

Report of Test LLI-16282-5

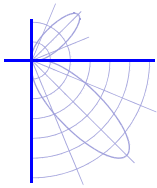
Clarte Lighting - 6" downlight luminaire. Product ID: PAR 20 / Narrow Spot
Extruded aluminum housing with semi-specular trim ring.
Six LEDs mounted in circular array to white PCB with clear plastic array of individual lenses.
PCB mounted to extruded aluminum heat sink.
One Clarte driver. Model: 615E28XS20P2HC5
Operating at 120 VAC and 60 Hz.



Performance Summary

Total Light Output	1638 lm	Min Power Factor	0.86 @ 277 V
Luminaire Power	26.9 W	Max THD(i)*	10.9 % @ 277 V
Luminous Efficacy	60.9 lm/W		
CCT	2820 K		
CIE(x,y) 1931	(0.445, 0.398)		
CRI	82		

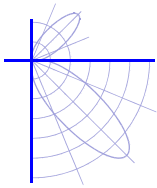
PREPARED FOR : Clarte Lighting, Azusa, CA



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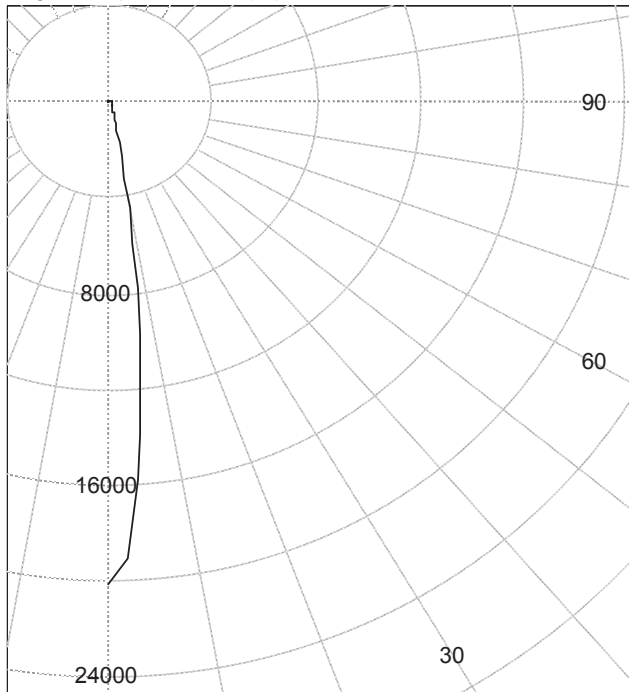
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Legend: All planes - Solid (cd)



(Rotational symmetry)

INTENSITY SUMMARY (cd)

Gamma	All Planes	Flux (lm)	Gamma	C0	Flux (lm)
0	20206		90	0	
5	13883	1000	95	0	0
10	4389		100	0	0
15	921	334	105	0	0
20	336		110	0	0
25	210	99	115	0	0
30	149		120	0	0
35	117	75	125	0	0
40	102		130	0	0
45	81	65	135	0	0
50	73		140	0	0
55	49	47	145	0	0
60	41		150	0	0
65	15	17	155	0	0
70	1		160	0	0
75	0	0	165	0	0
80	0		170	0	0
85	0	0	175	0	0
90	0		180	0	0

ZONAL FLUX AND PERCENTAGES

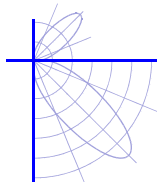
Zone	Flux (lm)	%Lamp	%Luminaire
0-30	1433	N / A	87.5
0-40	1508	N / A	92.1
0-60	1620	N / A	98.9
0-90	1638	N / A	100.0
40-90	130	N / A	7.9
60-90	18	N / A	1.1
90-180	0	N / A	0.0
0-180	1638	N / A	100.0

Total Light Output = 1,638 lm

Signed:

Ryder Tunney
Authorized Signatory

Date of test 13-Oct-2016
Date of report 21-Oct-2016

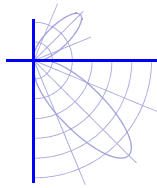


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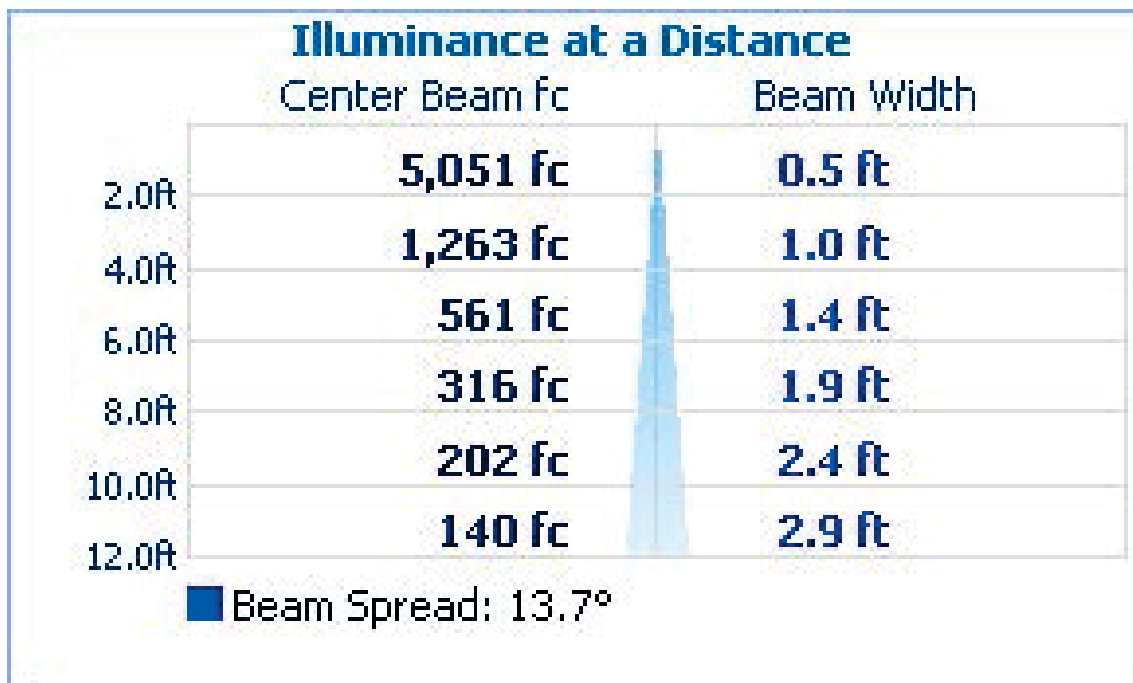
Intensity (cd) and Flux (lm) data

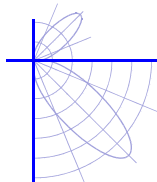
Gamma	Intensity	Flux	Gamma	Intensity	Flux
0.0	20206		90.0	0	
2.5	18419		92.5	0	
5.0	13883	1000	95.0	0	
7.5	8761		97.5	0	0
10.0	4389		100.0	0	
12.5	1970		102.5	0	
15.0	921	334	105.0	0	
17.5	488		107.5	0	0
20.0	336		110.0	0	
22.5	258		112.5	0	
25.0	210	99	115.0	0	
27.5	174		117.5	0	0
30.0	149		120.0	0	
32.5	131		122.5	0	
35.0	117	75	125.0	0	
37.5	109		127.5	0	0
40.0	102		130.0	0	
42.5	94		132.5	0	
45.0	81	65	135.0	0	
47.5	78		137.5	0	0
50.0	73		140.0	0	
52.5	60		142.5	0	
55.0	49	47	145.0	0	
57.5	45		147.5	0	0
60.0	41		150.0	0	
62.5	32		152.5	0	
65.0	15	17	155.0	0	
67.5	2		157.5	0	0
70.0	1		160.0	0	
72.5	1		162.5	0	
75.0	0	0	165.0	0	
77.5	0		167.5	0	0
80.0	0		170.0	0	
82.5	0		172.5	0	
85.0	0	0	175.0	0	
87.5	0		177.5	0	0
90.0	0		180.0	0	



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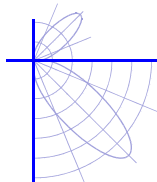
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LM-79 Performance Data

Spectral	CIE 1931 (x, y) ⁽¹⁾	(0.445, 0.398)	
	CIE 1976 (u', v') ⁽¹⁾	(0.259, 0.520)	
	Correlated Color Temperature (CCT) ⁽¹⁾	2820 K	
	Color Spatial Uniformity ⁽²⁾	0.0030	
	Color Rendering Index (Ra) ⁽¹⁾	82.0	
	Special CRI 9 (R ₉) ^{(1),(3)}	9	
	Distance from Planckian Locus (Duv) ^{(1),(3)}	-0.0034	
	Scotopic/Photopic Ratio ^{(1),(3)}	1.27	
Electrical	Voltage	120 V	(Setpoint 1)
	Frequency	60 Hz	
	Current	0.231 A	
	Power	26.9 W	
	Power Factor	0.971	
	Current THD	9.78 %	
	Voltage	277 V	(Setpoint 2)
	Frequency	60 Hz	
	Current	0.115 A	
	Power	27.6 W	
	Power Factor	0.863	
	Current THD	10.87 %	

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



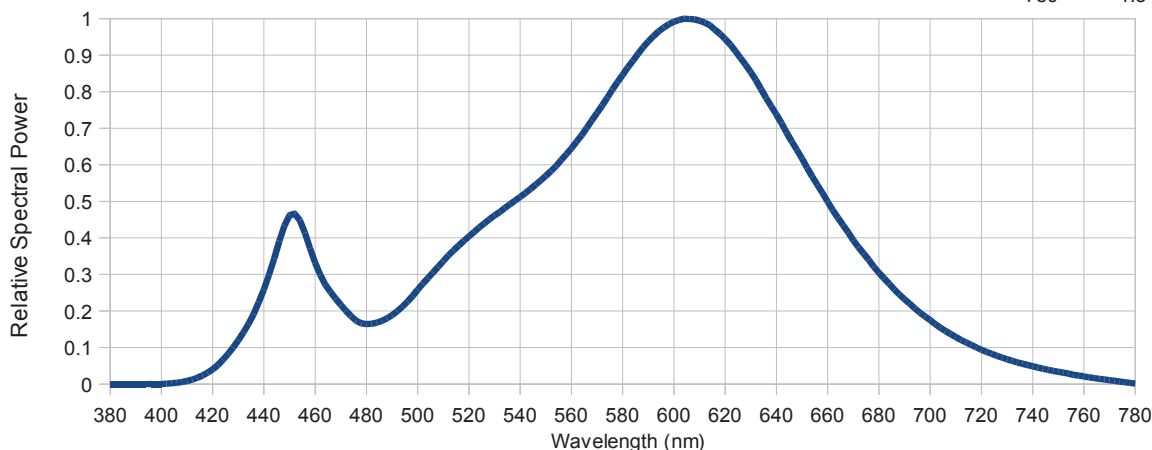
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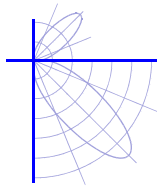
LM-79 Performance Data

Summary Relative Spectral Irradiance Distribution (wavelength – nm, irradiance – relative to peak = 1)

380	0.00E+00	480	1.64E-01	580	8.46E-01	680	3.05E-01
385	0.00E+00	485	1.70E-01	585	8.94E-01	685	2.67E-01
390	0.00E+00	490	1.88E-01	590	9.38E-01	690	2.32E-01
395	0.00E+00	495	2.19E-01	595	9.70E-01	695	2.01E-01
400	3.41E-04	500	2.58E-01	600	9.92E-01	700	1.75E-01
405	2.76E-03	505	2.98E-01	605	1.00E+00	705	1.50E-01
410	8.41E-03	510	3.36E-01	610	9.95E-01	710	1.29E-01
415	2.00E-02	515	3.72E-01	615	9.76E-01	715	1.11E-01
420	4.03E-02	520	4.04E-01	620	9.44E-01	720	9.38E-02
425	7.41E-02	525	4.34E-01	625	9.02E-01	725	8.02E-02
430	1.20E-01	530	4.61E-01	630	8.54E-01	730	6.78E-02
435	1.78E-01	535	4.87E-01	635	7.95E-01	735	5.72E-02
440	2.58E-01	540	5.12E-01	640	7.37E-01	740	4.85E-02
445	3.68E-01	545	5.40E-01	645	6.76E-01	745	4.03E-02
450	4.62E-01	550	5.70E-01	650	6.17E-01	750	3.32E-02
455	4.31E-01	555	6.05E-01	655	5.57E-01	755	2.68E-02
460	3.32E-01	560	6.45E-01	660	4.99E-01	760	2.09E-02
465	2.62E-01	565	6.91E-01	665	4.45E-01	765	1.54E-02
470	2.17E-01	570	7.42E-01	670	3.93E-01	770	1.04E-02
475	1.79E-01	575	7.95E-01	675	3.49E-01	775	5.86E-03
						780	1.54E-03



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



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LM-79 Performance Data

Spatial measurements

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
0	(0.258, 0.519)	(0.258, 0.520)
1	(0.258, 0.519)	(0.258, 0.519)
2	(0.258, 0.519)	(0.258, 0.520)
3	(0.258, 0.520)	(0.258, 0.520)
4	(0.258, 0.520)	(0.258, 0.520)
5	(0.258, 0.520)	(0.259, 0.520)
6	(0.259, 0.520)	(0.259, 0.520)
7	(0.259, 0.520)	(0.258, 0.520)
8	(0.259, 0.521)	(0.259, 0.520)
9	(0.259, 0.521)	(0.259, 0.520)

Spatial measurements

Vertical angle (deg)	CIE 1976 (u',v') coordinates	
	Horizontal 0 plane	Horizontal 90 plane
9	(0.259, 0.521)	(0.259, 0.520)
10	(0.260, 0.522)	(0.259, 0.520)
11	(0.260, 0.523)	(0.259, 0.521)
12	I <= 10 %	(0.258, 0.521)
13	I <= 10 %	(0.258, 0.521)
14	I <= 10 %	I <= 10 %
15	I <= 10 %	I <= 10 %
-	-	-
-	-	-
-	-	-

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 Time	20.5 hour
		Total Operation Time	21.5 hour

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 %
Horizontal, Vertical Angles	± 0.25°		

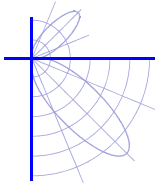
PhotoResearch PR-670 spectroradiometer (380 - 780 nm., 2 nm. per pixel) measuring at a distance from the sample deemed greater than five times the maximum observed luminous opening dimension.

CIE (x, y) coordinates	± 0.003	CCT	± 100 K
CIE (u', v') coordinates	± 0.002	CRI (Ra)	± 2
Δ (u', v') Color difference	± 0.001	Scotopic / Photopic Ratio *	± 0.02
Relative Spectral Irradiance *	± 2 %	R9 *	± 2

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.
IESNA LM-79-08 Calculator v5.1 (28th Jun 2016)



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Test Distance 8.0 m
Test Temperature 24.8 °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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This report must not be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the Federal Government.