



Report of Test LLI-17138-1

Leotek Electronics - Wall pack luminaire. Product ID: ES2-88H-MV-CW-W-DB-450
Brown painted cast aluminum housing with specular reflectors and prismaic clear plastic lens.
88 LEDs in 22 x 4 array with sheets of clear plastic individual lenses.
One Inventronics LED Driver. Model: EUD-200S490DT
Operating at 120 VAC and 60 Hz with dimming attached to switch set to "1".



Performance Summary

Total Light Output	14294 lm	Min Power Factor	0.90 @ 277 V
Luminaire Power	128.8 W	Max THD(i)*	12.0 % @ 277 V
Luminous Efficacy	111.0 lm/W		
CCT	4760 K		
CIE(x,y) 1931	(0.354, 0.368)	Bug Rating	B3-U0-G2
CRI	74		

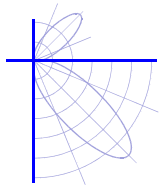
PREPARED FOR : Leotek Electronics USA Corp, San Jose CA 95131.



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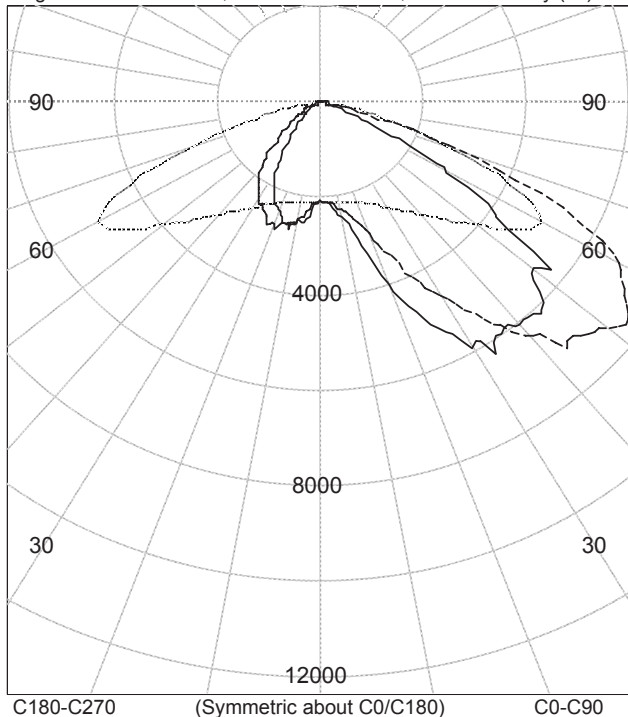




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Legend: C0/C180-Solid, C45/C225-Dashed, C90/C270-Grey (cd)



INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	2053	2053	2053	2053	2053	
5.0	2146	2123	2120	2085	2072	213
10.0	2442	2410	2259	2144	2097	
15.0	3098	2922	2541	2269	2163	739
20.0	4235	4007	3057	2404	2239	
25.0	5116	4855	3916	2664	2362	1446
30.0	5950	5605	4669	3009	2530	
35.0	5943	6497	5547	3521	2768	2217
40.0	6032	6358	6394	4183	3048	
45.0	6092	6721	6938	4726	3452	2880
50.0	5375	6289	7331	5559	3985	
55.0	4177	5872	7285	6545	4652	3261
60.0	2748	3816	6701	7103	4932	
65.0	1207	1879	5167	6712	4081	2465
70.0	555	780	2676	5435	2496	
75.0	166	266	936	3536	1267	933
80.0	80	94	355	1571	513	
85.0	30	36	99	488	115	139
90.0	0	0	0	0	0	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	2398	N / A	16.8
0-40	4615	N / A	32.3
0-60	10756	N / A	75.2
0-90	14294	N / A	100.0
40-90	9679	N / A	67.7
60-90	3538	N / A	24.8
90-180	0	N / A	0.0
0-180	14294	N / A	100.0

Total Light Output = 14,294 lm

Signed:

Ryder Tunney
Ryder Tunney
Authorized Signatory

Date of test 31-May-2017
Date of report 31-May-2017

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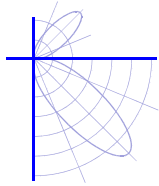


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Intensity data (cd)					
Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	2053	2053	2053	2053	2053
2.5	2079	2070	2072	2051	2062
5.0	2146	2123	2120	2085	2072
7.5	2262	2248	2195	2125	2078
10.0	2442	2410	2259	2144	2097
12.5	2683	2578	2385	2182	2126
15.0	3098	2922	2541	2269	2163
17.5	3657	3361	2753	2317	2196
20.0	4235	4007	3057	2404	2239
22.5	4710	4454	3406	2529	2285
25.0	5116	4855	3916	2664	2362
27.5	5448	5302	4320	2826	2440
30.0	5950	5605	4669	3009	2530
32.5	6046	6045	5049	3261	2636
35.0	5943	6497	5547	3521	2768
37.5	5897	6285	5895	3846	2902
40.0	6032	6358	6394	4183	3048
42.5	6028	6563	6978	4455	3243
45.0	6092	6721	6938	4726	3452
47.5	5675	6654	7117	5095	3691
50.0	5375	6289	7331	5559	3985
52.5	5487	5911	7588	5983	4326
55.0	4177	5872	7285	6545	4652
57.5	3601	4589	7004	6977	4891
60.0	2748	3816	6701	7103	4932
62.5	1805	3063	5958	7033	4675
65.0	1207	1879	5167	6712	4081
67.5	848	1182	3925	6168	3290
70.0	555	780	2676	5435	2496
72.5	294	494	1627	4594	1814
75.0	166	266	936	3536	1267
77.5	116	142	553	2458	838
80.0	80	94	355	1571	513
82.5	52	62	207	943	275
85.0	30	36	99	488	115
87.5	13	15	31	165	24
90.0	0	0	0	0	0

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Intensity data (cd)

Gamma	C-Plane				
	C90	C112.5	C135	C157.5	C180
0.0	2053	2053	2053	2053	2053
2.5	2062	2088	2091	2129	2146
5.0	2072	2105	2226	2344	2377
7.5	2078	2154	2397	2518	2545
10.0	2097	2285	2549	2517	2603
12.5	2126	2420	2538	2573	2672
15.0	2163	2509	2654	2592	2648
17.5	2196	2647	2734	2590	2451
20.0	2239	2715	2648	2446	2363
22.5	2285	2715	2665	2329	2245
25.0	2362	2839	2541	2203	2042
27.5	2440	2924	2450	2001	1878
30.0	2530	3009	2352	1855	1690
32.5	2636	3068	2206	1659	1474
35.0	2768	3054	2042	1448	1208
37.5	2902	3129	1914	1185	997
40.0	3048	3024	1708	982	787
42.5	3243	2946	1511	781	610
45.0	3452	2854	1253	606	472
47.5	3691	2738	1053	468	409
50.0	3985	2627	858	407	363
52.5	4326	2440	706	362	317
55.0	4652	2220	548	319	271
57.5	4891	1994	441	275	228
60.0	4932	1759	375	233	190
62.5	4675	1495	325	194	158
65.0	4081	1215	274	160	130
67.5	3290	970	225	130	107
70.0	2496	759	181	105	87
72.5	1814	576	141	83	69
75.0	1267	415	106	64	53
77.5	838	283	77	47	39
80.0	513	181	52	32	26
82.5	275	103	31	19	16
85.0	115	48	15	10	8
87.5	24	14	4	3	3
90.0	0	0	0	0	0



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LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.354, 0.368)
	CIE 1976 (u', v') ⁽¹⁾	(0.211, 0.494)
	Correlated Color Temperature (CCT) ⁽¹⁾	4760 K
	Spatial Δ (u', v') Uniformity ⁽²⁾	0.0144
	Color Rendering Index (Ra) ⁽¹⁾	73.7
	Special CRI 9 (R ₉) ^{(1),(3)}	-22.9
	Distance from Planckian Locus (Duv) ^{(1),(3)}	0.0048
	Scotopic/Photopic Ratio ^{(1),(3)}	1.73
Electrical	Voltage	120.0 V (Setpoint 1)
	Frequency	60.0 Hz
	Current	1.078 A
	Power	129 W
	Power Factor	0.996
	Current THD	5.2 %
	Voltage	277.0 V (Setpoint 2)
	Frequency	60.0 Hz
	Current	0.511 A
	Power	127 W
	Power Factor	0.896
	Current THD	12 %

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



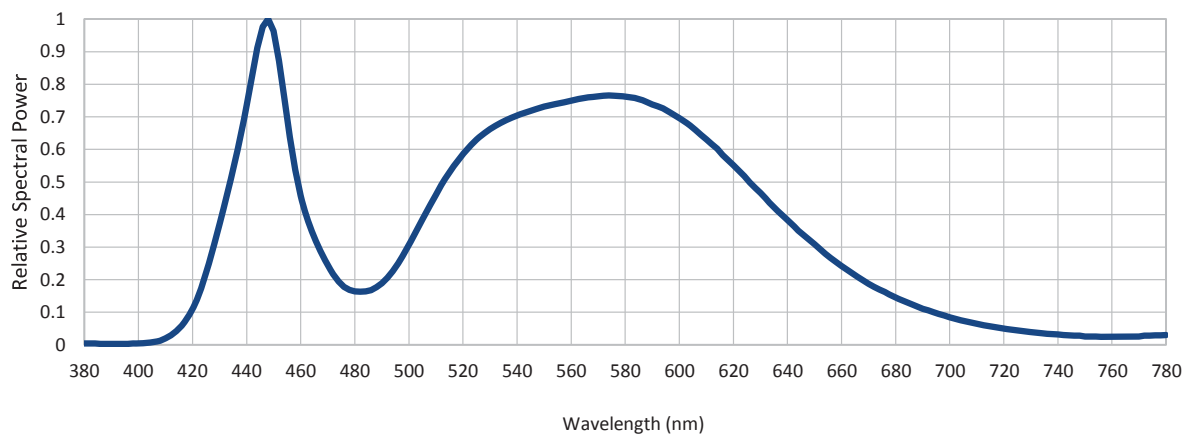
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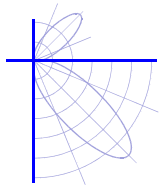
LM-79 Performance Data

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

380	0.004	480	0.164	580	0.762	680	0.145
385	0.003	485	0.166	585	0.754	685	0.127
390	0.003	490	0.189	590	0.738	690	0.111
395	0.003	495	0.238	595	0.721	695	0.097
400	0.004	500	0.308	600	0.696	700	0.085
405	0.008	505	0.385	605	0.666	705	0.074
410	0.020	510	0.460	610	0.631	710	0.065
415	0.051	515	0.529	615	0.592	715	0.057
420	0.111	520	0.585	620	0.551	720	0.050
425	0.223	525	0.629	625	0.508	725	0.044
430	0.372	530	0.662	630	0.466	730	0.039
435	0.539	535	0.686	635	0.423	735	0.035
440	0.737	540	0.704	640	0.383	740	0.032
445	0.944	545	0.718	645	0.344	745	0.029
450	0.963	550	0.731	650	0.309	750	0.026
455	0.697	555	0.740	655	0.274	755	0.025
460	0.458	560	0.750	660	0.243	760	0.025
465	0.331	565	0.758	665	0.214	765	0.026
470	0.245	570	0.763	670	0.187	770	0.026
475	0.186	575	0.765	675	0.166	775	0.028
						780	0.030



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



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LM-79 Performance Data

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0° plane	Horiz. 90° plane
0.0	(0.211, 0.497)	(0.210, 0.496)
10.0	(0.210, 0.490)	(0.211, 0.496)
20.0	(0.210, 0.486)	(0.211, 0.496)
30.0	(0.210, 0.484)	(0.211, 0.498)
40.0	(0.210, 0.479)	(0.211, 0.499)
50.0	(0.209, 0.480)	(0.212, 0.502)
60.0	(0.210, 0.485)	(0.212, 0.505)
70.0	I <= 10% peak	(0.212, 0.507)
80.0	I <= 10% peak	I <= 10% peak
-	-	-

Spatial measurements

Vert. angle (°)	CIE 1976 (u',v') coordinates	
	Horiz. 0° plane	Horiz. 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 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 0.75 / 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

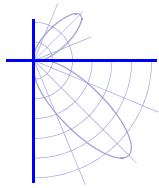
Voltage	± 0.5 %	Frequency *	± 0.1 Hz
Current	± 0.5 %	Power	± 0.5 %
Current THD *	± 3 %	Power Factor	± 0.02

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

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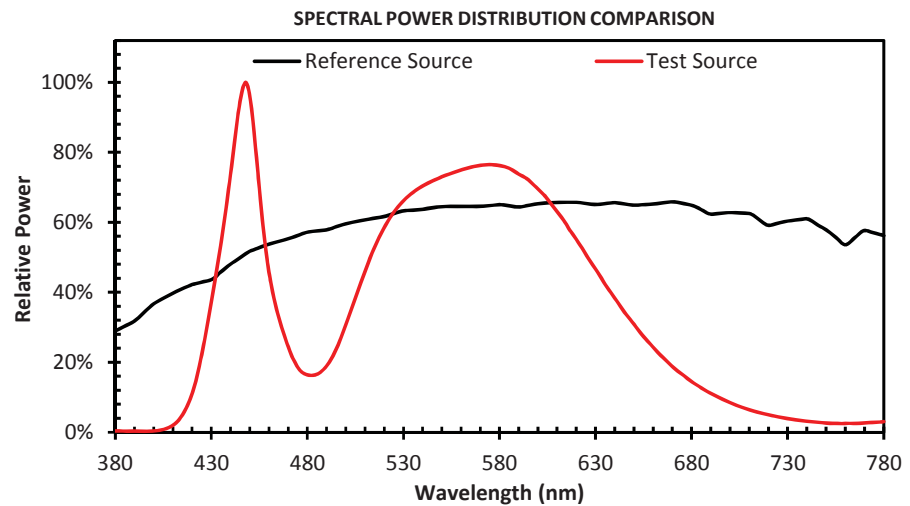
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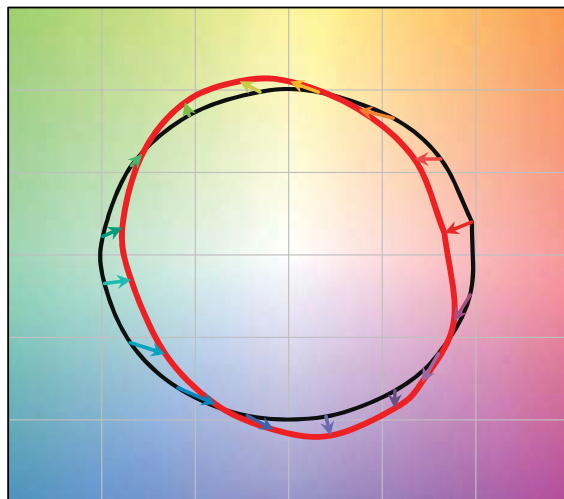
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R_f	73
R_g	95



COLOR VECTOR GRAPHIC



Reference Illuminant

Test Source

COLOR DISTORTION GRAPHIC



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Test Distance 8.0 m
Test Temperature 25.0 °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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