



Report of Test LLI-17138-3

Leotek Electronics - Wall pack luminaire. Product ID: ES2-88H-MV-NW-FT-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	14564 lm	Min Power Factor	0.89 @ 277 V
Luminaire Power	128.2 W	Max THD(i)*	12.0 % @ 277 V
Luminous Efficacy	113.6 lm/W		
CCT	4040 K		
CIE(x,y) 1931	(0.380, 0.380)	Bug Rating	B3-U0-G3
CRI	73		

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



LightLab
INTERNATIONAL

LightLab International, LLC
Phoenix AZ 85085



This document is issued in accordance with the accreditation requirements of NVLAP. The laboratory is accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to the SI system of units.

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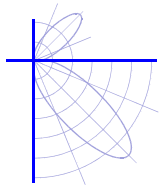
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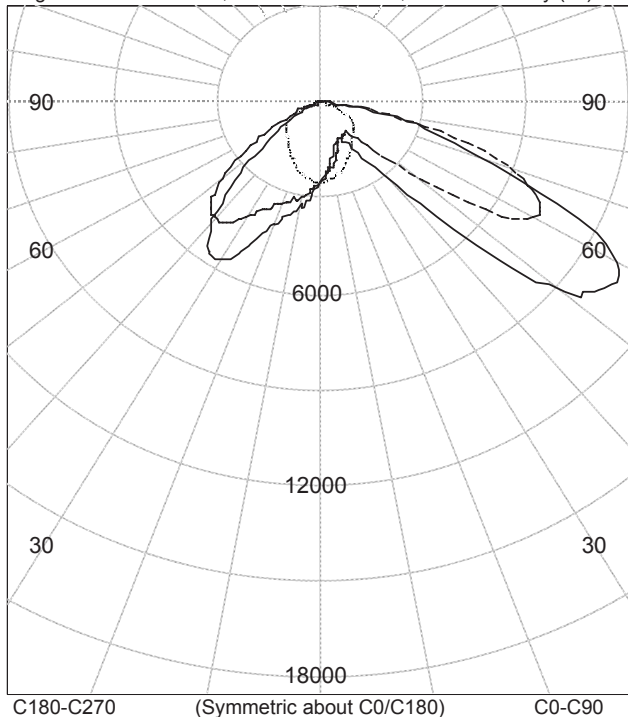
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Legend: C0/C180-Solid, C45/C225-Dashed, C90/C270-Grey (cd)



INTENSITY SUMMARY (cd)

Gamma	C-Plane					Flux (lm)
	C0	C22.5	C45	C67.5	C90	
0.0	2504	2504	2504	2504	2504	
5.0	2162	2181	2202	2355	2460	239
10.0	1898	1932	2053	2133	2367	
15.0	1535	1577	1786	2051	2259	699
20.0	1323	1284	1573	1906	2093	
25.0	1292	1202	1337	1772	1916	1183
30.0	1365	1292	1215	1725	1757	
35.0	1902	1609	1200	1679	1599	1779
40.0	3398	2703	1223	1415	1450	
45.0	5934	4882	1935	1038	1375	2484
50.0	9292	8389	3411	831	1330	
55.0	10068	10024	5880	923	1243	3396
60.0	10005	10433	7174	1274	1023	
65.0	7639	9080	6911	1425	729	3033
70.0	4857	5940	5772	1305	451	
75.0	3201	3746	3615	888	258	1461
80.0	1586	2023	1733	466	125	
85.0	511	706	596	158	38	291
90.0	0	0	0	0	0	

ZONAL FLUX AND PERCENTAGES

Zone	Flux (lm)	% Lamp	% Luminaire
0-30	2121	N / A	14.6
0-40	3900	N / A	26.8
0-60	9780	N / A	67.2
0-90	14564	N / A	100.0
40-90	10664	N / A	73.2
60-90	4784	N / A	32.8
90-180	0	N / A	0.0
0-180	14564	N / A	100.0

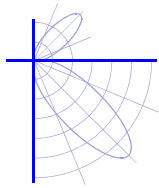
Total Light Output = 14,564 lm

Signed:

Ryder Tunney
Ryder Tunney
Authorized Signatory

Date of test 31-May-2017
Date of report 1-Jun-2017

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Intensity data (cd)					
Gamma	C-Plane				
	C0	C22.5	C45	C67.5	C90
0.0	2504	2504	2504	2504	2504
2.5	2346	2361	2390	2462	2496
5.0	2162	2181	2202	2355	2460
7.5	2078	2098	2139	2246	2422
10.0	1898	1932	2053	2133	2367
12.5	1695	1728	1902	2067	2322
15.0	1535	1577	1786	2051	2259
17.5	1384	1414	1681	1978	2184
20.0	1323	1284	1573	1906	2093
22.5	1300	1222	1437	1824	1998
25.0	1292	1202	1337	1772	1916
27.5	1311	1213	1257	1731	1834
30.0	1365	1292	1215	1725	1757
32.5	1460	1406	1193	1725	1674
35.0	1902	1609	1200	1679	1599
37.5	2499	2117	1193	1571	1516
40.0	3398	2703	1223	1415	1450
42.5	4603	3628	1450	1219	1411
45.0	5934	4882	1935	1038	1375
47.5	8098	6336	2544	905	1352
50.0	9292	8389	3411	831	1330
52.5	9813	9532	4515	825	1299
55.0	10068	10024	5880	923	1243
57.5	10324	10319	6839	1101	1147
60.0	10005	10433	7174	1274	1023
62.5	9239	10031	7200	1378	880
65.0	7639	9080	6911	1425	729
67.5	6104	7434	6436	1414	582
70.0	4857	5940	5772	1305	451
72.5	3920	4729	4738	1116	344
75.0	3201	3746	3615	888	258
77.5	2406	2858	2583	667	185
80.0	1586	2023	1733	466	125
82.5	950	1273	1093	296	76
85.0	511	706	596	158	38
87.5	204	280	224	56	12
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	2504	2504	2504	2504	2504
2.5	2496	2526	2620	2615	2624
5.0	2460	2589	2714	2827	2869
7.5	2422	2603	2876	3078	3179
10.0	2367	2603	2989	3270	3258
12.5	2322	2644	3128	3444	3499
15.0	2259	2709	3223	3588	3659
17.5	2184	2665	3265	3765	3893
20.0	2093	2731	3382	3933	4156
22.5	1998	2671	3533	4228	4523
25.0	1916	2636	3694	4580	4969
27.5	1834	2703	3840	4978	5412
30.0	1757	2705	4053	5341	5674
32.5	1674	2733	4318	5487	5748
35.0	1599	2782	4538	5515	5650
37.5	1516	2811	4719	5371	5251
40.0	1450	2857	4707	5001	4824
42.5	1411	2884	4665	4569	4138
45.0	1375	2878	4451	3922	3450
47.5	1352	2878	4124	3249	2890
50.0	1330	2826	3707	2729	2246
52.5	1299	2712	3183	2141	1732
55.0	1243	2567	2595	1641	1365
57.5	1147	2341	2126	1283	943
60.0	1023	2084	1688	907	646
62.5	880	1778	1320	633	485
65.0	729	1467	967	454	322
67.5	582	1151	703	307	203
70.0	451	860	516	195	133
72.5	344	619	357	123	101
75.0	258	428	235	85	78
77.5	185	283	153	61	58
80.0	125	179	94	43	40
82.5	76	103	52	27	25
85.0	38	50	25	15	14
87.5	12	15	8	6	6
90.0	0	0	0	0	0

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LM-79 Performance Data

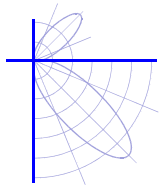
Spectral	CIE 1931 (x, y)	(0.380, 0.380)		
	CIE 1976 (u', v')	(0.223, 0.503)		
	Correlated Color Temperature (CCT)	4040	K	
	Spatial Δ (u', v') Uniformity	0.0132		
	Color Rendering Index (Ra)	72.8		
	Special CRI 9 (R _g)	-22.0		
	Distance from Planckian Locus (Duv)	0.0017		
	Scotopic/Photopic Ratio	1.52		
Electrical	Voltage	120.0	V	(Setpoint 1)
	Frequency	60.0	Hz	
	Current	1.073	A	
	Power	128	W	
	Power Factor	0.996		
	Current THD	5.1	%	
	Voltage	277.0	V	(Setpoint 2)
	Frequency	60.0	Hz	
	Current	0.511	A	
	Power	126	W	
	Power Factor	0.892		
	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



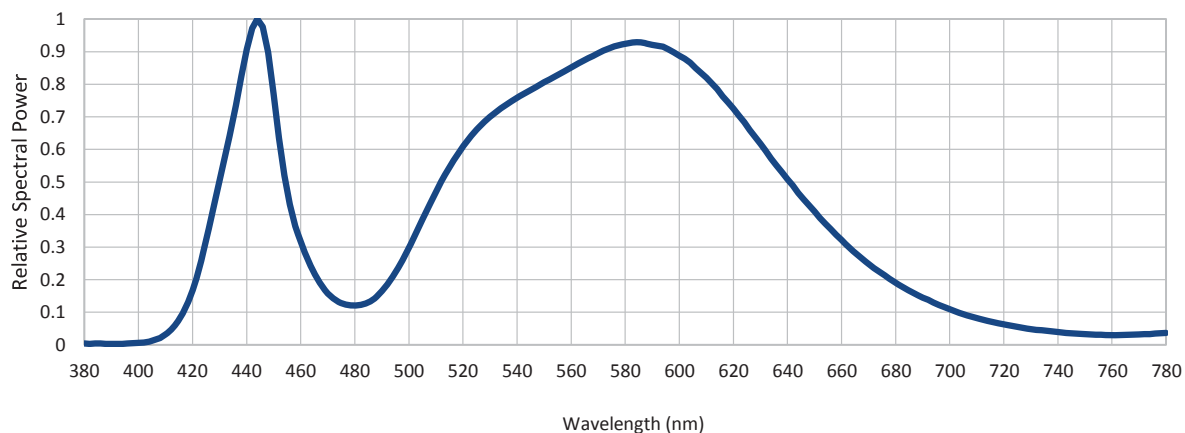
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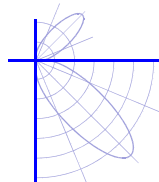
LM-79 Performance Data

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

380	0.004	480	0.121	580	0.924	680	0.190
385	0.004	485	0.131	585	0.928	685	0.166
390	0.003	490	0.165	590	0.921	690	0.145
395	0.004	495	0.223	595	0.911	695	0.127
400	0.006	500	0.299	600	0.888	700	0.110
405	0.013	505	0.384	605	0.858	705	0.095
410	0.032	510	0.468	610	0.820	710	0.082
415	0.078	515	0.545	615	0.774	715	0.072
420	0.168	520	0.608	620	0.725	720	0.063
425	0.322	525	0.660	625	0.671	725	0.055
430	0.506	530	0.700	630	0.617	730	0.048
435	0.695	535	0.732	635	0.561	735	0.044
440	0.907	540	0.758	640	0.509	740	0.039
445	0.988	545	0.782	645	0.457	745	0.036
450	0.771	550	0.806	650	0.410	750	0.033
455	0.476	555	0.828	655	0.363	755	0.031
460	0.316	560	0.852	660	0.322	760	0.030
465	0.221	565	0.875	665	0.283	765	0.030
470	0.158	570	0.895	670	0.247	770	0.032
475	0.129	575	0.913	675	0.218	775	0.034
						780	0.037



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	(0.225, 0.512)	(0.225, 0.513)
10.0	(0.225, 0.512)	(0.225, 0.513)
20.0	(0.223, 0.506)	(0.226, 0.514)
30.0	(0.223, 0.506)	(0.226, 0.514)
40.0	(0.222, 0.500)	(0.226, 0.514)
50.0	(0.222, 0.499)	(0.226, 0.515)
60.0	(0.223, 0.501)	(0.226, 0.516)
70.0	(0.223, 0.500)	I ≤ 10% peak
80.0	(0.222, 0.497)	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 4.5 / 5.5 hours

Equipment and uncertainties

LightLab International R80A C-gamma rotating mirror goniophotometer with a test distance of 8 m.

Luminous Intensity ± 4 %
Luminous Flux ± 4 %
Horiz., Vert. Angles ± 0.25°

Temperature ± 1 °C
Luminous Efficacy ± 4.5 %

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
CIE (u', v') coordinates ± 0.002
Spatial Δ (u', v') uniformity ± 0.001
Rel. Spectral Irradiance * ± 2 %
Duv * ± 5E-04

CCT ± 100 K
CRI (Ra) ± 2
Scotopic / Photopic Ratio * ± 0.02
R9 * ± 2

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

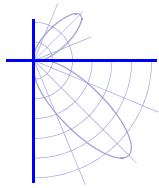
Voltage ± 0.5 %
Current ± 0.5 %
Current THD * ± 3 %
Frequency * ± 0.1 Hz
Power ± 0.5 %
Power Factor ± 0.02

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)

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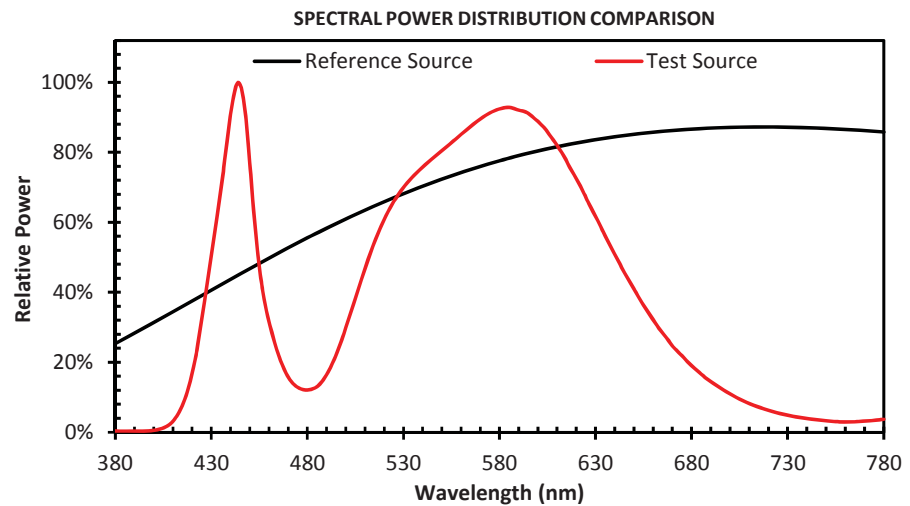
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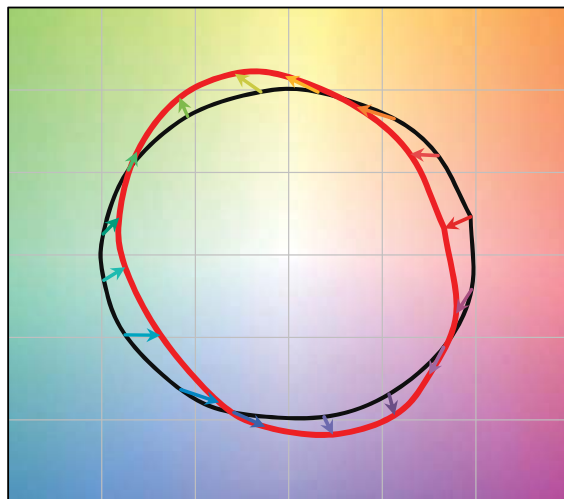
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R_f	71
R_g	97



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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