Dialight OPTICS LABORATORY

NVLAP Lab Code 201033-0

Test Report

Report Number: L15008 Date: Feb 13, 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: FLX455NC4NG

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 9, 2015 through February 13, 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:	L15008
Manufacturer:	Dialight Corporation
Product Name:	LED Floodlight
Description:	LED Floodlight
Model Number:	FLx455NC4NG

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Report Summary

Sample number L15008

Dialight unit model number FLx455NC4NG

Photograph(s) of sample:

*Photographs not to scale. For reference only.

Summary of Results:

	Integrating Sphere		Goniophotometer	
Luminous Flux:	14380	(lumens)	14407	(lumens)
Electrical Power:	135.1	(W)	135.3	(W)
Luminous Efficacy:	106.5	(lumens/W)	106.5	(lumens/W)

Electrical Measurements:

Input Power (120VAC):	135.1	(W)
Power Factor (120VAC):	0.998	
Current ATHD % (120VAC):	3.036	
Input Power (277VAC):	130.6	(W)
Power Factor (277VAC):	0.943	
Current ATHD % (277VAC):	7.001	

Color Measurements:

Correlated Color Temperature (CCT):	4868
Color Rendering Index (CRI):	72.6
Chromaticity Coordinate (x):	0.35
Chromaticity Coordinate (y):	0.361
Chromaticity Coordinate (u'):	0.211
Chromaticity Coordinate (v'):	0.327
DUV:	0.0028

Temperature Measurements:

In Situ LED Source Temperature:	67.8	(°C)

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Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L15008.
Dialight unit model number FLx455NC4NG

Test Conditions:

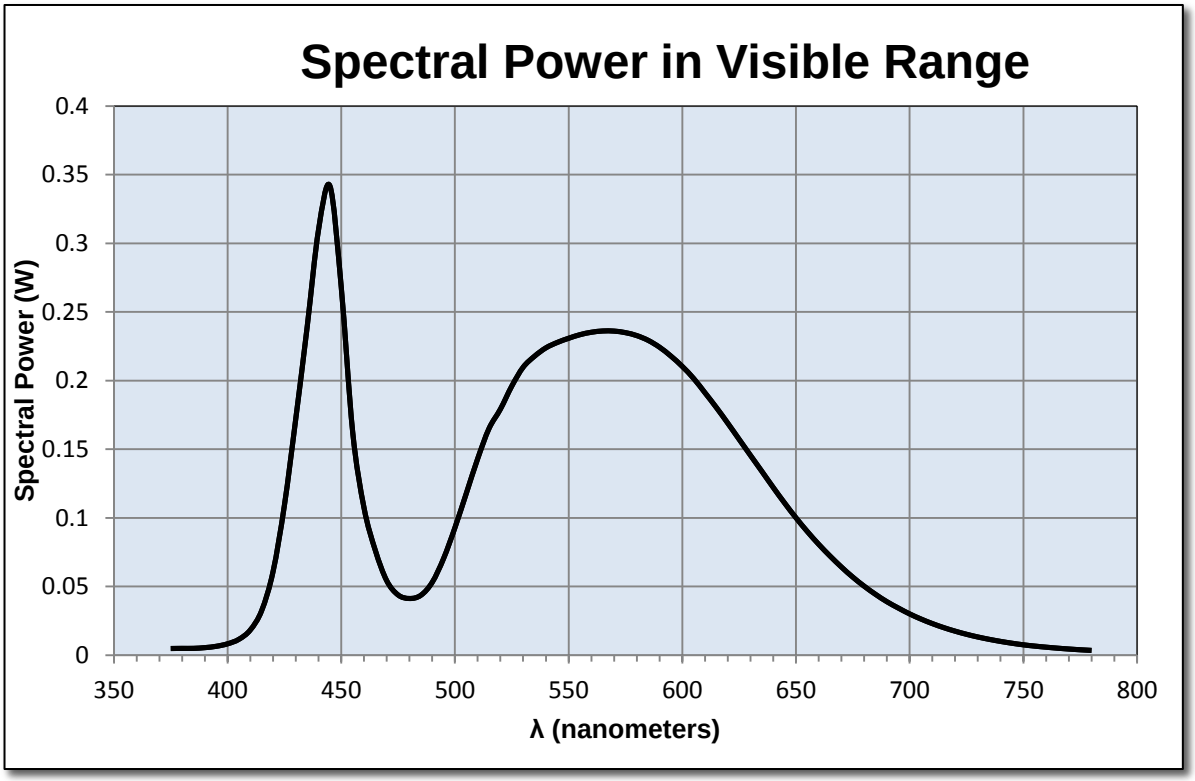
Ambient Temperature:	25 ± 1	(°C)

Electrical Measurements:

Input Voltage:	120	(VAC)
Input Current:	1.125	(A)
Input Power:	135.1	(W)
Input Power Factor:	0.998	
Current ATHD:	3.036	(%)

Photometric measurements:

Luminous Flux:	14380	(lumens)
Luminous Efficacy:	106.5	(lumens/W)
Correlated Color Temperature (CCT):	4868	(K)
CRI -Ra:	72.6	
CRI -R9:	-16.4	
DUV:	0.0028	
CIE Coordinate (x):	0.35	
CIE Coordinate (y):	0.361	
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:

λ(nm)	(W/nm)	λ(nm)	(W/nm)	λ(nm)	(W/nm)
375	0.005	515	0.165	655	0.09
380	0.005	520	0.179	660	0.081
385	0.005	525	0.196	665	0.072
390	0.006	530	0.21	670	0.064
395	0.007	535	0.218	675	0.057
400	0.008	540	0.224	680	0.05
405	0.012	545	0.228	685	0.044
410	0.018	550	0.231	690	0.039
415	0.033	555	0.233	695	0.034
420	0.061	560	0.235	700	0.03
425	0.109	565	0.236	705	0.026
430	0.172	570	0.236	710	0.023
435	0.239	575	0.235	715	0.02
440	0.31	580	0.233	720	0.018
445	0.342	585	0.229	725	0.015
450	0.268	590	0.224	730	0.013
455	0.163	595	0.218	735	0.012
460	0.107	600	0.21	740	0.01
465	0.076	605	0.202	745	0.009
470	0.054	610	0.191	750	0.008
475	0.044	615	0.18	755	0.007
480	0.041	620	0.169	760	0.006
485	0.044	625	0.157	765	0.005
490	0.053	630	0.146	770	0.005
495	0.07	635	0.134	775	0.004
500	0.093	640	0.122	780	0.004
505	0.118	645	0.111		
510	0.143	650	0.1		

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Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L15008.
Dialight unit model number FLx455NC4NG

Electrical Measurements:

Input Voltage:	120	(VAC)
Input current:	1.283	(A)
Input Power:	135.3	(W)
Power Factor:	0.996	

Photometric measurements:

Absolute Luminous Flux:	14407	(lumens)
Luminous Efficacy:	106.5	(lumens/W)

Intensity Summary:

INTENSITY (CANDLEPOWER) SUMMARY

ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	29599	29570	29486	29560	29597	
5	25932	25831	25663	25754	26024	1022
15	13215	13162	13614	13266	13319	3673
25	8397	8220	7807	8095	8343	4333
35	4948	4940	4956	4994	5011	3235
45	1035	1021	991	911	925	2110
55	37	29	28	28	29	100
65	13	11	12	11	12	16
75	7	6	7	6	6	8
85	3	2	3	3	2	4
95	1	1	1	1	1	1
105	1	1	1	1	1	1
115	1	1	1	1	1	1
125	2	2	2	2	2	1
135	5	5	5	5	5	3
145	11	11	11	11	11	6
155	18	18	18	18	18	8
165	24	24	24	24	24	8
175	26	26	26	26	26	4
180	26	26	27	27	27	

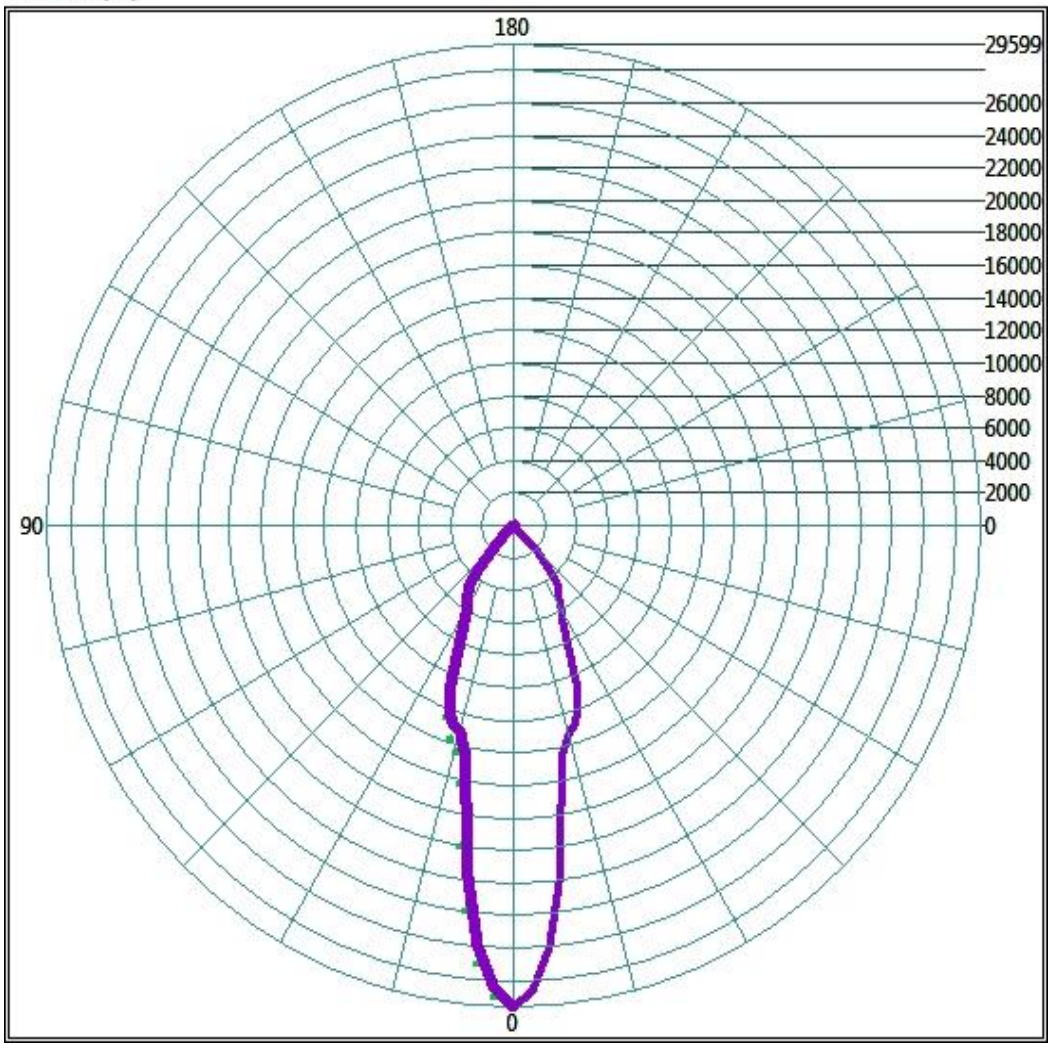
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	10683.41	73.5%
0-40	13696.84	94.2%
0-60	14482.34	99.6%
60-90	24.15	0.2%
0-90	14502.24	99.8%
90-180	32.96	0.2%
0-180	14534.98	100.0%

Test Results: Goniometer

Results continued from previous page.

Polar Plot: Polar Plot (cd)



Target % of Peak Intensity	Beam Angle to % Intensity Value (degrees)	Beam Angle to Specified % Intensity Value (degrees) [-]
50.00	27.62	26.59

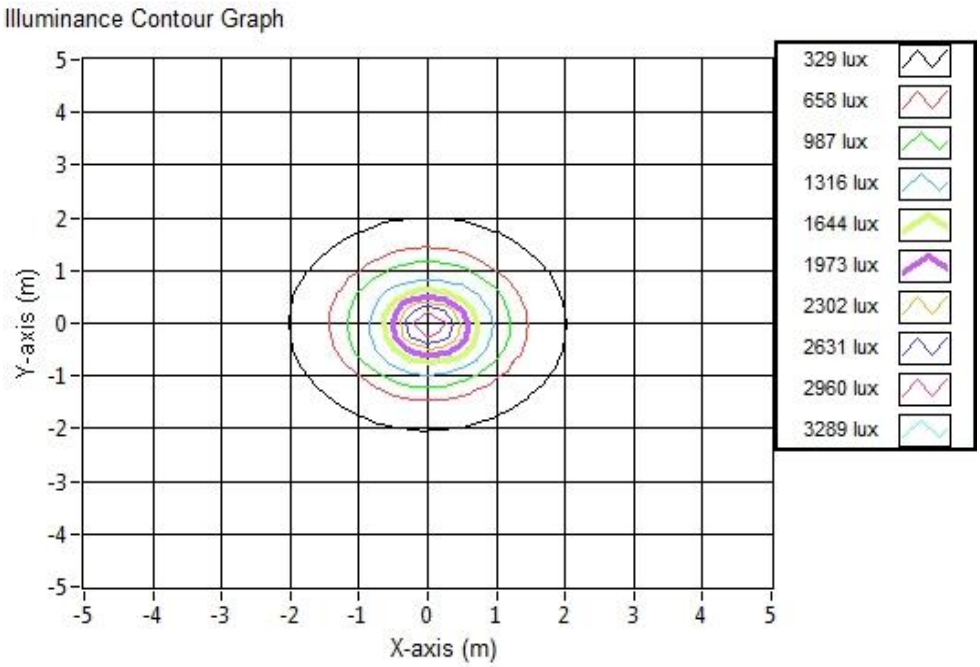
Beam Spread (at 50% Max CD)		Field Spread (at 10% Max CD)		IESNA LM-35-02 Floodlight Designation	
(deg) Horiz	(deg) Vert	(deg) Horiz	(deg) Vert	IESNA LM-35-02 Floodlight H Designation	IESNA LM-35-02 Floodlight V Designation
26.82	27.83	82.73	82.68	5	5

Total Luminous Flux	Field (%)	Field Flux (lm)	Beam Flux (%)	Beam Flux (lm)	Beam Spill (%)	Spill Flux (lm)
14496.99	94.43	13689.69	26.07	3779.77	5.57	807.31

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	1.50	1.44	3180.0
6.096	3.00	2.88	795.0
9.144	4.50	4.32	353.3
12.192	6.00	5.76	198.8
15.24	7.50	7.21	127.2
18.288	9.00	8.65	88.3
21.336	10.50	10.09	64.9
24.384	12.00	11.53	49.7
27.432	13.50	12.97	39.3
30.48	15.00	14.41	31.8

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Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L15008.
Dialight unit model number FLx455NC4NG

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:

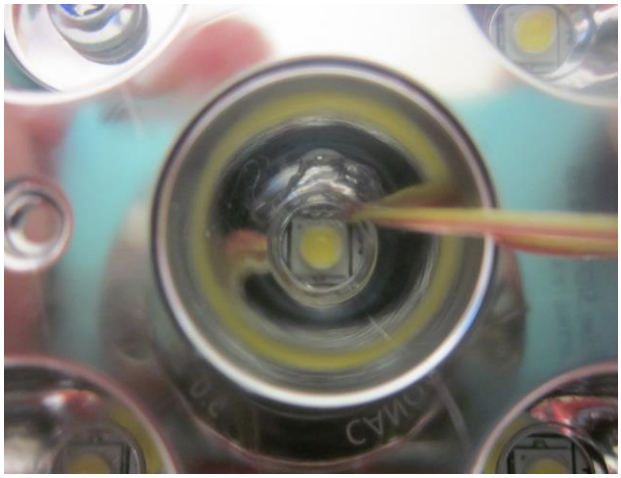
Maximum Power at Indicated Current:	1.36	(W)
Maximum Source Temperature:	135	(°C)

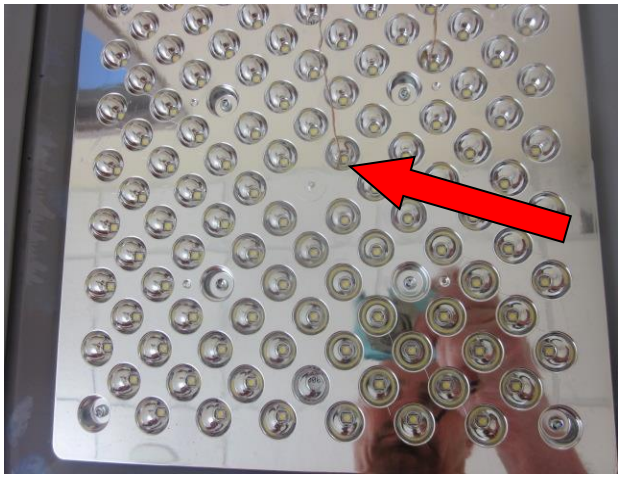
Test Conditions:

Temperature Measurement Location:	See Photographs Below	
Ambient Temperature:	25° ± 1‘	(°C)
Ambient temperature at time of measurement:	24.2	(°C)
Relative humidity at time of measurement:	10%	

Results:

Measured LED source temperature: 67.8 (°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 Precison	1715A	-
TDK-Lambda	GEN1500W	-
Fluke 8808A Digit Multimeter	8808A	4/14/2015
TPI Digitial Thermometer 343	343	4/17/2015
TPI Digitial 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.

This report shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Test Report Issued By:

Richard Huegi
Dialight Optics Laboratory
Senior Optical Engineering Technician
Lighting Division

Test Report Reviewed and Approved By:

Vishnu Shastry
Dialight Optics Laboratory
Optical Engineer
Approved Signatory