

Test Report

Report Number: L15007

Date: Feb 10, 2015

Issued by:

Dialight Optics Laboratory
1501 Route 34 South, Farmingdale, NJ 07727

Test of one LED Floodlight
Unit manufacturer: Dialight Corporation
Unit model number: FLX444NC4NG

Issued to:

Dialight Corporation
1501 Route 34 South, Farmingdale, NJ 07727

Tests performed: Photometric characterization and temperature measurement per the described standards.

Dates of test: February 6, 2015 through February 10, 2015

Standards used: All tests are performed in accordance with procedures and guidelines prescribed by the American National Standards Institute (ANSI) or Illuminating Engineering Society of North America (IES):

- IES LM-79:2008: Electrical and Photometric Measurements of Solid-State Lighting Products
- ANSI/UL 1598:2008: Underwriters Laboratories Inc. Standard for Safety: Luminaires
- ENERGY STAR Manufacturer's Guide for Qualifying Solid State Lighting Luminaires Version 2.1

Description of sample:

Sample Number: L15007
Manufacturer: Dialight Corporation
Product Name: LED Floodlight
Description: LED Floodlight
Model Number: FLx444NC4NG

Report Summary

Sample number L15007
Dialight unit model number FLx444NC4NG

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	14540 (lumens)	14453 (lumens)
Electrical Power:	137.1 (W)	137.0 (W)
Luminous Efficacy:	106 (lumens/W)	105.5 (lumens/W)

Electrical Measurements:

Input Power (120VAC): 137.1 (W)
 Power Factor (120VAC): 0.997
 Current ATHD % (120VAC): 3.162
 Input Power (277VAC): 132.5 (W)
 Power Factor (277VAC): 0.943
 Current ATHD % (277VAC): 7.248

Color Measurements:

Correlated Color Temperature (CCT): 4861
 Color Rendering Index (CRI): 72.7
 Chromaticity Coordinate (x): 0.35
 Chromaticity Coordinate (y): 0.362
 Chromaticity Coordinate (u'): 0.211
 Chromaticity Coordinate (v'): 0.327
 DUV: 0.003

Temperature Measurements:

In Situ LED Source Temperature: 68.4 (°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L15007.
Dialight unit model number FLx444NC4NG

Test Conditions:

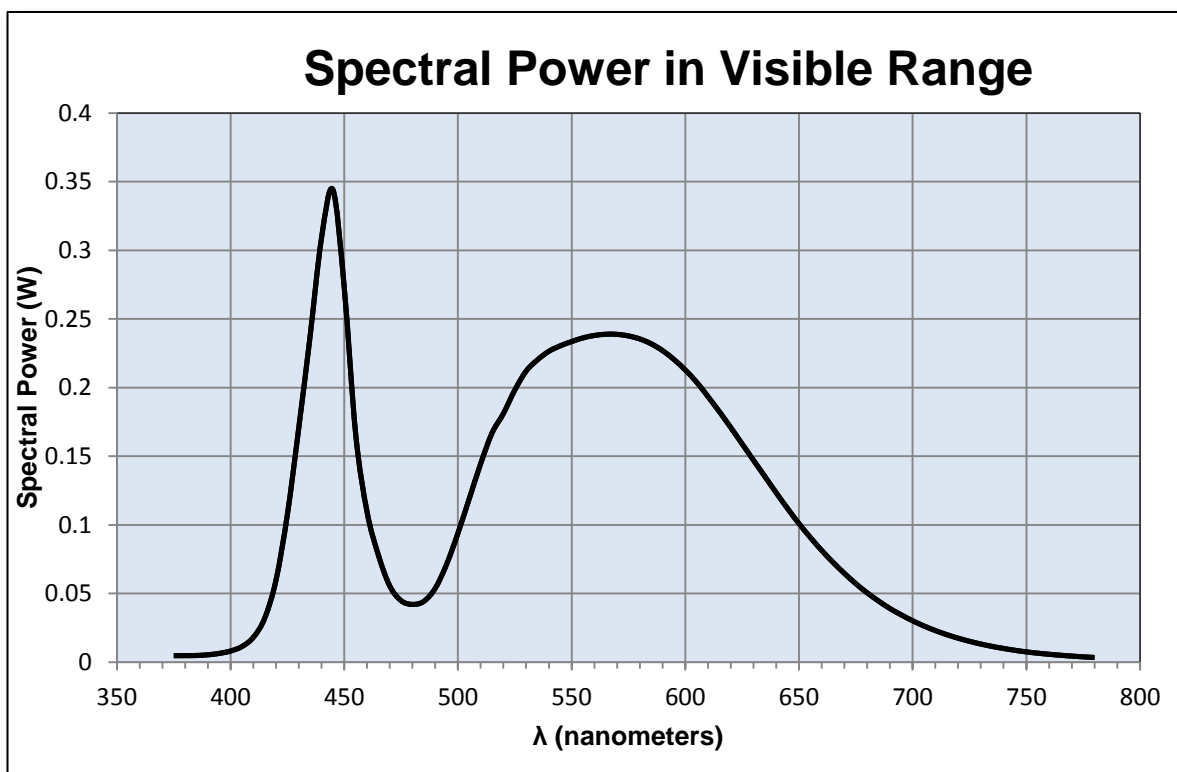
Ambient Temperature: 25 ± 1 (°C)

Electrical Measurements:

Input Voltage: 120 (VAC)
Input Current: 1.142 (A)
Input Power: 137.1 (W)
Input Power Factor: 0.997
Current ATHD: 3.162 (%)

Photometric measurements:

Luminous Flux: 14540 (lumens)
Luminous Efficacy: 106.0 (lumens/W)
Correlated Color Temperature (CCT): 4861 (K)
CRI -Ra: 72.7
CRI -R9: -16.6
DUV: 0.003
CIE Coordinate (x): 0.35
CIE Coordinate (y): 0.362
CIE Coordinate (u'): 0.211
CIE Coordinate (v'): 0.327



Test Results: Integrating Sphere

Results continued from previous page.

Tabulated Spectral Power in Visible Range:

$\lambda(\text{nm})$	(W/nm)	$\lambda(\text{nm})$	(W/nm)	$\lambda(\text{nm})$	(W/nm)
375	0.005	515	0.167	655	0.091
380	0.005	520	0.181	660	0.081
385	0.005	525	0.198	665	0.073
390	0.005	530	0.212	670	0.065
395	0.006	535	0.22	675	0.057
400	0.008	540	0.226	680	0.051
405	0.011	545	0.23	685	0.045
410	0.018	550	0.234	690	0.039
415	0.032	555	0.236	695	0.034
420	0.06	560	0.238	700	0.03
425	0.108	565	0.239	705	0.026
430	0.171	570	0.239	710	0.023
435	0.238	575	0.238	715	0.02
440	0.309	580	0.235	720	0.018
445	0.344	585	0.232	725	0.015
450	0.273	590	0.227	730	0.013
455	0.166	595	0.221	735	0.012
460	0.11	600	0.213	740	0.01
465	0.078	605	0.204	745	0.009
470	0.056	610	0.193	750	0.008
475	0.045	615	0.182	755	0.007
480	0.042	620	0.171	760	0.006
485	0.044	625	0.159	765	0.005
490	0.054	630	0.147	770	0.004
495	0.071	635	0.135	775	0.004
500	0.094	640	0.123	780	0.003
505	0.119	645	0.112		
510	0.145	650	0.101		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L15007.
Dialight unit model number FLx444NC4NG

Electrical Measurements:

Input Voltage: 120 (VAC)
Input current: 1.142 (A)
Input Power: 137.0 (W)
Power Factor: 0.997

Photometric measurements:

Absolute Luminous Flux: 14453 (lumens)
Luminous Efficacy: 105.5 (lumens/W)

Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	46871	46871	46871	46871	46871	
5	45086	45285	45436	45287	45247	1708
15	16312	16522	16704	16650	16568	5869
25	5013	5046	5072	5072	5073	2696
35	3909	3914	3893	3914	3924	2404
45	982	983	995	1002	978	1721
55	0	0	0	0	0	55
65	0	0	0	0	0	0
75	0	0	0	0	0	0
85	0	0	0	0	0	0
95	0	0	0	0	0	0
105	0	0	0	0	0	0
115	0	0	0	0	0	0
125	0	0	0	0	0	0
135	0	0	0	0	0	0
145	0	0	0	0	0	0
155	0	0	0	0	0	0
165	3	3	3	3	3	0
175	1	1	1	1	1	0
180	0	0	0	0	0	

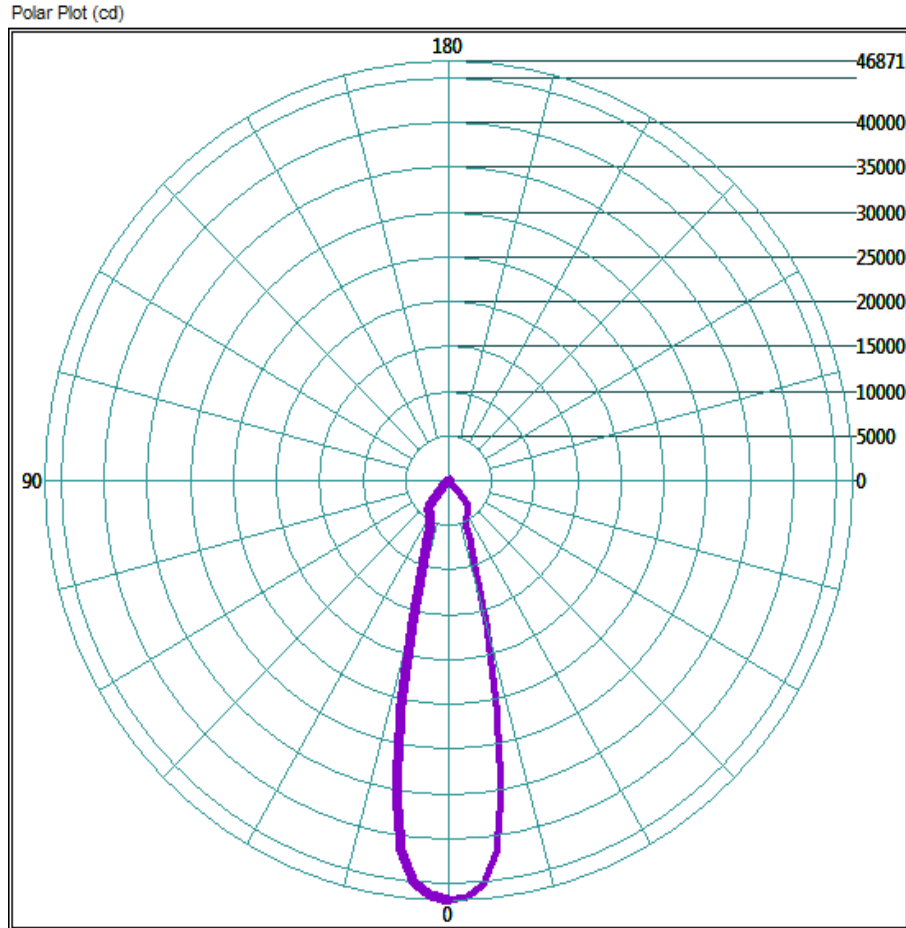
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	11456.32	79.3%
0-40	13824.26	95.6%
0-60	14452.42	100.0%
60-90	0	0.0%
0-90	14452.42	100.0%
90-180	0.8	0.0%
0-180	14453.22	100.0%

Test Results: Goniometer

Results continued from previous page.

Polar Plot:



Target % of Peak Intensity	Beam Angle to % Intensity Value (degrees)	Beam Angle to Specified % Intensity Value (degrees) [-]
50.00	26.15	26.30

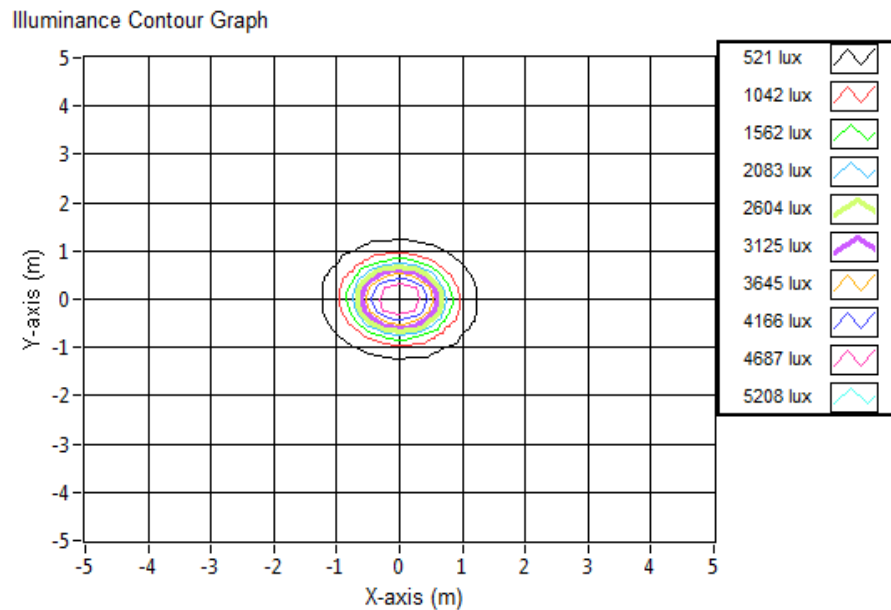
Beam Spread (at 50% Max CD)		Field Spread (at 10% Max CD)		IESNA LM-35-02 Floodlight Designation	
(deg) Horiz	(deg) Vert	(deg) Horiz	(deg) Vert	IESNA LM-35-02 Floodlight H Designation	IESNA LM-35-02 Floodlight V Designation
26.30	26.15	55.20	54.59	4	4

Total Luminous Flux	Field (%)	Field Flux (lm)	Beam Flux (%)	Beam Flux (lm)	Beam Spill (%)	Spill Flux (lm)
14450.32	72.70	10504.79	42.24	6103.92	27.30	3945.54

Test Results: Goniometer

Results continued from previous page.

Illuminance Plot:



Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
3.048	1.42	1.42	5045.1
6.096	2.83	2.85	1261.3
9.144	4.25	4.27	560.6
12.192	5.66	5.70	315.3
15.24	7.08	7.12	201.8
18.288	8.49	8.55	140.1
21.336	9.91	9.97	103.0
24.384	11.33	11.39	78.8
27.432	12.74	12.82	62.3
30.48	14.16	14.24	50.5

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L15007.
Dialight unit model number FLx444NC4NG

LED identified as Nichia part number Nichia 219B.

LED drive current (as indicated by customer): 400 (mA)

LED Specifications:

LED specifications are taken from LED manufacturer datasheet:

Maximum Forward Current (If): 1500 (mA)
Maximum Rated Power Dissipation: 5.1 (W)
Maximum Junction Temp. (Tj): 150 (°C)
Thermal Resistance (Rth): 11 (°C/W)

Derived Specifications:

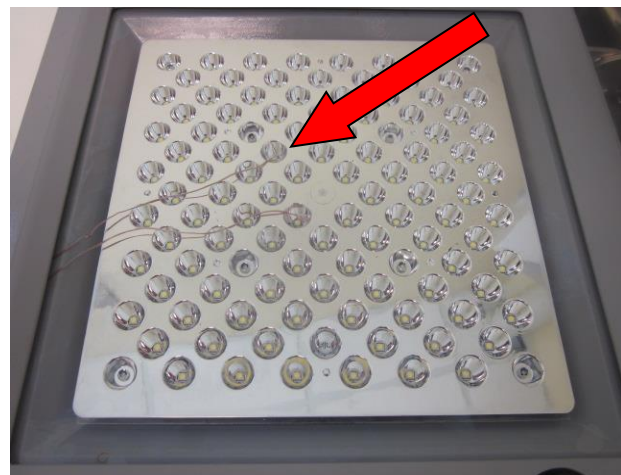
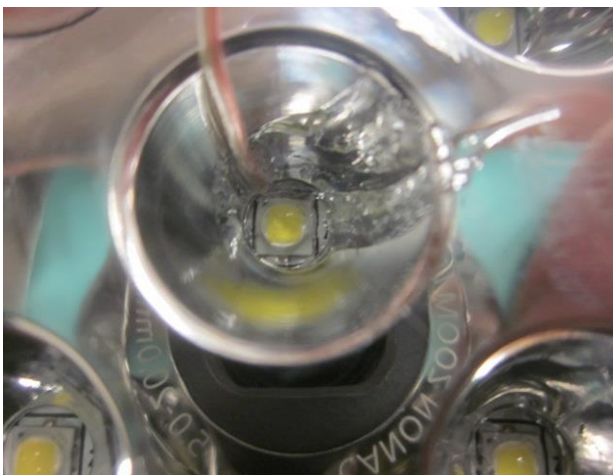
Maximum Power at Indicated Current: 1.36 (W)
Maximum Source Temperature: 135 (°C)

Test Conditions:

Temperature Measurement Location: See Photographs Below
Ambient Temperature: $25^{\circ} \pm 1^{\circ}$ (°C)
Ambient temperature at time of measurement: 24.8 (°C)
Relative humidity at time of measurement: 10%

Results:

Measured LED source temperature: 68.4 (°C)



Equipment Used:

Equipment Name	Model Number	Calibration Due Date
Omega TC	Dpi8	3/7/2015
Fluke 8808A Digit Multimeter	8808A	4/7/2015
YOKOGAWA Digital Power Meter	760401	4/7/2015
LSI Standard Lamps	#30279	4/17/2015
LSI High Speed Mirror Goniometer	6240T	-
Instrument System Spectrometer	CAS140B-151	-
Instrument System Sphere Lamps (Osram Sylvania)	STD-20WF-3	4/17/2015
Instrument System Sphere Lamps (Osram Sylvania)	STD-20WF-3	4/17/2015
Instrument System Sphere Lamps (Osram Sylvania)	STD-20WF-3	4/17/2015
Instrument System 1.5 Meter Sphere	ISP1500	-
Volttech Power Analyzer	PM1000+	4/17/2015
Delta Elektronika DC Power Supply	SM.300-5	-
Elgar AC Power Supply	CW1251P	-
Instek AC Power Supply	APS-9501	-
Sorensen DC Power Supply	XHR150-7	-
Extech Hygro-Thermometer	445703	-
Extech Hygro-Thermometer	445703	-
Fluke 52II Thermometer	52II Thermometer	3/6/2015
Volttech Power Analyzer	PM1000+	4/17/2015
Tenma AC Power Source	72-7675	-
BK Precision	1715A	-
TDK-Lambda	GEN1500W	-
Fluke 8808A Digit Multimeter	8808A	4/14/2015
TPI Digital Thermometer 343	343	4/17/2015
TPI Digital Thermometer 343	343	4/17/2015

Additional Notes:

Samples are received and tested in new and undamaged condition, unless otherwise noted.

The results shown in this report are representative only of the test samples submitted. This data has been issued to the assignee for further evaluation.

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