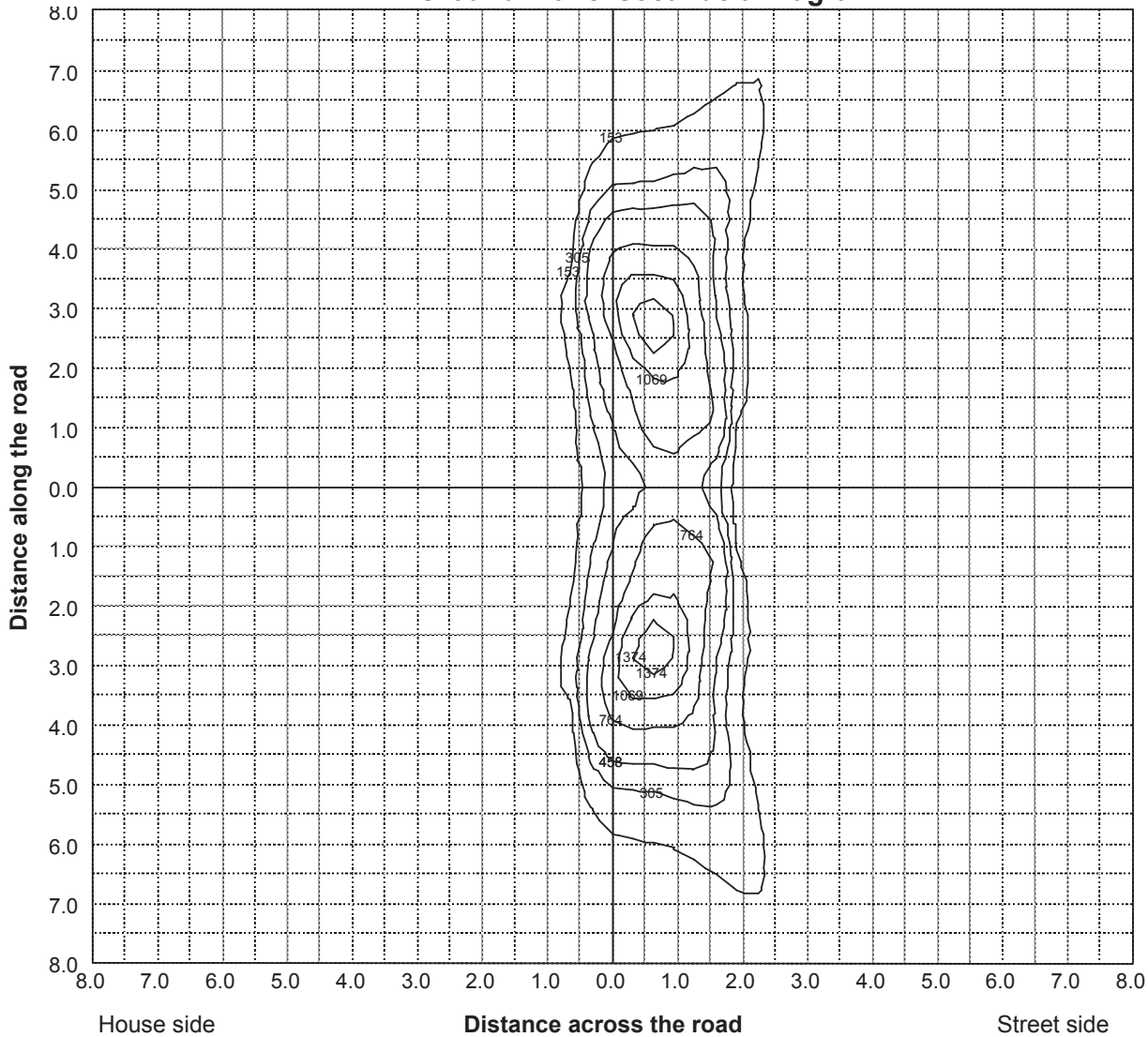
House side (L180) (cd) Street side (L0)



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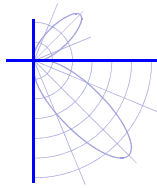
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Ground Plane Isocandela Diagram



The isocandela contour units are expressed as cd

Upstream and downstream sides have been averaged.

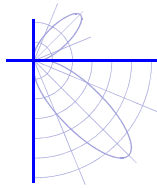


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Intensity data (cd)

Vertical	L-Plane								
	L0	L15	L30	L40	L45	L50	L55	L60	L65
0.0	370	370	370	370	370	370	370	370	370
10.0	383	381	378	376	374	373	371	368	366
20.0	399	400	406	409	411	412	411	406	399
30.0	467	478	518	511	502	493	484	475	469
35.0	519	536	599	615	602	583	560	535	517
40.0	568	599	675	711	715	703	675	636	598
45.0	591	624	746	790	805	821	809	764	710
47.5	583	616	762	829	848	870	873	833	775
50.0	555	601	764	854	885	911	926	897	838
52.5	507	559	755	863	912	941	963	947	889
55.0	453	548	741	851	911	950	974	976	932
57.5	376	499	725	819	878	929	960	980	961
60.0	182	334	720	931	876	913	941	979	988
62.5	104	136	563	930	1021	975	983	1037	1074
65.0	30	63	185	668	821	933	942	997	1135
67.5	23	30	92	319	522	695	856	982	1172
70.0	19	23	58	93	229	415	603	816	1125
72.5	18	19	40	53	80	162	313	497	814
75.0	16	17	30	35	47	72	111	211	442
77.5	13	15	24	25	30	33	50	78	187
80.0	11	12	19	16	16	17	23	33	85
82.5	9	9	13	9	9	10	13	15	32
85.0	5	4	6	4	4	4	5	6	10
87.5	1	1	1	1	1	1	1	1	1
90.0	0	0	0	0	0	0	0	0	0
92.5	0	0	0	0	0	0	0	0	0
95.0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0
100.0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0
105.0	0	0	0	0	0	0	0	0	0
120.0	0	0	0	0	0	0	0	0	0
135.0	0	0	0	0	0	0	0	0	0
150.0	0	0	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0	0	0

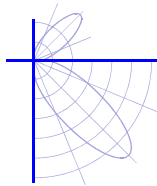


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Intensity data (cd)

Vertical	L-Plane								
	L70	L75	L80	L85	L90	L95	L100	L105	L110
0.0	370	370	370	370	370	370	370	370	370
10.0	365	364	361	360	359	355	351	345	339
20.0	390	383	378	375	368	358	345	330	313
30.0	459	443	423	411	396	375	350	322	294
35.0	500	476	445	431	415	387	354	320	286
40.0	563	528	483	453	430	398	359	318	275
45.0	655	601	539	487	452	412	364	315	263
47.5	708	644	573	508	466	421	367	312	253
50.0	763	690	612	535	481	429	369	307	240
52.5	815	737	656	567	499	439	371	302	223
55.0	861	785	703	605	520	450	373	294	202
57.5	905	837	759	649	542	459	372	282	177
60.0	954	903	828	701	567	466	367	266	152
62.5	1060	1008	921	770	595	469	358	245	125
65.0	1228	1207	1089	876	633	471	344	218	98
67.5	1366	1427	1320	1061	724	482	327	189	76
70.0	1418	1559	1512	1269	886	535	314	161	61
72.5	1200	1388	1405	1269	977	595	271	129	47
75.0	816	990	992	980	837	518	131	94	38
77.5	489	610	552	542	497	280	40	75	30
80.0	257	290	227	198	175	70	9	33	12
82.5	123	107	55	33	30	8	4	8	5
85.0	34	16	8	6	5	3	2	2	2
87.5	1	1	1	1	1	1	1	1	1
90.0	0	0	0	0	0	0	0	0	0
92.5	0	0	0	0	0	0	0	0	0
95.0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0
100.0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0
105.0	0	0	0	0	0	0	0	0	0
120.0	0	0	0	0	0	0	0	0	0
135.0	0	0	0	0	0	0	0	0	0
150.0	0	0	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0	0	0

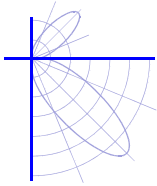


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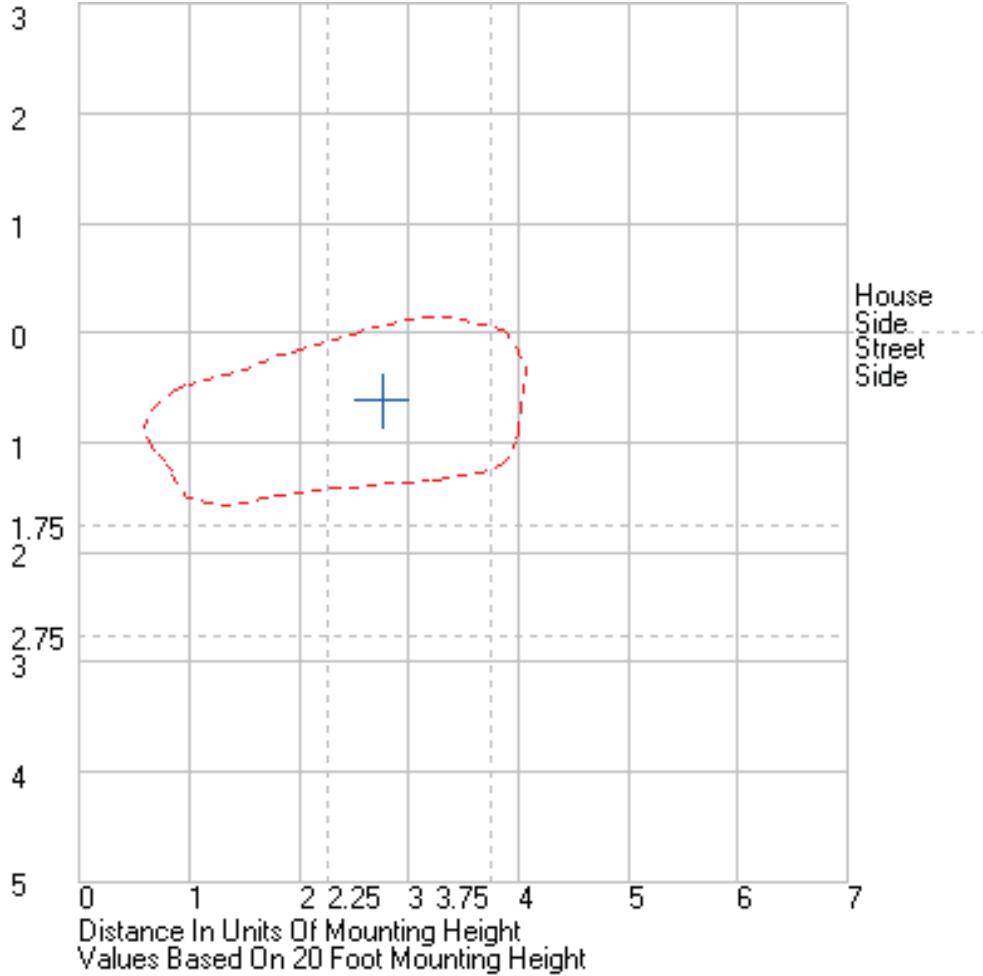
Intensity data (cd)

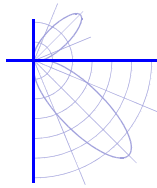
Vertical	L-Plane								
	L115	L120	L125	L130	L135	L140	L150	L165	L180
0.0	370	370	370	370	370	370	370	370	370
10.0	335	329	325	319	314	309	301	293	290
20.0	298	281	264	247	231	216	192	169	162
30.0	268	239	212	186	162	144	127	114	107
35.0	252	218	184	153	134	124	113	98	86
40.0	233	189	147	123	113	108	97	73	61
45.0	206	147	112	100	96	90	73	53	43
47.5	186	126	98	92	87	80	63	46	38
50.0	163	106	88	84	79	69	56	42	35
52.5	138	88	79	76	71	62	50	38	31
55.0	114	75	71	69	63	56	44	34	28
57.5	92	65	63	61	56	49	40	31	26
60.0	72	57	55	52	46	42	37	29	24
62.5	57	48	47	43	39	38	35	27	25
65.0	46	41	39	35	33	33	32	26	28
67.5	38	34	32	27	26	27	29	25	27
70.0	33	29	25	20	20	20	25	23	26
72.5	27	21	19	16	15	15	20	18	14
75.0	18	14	14	12	11	11	14	12	9
77.5	13	11	10	9	7	7	9	9	7
80.0	8	7	6	5	4	4	5	6	5
82.5	4	3	3	3	3	2	2	3	3
85.0	2	1	1	1	1	1	1	1	1
87.5	1	1	0	1	0	0	0	0	0
90.0	0	0	0	0	0	0	0	0	0
92.5	0	0	0	0	0	0	0	0	0
95.0	0	0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0	0	0
100.0	0	0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0	0	0
105.0	0	0	0	0	0	0	0	0	0
120.0	0	0	0	0	0	0	0	0	0
135.0	0	0	0	0	0	0	0	0	0
150.0	0	0	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0	0	0



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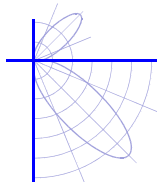
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LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.435, 0.404)
	CIE 1976 (u', v') ⁽¹⁾	(0.249, 0.521)
	Correlated Color Temperature (CCT) ⁽¹⁾	3030 K
	Spatial Δ (u', v') Uniformity ⁽²⁾	0.0116
	Color Rendering Index (Ra) ⁽¹⁾	74.2
	Special CRI 9 (R ₉) ^{(1),(3)}	-19.0
	Distance from Planckian Locus (Duv) ^{(1),(3)}	0.0002
	Scotopic/Photopic Ratio ^{(1),(3)}	1.21
Electrical	Voltage	120.0 V (Setpoint 1)
	Frequency	60.0 Hz
	Current	0.126 A
	Power	14.4 W
	Power Factor	0.955
	Current THD	12 %
	Voltage	277.0 V (Setpoint 2)
	Frequency	60.0 Hz
	Current	0.070 A
	Power	14.7 W
	Power Factor	0.758
	Current THD	17 %

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



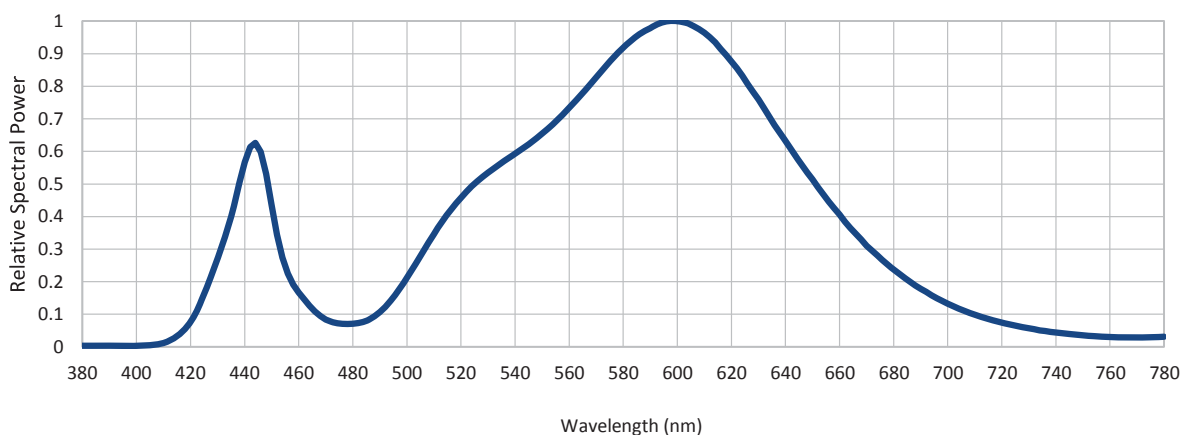
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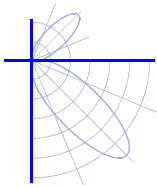
LM-79 Performance Data

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

380	0.003	480	0.071	580	0.918	680	0.237
385	0.003	485	0.080	585	0.954	685	0.206
390	0.003	490	0.107	590	0.978	690	0.178
395	0.003	495	0.153	595	0.997	695	0.154
400	0.003	500	0.213	600	1.000	700	0.133
405	0.005	505	0.279	605	0.989	705	0.114
410	0.012	510	0.345	610	0.964	710	0.099
415	0.033	515	0.406	615	0.925	715	0.086
420	0.077	520	0.458	620	0.876	720	0.074
425	0.163	525	0.501	625	0.819	725	0.065
430	0.272	530	0.535	630	0.759	730	0.057
435	0.402	535	0.565	635	0.694	735	0.050
440	0.567	540	0.593	640	0.633	740	0.044
445	0.612	545	0.622	645	0.571	745	0.039
450	0.436	550	0.655	650	0.514	750	0.035
455	0.249	555	0.692	655	0.457	755	0.032
460	0.167	560	0.734	660	0.406	760	0.030
465	0.117	565	0.779	665	0.356	765	0.029
470	0.084	570	0.827	670	0.310	770	0.029
475	0.072	575	0.875	675	0.273	775	0.029
						780	0.031



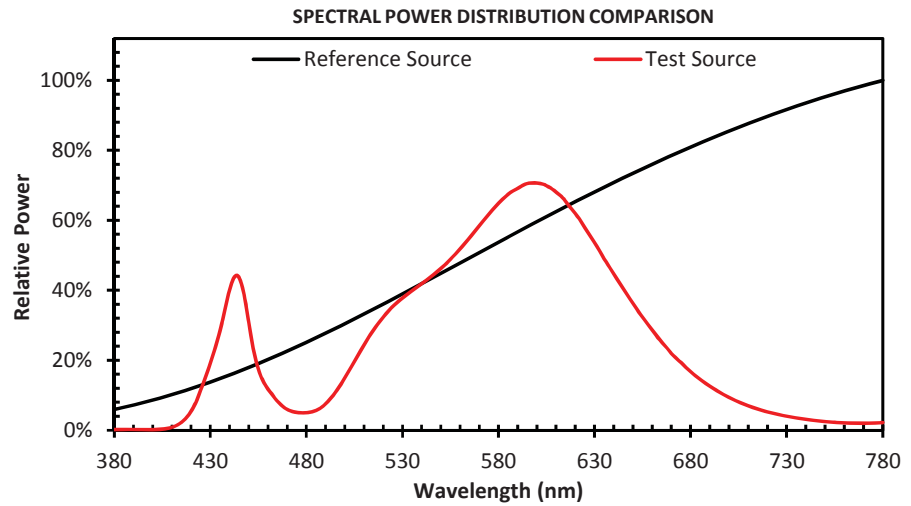
The relative spectral power distribution combines the weighted spectral power distributions of all spatial measurements.



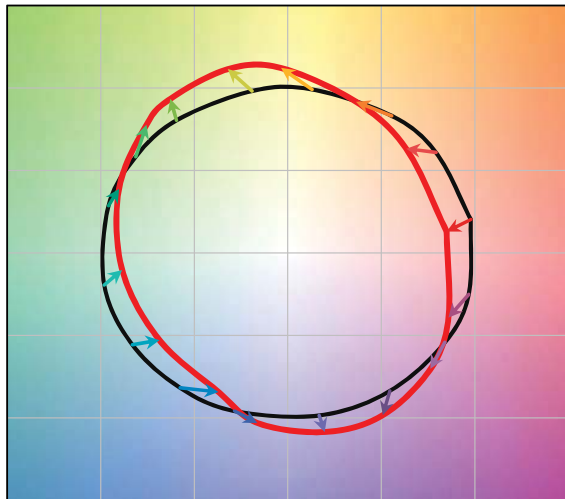
Test Report No. LLI-17133-1-R01

Leotek Electronics - Cobra head roadway luminaire. Product ID: GCJ0-15H-MV-WW-2R-XX-300
Grey painted cast aluminum housing with plastic driver door. Fixture extents ~ 9.5" x 18.25" x 4.5"
15 LEDs in 3 x 5 array with clear plastic sheet of individual lenses.
One Liteon LED Driver. Model: PA-1600-31SL
Operating at 120 VAC and 60 Hz with dimming set to 300mA.

R_f	71
R_g	98

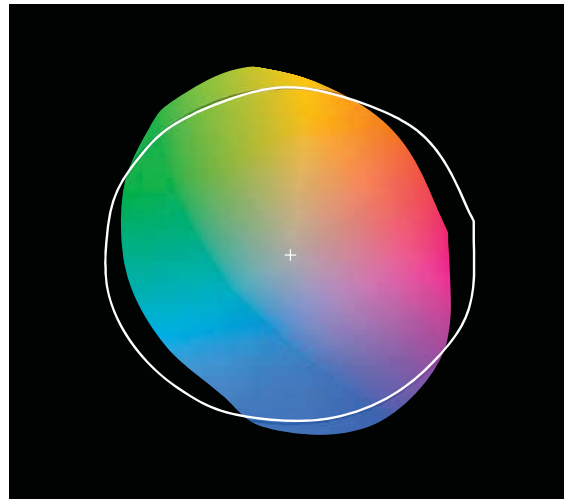


COLOR VECTOR GRAPHIC

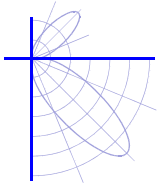


— Reference Illuminant — Test Source

COLOR DISTORTION GRAPHIC



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Test Report No. LLI-17133-1-R01

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One Liteon LED Driver. Model: PA-1600-31SL
Operating at 120 VAC and 60 Hz with dimming set to 300mA.

Test Distance 8.0 m
Test Temperature 24.7 °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 IESNA Type C coordinate system (L, V) as defined in IESNA publication LM-75.

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

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