Dialight OPTICS LABORATORY

NVLAP Lab Code 201033-0

Test Report

Report Number: L16067 Date: Aug 31, 2016

Issued by:
Dialight Optics Laboratory
1501 Route 34 South, Farmingdale, NJ 07727

Test of one Die Cast Floodlight
Unit manufacturer: Dialight Corporation
Unit model number: FLx455xC4NP

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: August 29, 2016 through August 30, 2016

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:	L16067
Manufacturer:	Dialight Corporation
Product Name:	Die Cast Floodlight
Description:	Die Cast Floodlight
Model Number:	FLx455xC4NP

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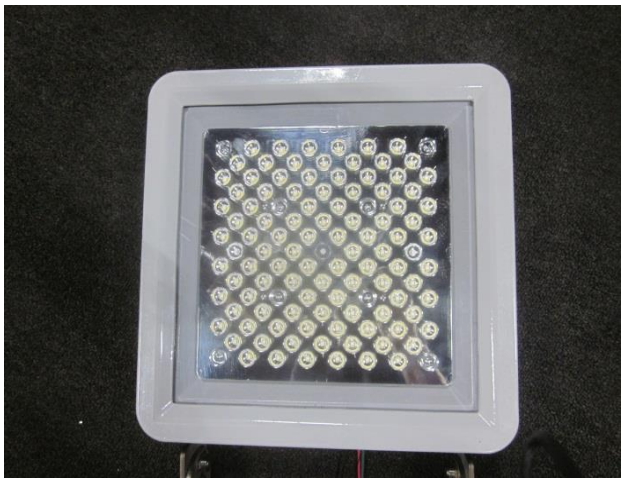
Report Summary

Sample number L16067

Dialight unit model number FLx455xC4NP

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	Integrating Sphere		Goniophotometer	
Luminous Flux:	14120	(lumens)	14227	(lumens)
Electrical Power:	137.9	(W)	137.9	(W)
Luminous Efficacy:	102.4	(lumens/W)	103.2	(lumens/W)

Electrical Measurements:

Input Power (120VAC):	137.9	(W)
Power Factor (120VAC):	0.997	
Current ATHD % (120VAC):	3.422	
Input Power (277VAC):	133.1	(W)
Power Factor (277VAC):	0.946	
Current ATHD % (277VAC):	8.163	

Color Measurements:

Correlated Color Temperature (CCT):	5384
Color Rendering Index (CRI):	76.1
Chromaticity Coordinate (x):	0.335
Chromaticity Coordinate (y):	0.337
Chromaticity Coordinate (u'):	0.21
Chromaticity Coordinate (v'):	0.317
DUV:	0.0032

Temperature Measurements:

In Situ LED Source Temperature:	70.5	(°C)

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Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L16067.
Dialight unit model number FLx455xC4NP

Test Conditions:

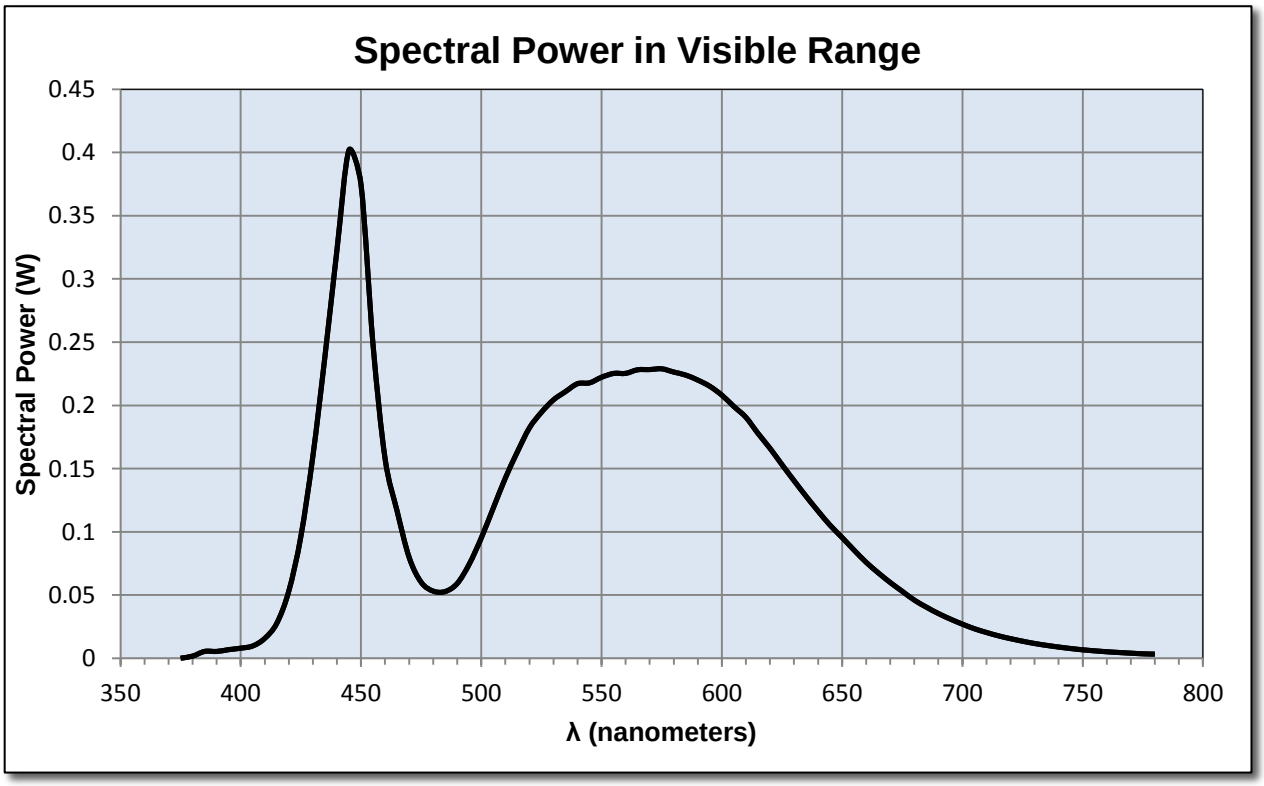
Ambient Temperature:	25 ± 1	(°C)

Electrical Measurements:

Input Voltage:	120	(VAC)
Input Current:	1.15	(A)
Input Power:	137.9	(W)
Input Power Factor:	0.997	
Current ATHD:	3.422	(%)

Photometric measurements:

Luminous Flux:	14120	(lumens)
Luminous Efficacy:	102.4	(lumens/W)
Correlated Color Temperature (CCT):	5384	(K)
CRI -Ra:	76.1	
CRI -R9:	-3	
DUV:	0.0032	
CIE Coordinate (x):	0.335	
CIE Coordinate (y):	0.337	
CIE Coordinate (u'):	0.21	
CIE Coordinate (v'):	0.317	



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	0.000	515	0.163	655	0.085
380	0.002	520	0.182	660	0.076
385	0.005	525	0.195	665	0.068
390	0.005	530	0.204	670	0.060
395	0.007	535	0.211	675	0.053
400	0.008	540	0.217	680	0.046
405	0.010	545	0.218	685	0.041
410	0.016	550	0.222	690	0.035
415	0.028	555	0.225	695	0.031
420	0.053	560	0.225	700	0.027
425	0.096	565	0.228	705	0.023
430	0.160	570	0.228	710	0.020
435	0.239	575	0.229	715	0.018
440	0.323	580	0.226	720	0.016
445	0.402	585	0.224	725	0.014
450	0.375	590	0.220	730	0.012
455	0.248	595	0.215	735	0.010
460	0.158	600	0.208	740	0.009
465	0.117	605	0.199	745	0.008
470	0.080	610	0.191	750	0.007
475	0.060	615	0.178	755	0.006
480	0.053	620	0.166	760	0.005
485	0.053	625	0.153	765	0.005
490	0.059	630	0.141	770	0.004
495	0.075	635	0.128	775	0.004
500	0.095	640	0.116	780	0.003
505	0.119	645	0.105		
510	0.143	650	0.096		

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Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L16067.
Dialight unit model number FLx455xC4NP

Electrical Measurements:

Input Voltage:	120	(VAC)
Input current:	1.15	(A)
Input Power:	137.9	(W)
Power Factor:	0.996	

Photometric measurements:

Absolute Luminous Flux:	14227	(lumens)
Luminous Efficacy:	103.2	(lumens/W)

Intensity Summary:

INTENSITY (CANDLEPOWER) SUMMARY

ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	26530	26530	26530	26530	26530	
5	24033	24033	24033	24033	24033	923
15	14252	14252	14252	14252	14252	3625
25	7464	7464	7464	7464	7464	3802
35	4920	4920	4920	4920	4920	3177
45	1754	1754	1754	1754	1754	2368
55	104	104	104	104	104	252
65	31	31	31	31	31	51
75	15	15	15	15	15	20
85	3	3	3	3	3	8
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	0	0	0	0	0	0
175	0	0	0	0	0	0
180	0	0	0	0	0	

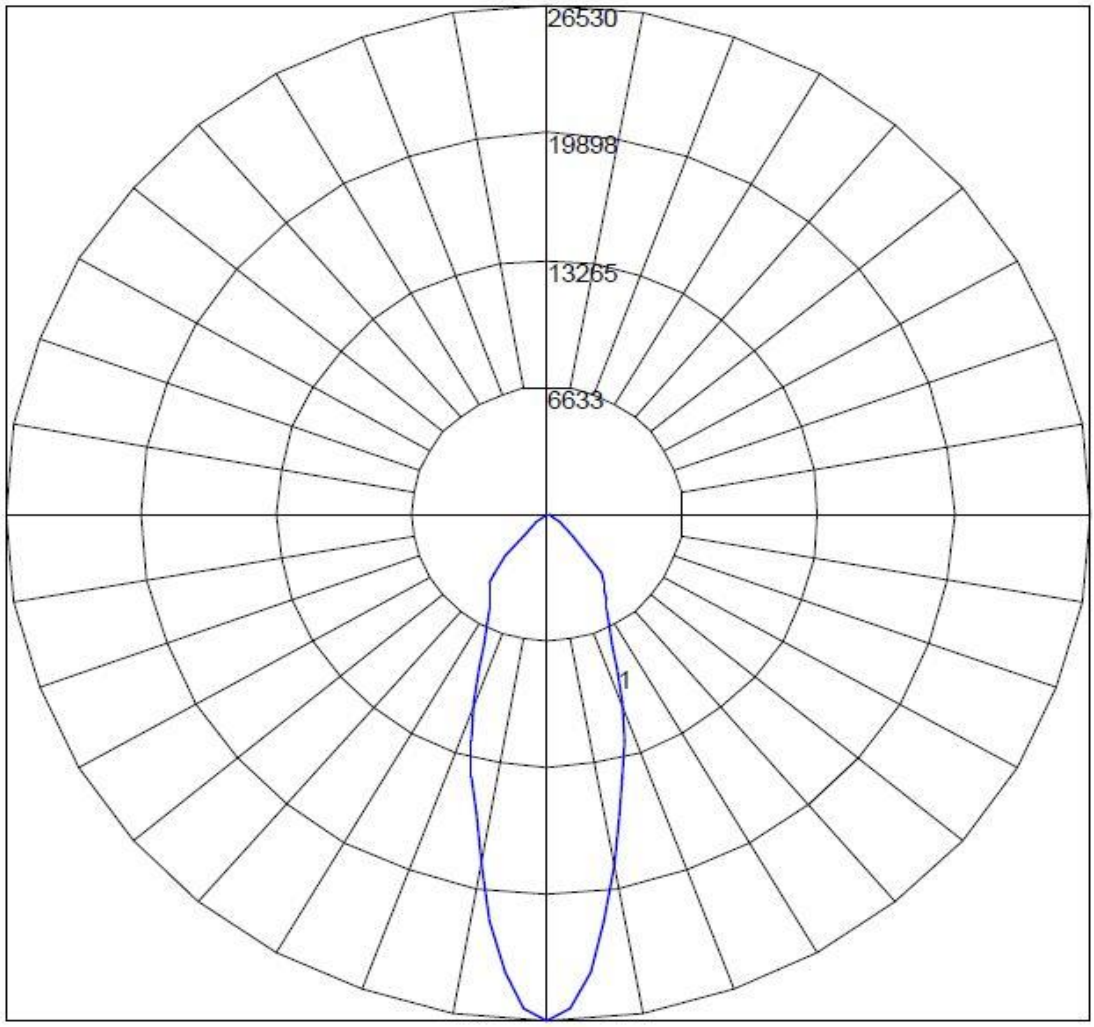
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	9972.16	70.1%
0-40	13000.64	91.4%
0-60	14180.16	99.7%
60-90	60.96	0.4%
0-90	14226.72	100.0%
90-180	0	0.0%
0-180	14226.72	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	32.85	32.85

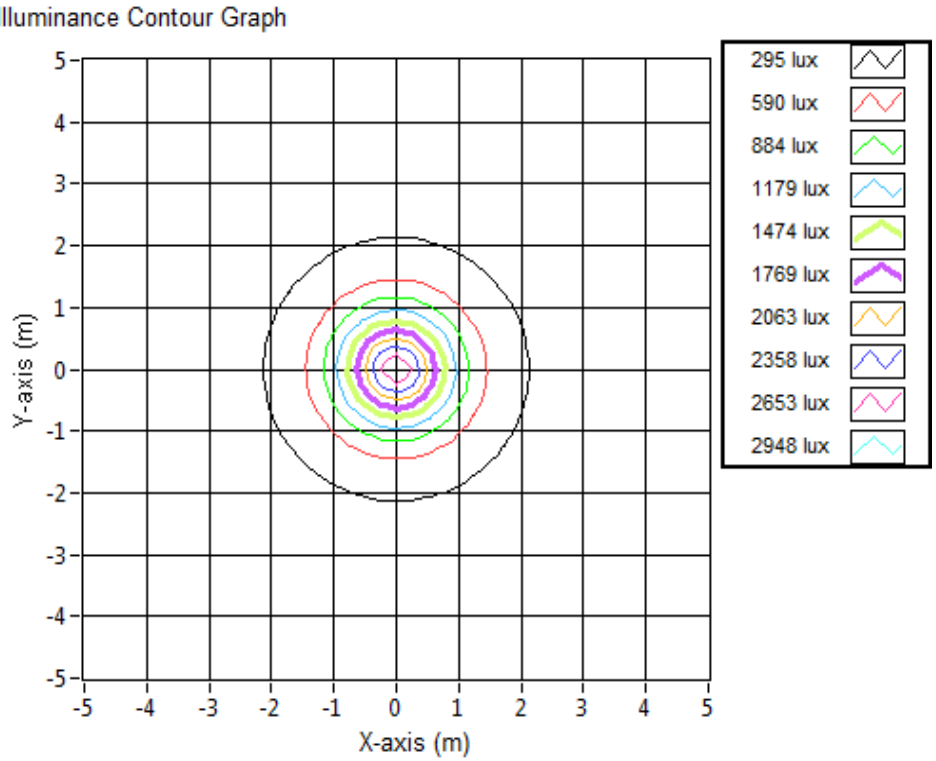
Beam Spread (at 50% Max CD)		Field Spread (at 10% Max CD)		IESNA LM-35-02 Floodlight Designation	
(deg) Horiz	(deg) Vert	(deg) Horiz	(deg) Vert	IESNA LM-35-02 Floodlight H Designation	IESNA LM-35-02 Floodlight V Designation
32.85	32.85	86.51	86.51	5	5

Total Luminous Flux	Field (%)	Field Flux (lm)	Beam Flux (%)	Beam Flux (lm)	Beam Spill (%)	Spill Flux (lm)
14212.91	94.78	13470.57	31.93	4538.09	5.22	742.33

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	1.80	1.80	2855.7
6.096	3.59	3.59	713.9
9.144	5.39	5.39	317.3
12.192	7.19	7.19	178.5
15.24	8.99	8.99	114.2
18.288	10.78	10.78	79.3
21.336	12.58	12.58	58.3
24.384	14.38	14.38	44.6
27.432	16.17	16.17	35.3
30.48	17.97	17.97	28.6

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Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L16067.
Dialight unit model number FLx455xC4NP

LED identified as Nichia part number 216B.

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:

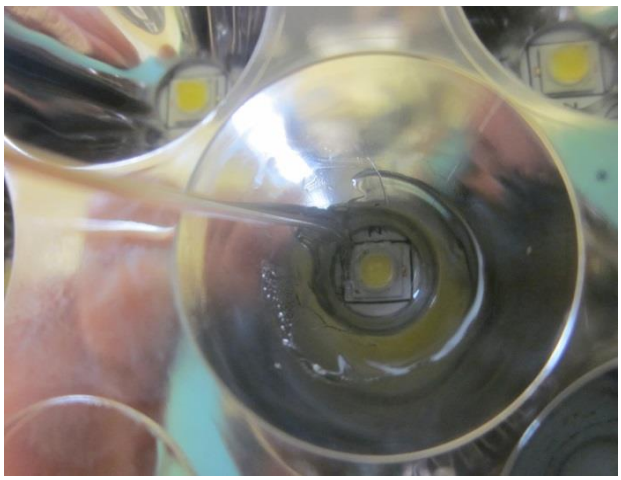
Maximum Power at Indicated Current:	1.36	(W)
Maximum Source Temperature:	135	(°C)

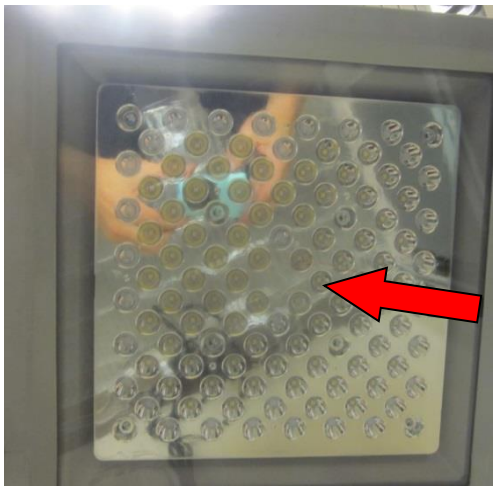
Test Conditions:

Temperature Measurement Location:	See Photographs Below	
Ambient Temperature:	25° ± 5‘	(°C)
Ambient temperature at time of measurement:	24.2	(°C)
Relative humidity at time of measurement:	30%	

Results:

Measured LED source temperature:	70.5	(°C)





Equipment Used:

Equipment Name	Model Number
Omega TC	Dpi8
Fluke 8808A Digit Multimeter	8808A
YOKOGAWA Digital Power Meter	11/26/3981
LSI High Speed Mirror Goniometer	6240T
Instrument System Spectrometer	CAS140B-151
Instrument System 1.5 Meter Sphere	ISP1500
Volttech Power Analyzer	PM1000+
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	4/16/3120
Extech Hygro-Thermometer	4/16/3120
Fluke 52II Thermometer	52II Thermometer
Volttech Power Analyzer	PM1000+
BK Precison	1715A
TDK-Lambda	GEN1500W
Fluke 8808A Digit Multimeter	8808A
TPI Digitial Thermometer 343	TPI 343
TPI Digitial Thermometer 343	TPI 343
Step-Up Transformer	
Omega TC	Dpi8-C24
Agilent True RMS OLED Multimeter	U1273A
Adaptive Power Systems AC Power Supply	FC-210
Xitron Power Analyzer	XT2640

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:

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Test Report Reviewed and Approved By:

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Optical Engineer