

# Test Report

Report Number: L16082

Date: Nov 1, 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: FLx422xC4NP

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:** October 18, 2016 through October 31, 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

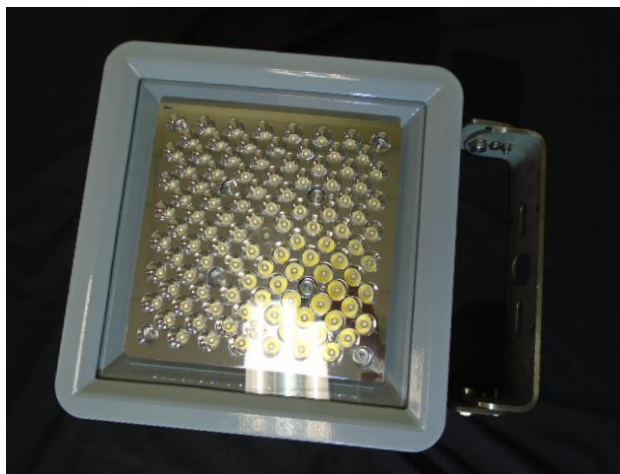
**Description of sample:**

Sample Number: L16082  
Manufacturer: Dialight Corporation  
Product Name: Die Cast Floodlight  
Description: Die Cast Floodlight  
Model Number: FLx422xC4NP

## Report Summary

Sample number L16082  
Dialight unit model number FLx422xC4NP

### Photograph(s) of sample:



\*Photographs not to scale. For reference only.

### Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	12240 (lumens)	12491 (lumens)
Electrical Power:	126.8 (W)	126.8 (W)
Luminous Efficacy:	96.53 (lumens/W)	98.53 (lumens/W)

### Electrical Measurements:

Input Power (120VAC): 126.8 (W)  
Power Factor (120VAC): 0.996  
Current ATHD % (120VAC): 3.801  
Input Power (277VAC): 122.8 (W)  
Power Factor (277VAC): 0.94  
Current ATHD % (277VAC): 8.435

### Color Measurements:

Correlated Color Temperature (CCT): 4953  
Color Rendering Index (CRI): 74.2  
Chromaticity Coordinate (x): 0.347  
Chromaticity Coordinate (y): 0.358  
Chromaticity Coordinate (u'): 0.21  
Chromaticity Coordinate (v'): 0.325  
DUV: 0.0023

### Temperature Measurements:

In Situ LED Source Temperature: 69.7 (°C)

## Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L16082.  
Dialight unit model number FLx422xC4NP

### Test Conditions:

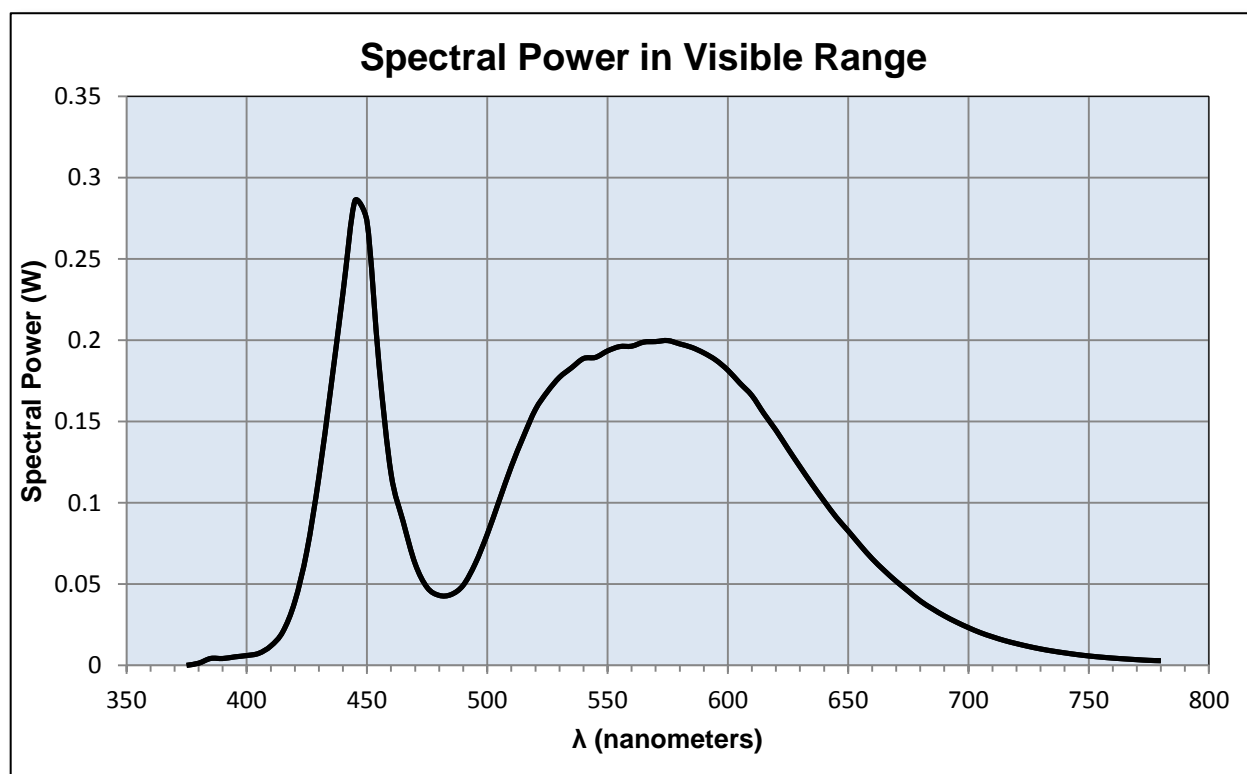
Ambient Temperature:  $25 \pm 1$  (°C)

### Electrical Measurements:

Input Voltage: 120 (VAC)  
Input Current: 1.061 (A)  
Input Power: 126.8 (W)  
Input Power Factor: 0.996  
Current ATHD: 3.801 (%)

### Photometric measurements:

Luminous Flux: 12240 (lumens)  
Luminous Efficacy: 96.5 (lumens/W)  
Correlated Color Temperature (CCT): 4953 (K)  
CRI -Ra: 74.2  
CRI -R9: -16.4  
DUV: 0.0023  
CIE Coordinate (x): 0.347  
CIE Coordinate (y): 0.358  
CIE Coordinate (u'): 0.21  
CIE Coordinate (v'): 0.325



## Test Results: Integrating Sphere

Results continued from previous page.

### Tabulated Spectral Power in Visible Range:

$\lambda$ (nm)	(W/nm)	$\lambda$ (nm)	(W/nm)	$\lambda$ (nm)	(W/nm)
375	0.000	515	0.141	655	0.074
380	0.001	520	0.157	660	0.066
385	0.004	525	0.168	665	0.058
390	0.004	530	0.177	670	0.052
395	0.005	535	0.183	675	0.046
400	0.006	540	0.189	680	0.040
405	0.007	545	0.189	685	0.035
410	0.012	550	0.193	690	0.030
415	0.021	555	0.196	695	0.027
420	0.039	560	0.196	700	0.023
425	0.070	565	0.199	705	0.020
430	0.116	570	0.199	710	0.018
435	0.171	575	0.200	715	0.015
440	0.229	580	0.198	720	0.013
445	0.286	585	0.196	725	0.012
450	0.273	590	0.192	730	0.010
455	0.185	595	0.188	735	0.009
460	0.118	600	0.182	740	0.008
465	0.089	605	0.174	745	0.007
470	0.063	610	0.166	750	0.006
475	0.048	615	0.155	755	0.005
480	0.043	620	0.145	760	0.004
485	0.044	625	0.133	765	0.004
490	0.049	630	0.122	770	0.003
495	0.063	635	0.111	775	0.003
500	0.081	640	0.101	780	0.003
505	0.102	645	0.091		
510	0.122	650	0.083		

## Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L16082.  
Dialight unit model number FLx422xC4NP

### Electrical Measurements:

Input Voltage: 120 (VAC)  
Input current: 1.061 (A)  
Input Power: 126.8 (W)  
Power Factor: 0.996

### Photometric measurements:

Absolute Luminous Flux: 12491 (lumens)  
Luminous Efficacy: 98.5 (lumens/W)

### Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	131239	131239	131239	131239	131239	
5	86572	86572	86572	86572	86572	3669
15	7933	7933	7933	7933	7933	4157
25	4039	4039	4039	4039	4039	1880
35	3126	3126	3126	3126	3126	1994
45	164	164	164	164	164	628
55	132	132	132	132	132	108
65	12	12	12	12	12	45
75	4	4	4	4	4	7
85	0	0	0	0	0	1
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	0

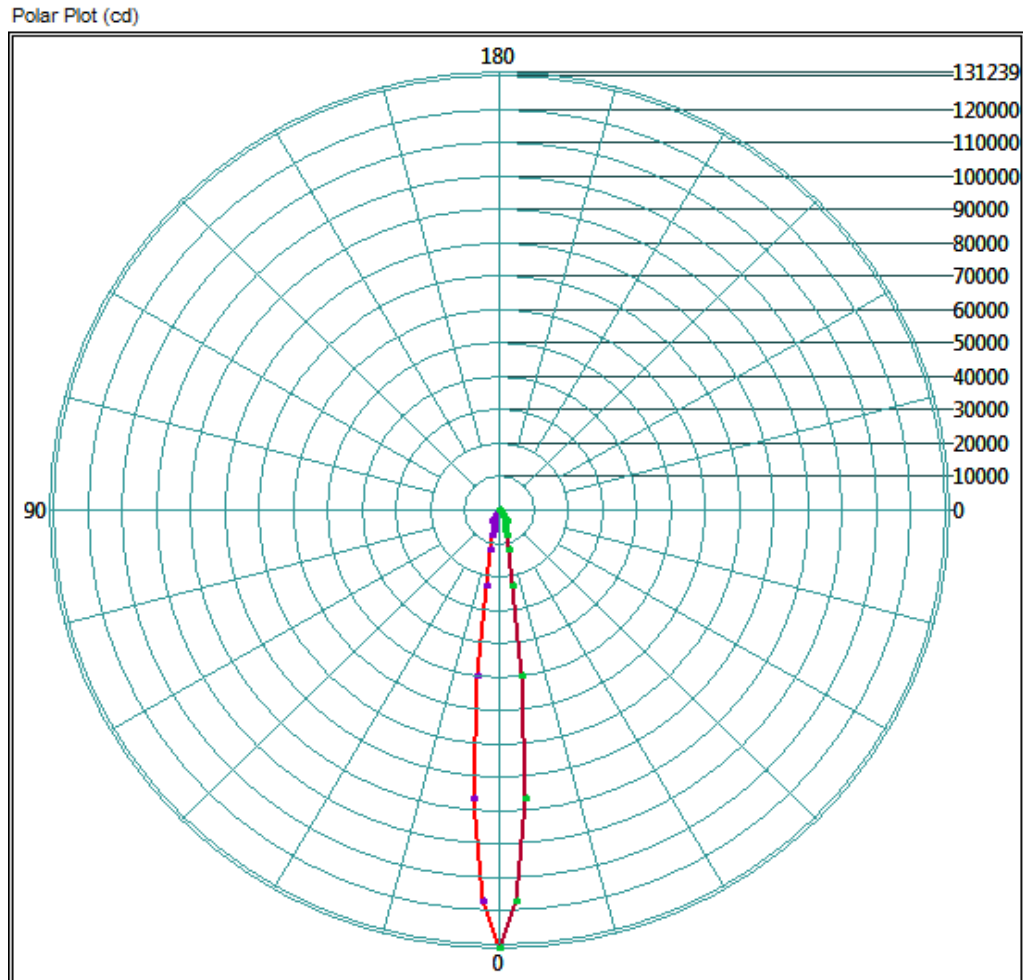
### ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	10690.24	85.6%
0-40	12238.72	98.0%
0-60	12474.72	99.9%
60-90	27.52	0.2%
0-90	12490.72	100.0%
90-180	0	0.0%
0-180	12490.72	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	12.86	12.86

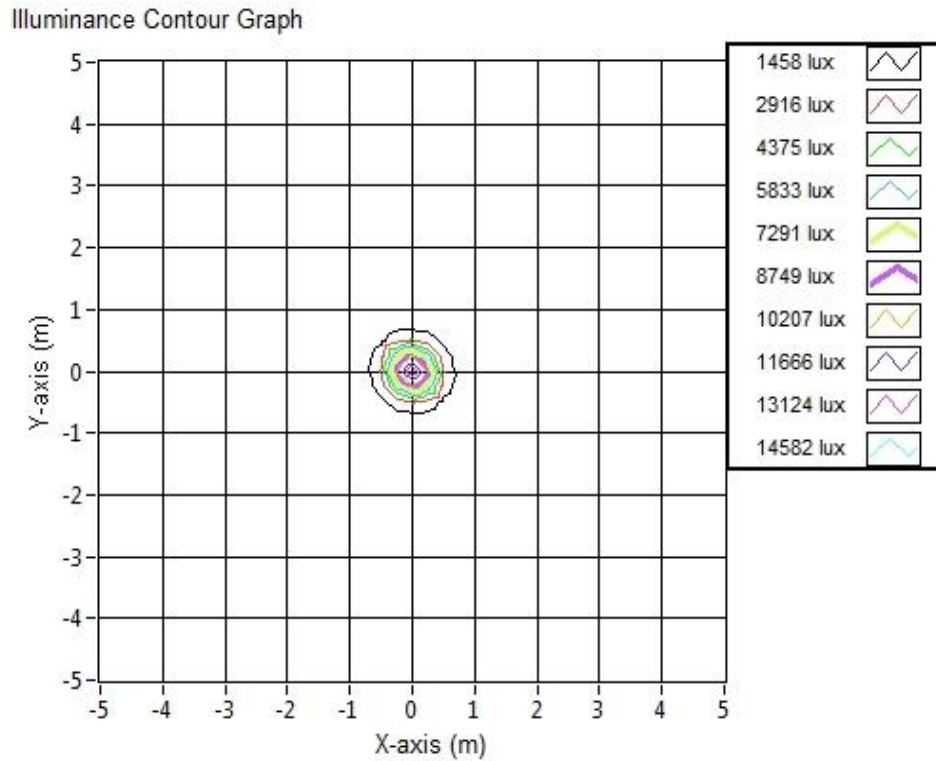
Beam Spread (at 50% Max CD)		Field Spread (at 10% Max CD)		IESNA LM-35-02 Floodlight Designation	
(deg) Horiz	(deg) Vert	(deg) Horiz	(deg) Vert	IESNA LM-35-02 Floodlight H Designation	IESNA LM-35-02 Floodlight V Designation
12.86	12.86	24.98	24.98	2	2

Total Luminous Flux	Field (%)	Field Flux (lm)	Beam Flux (%)	Beam Flux (lm)	Beam Spill (%)	Spill Flux (lm)
12541.68	55.06	6905.33	29.38	3684.52	44.94	5636.35

## 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	0.69	0.69	14126.4
6.096	1.37	1.37	3531.6
9.144	2.06	2.06	1569.6
12.192	2.75	2.75	882.9
15.24	3.44	3.44	565.1
18.288	4.12	4.12	392.4
21.336	4.81	4.81	288.3
27.384	6.17	6.17	175.0
27.432	6.19	6.19	174.4
30.48	6.87	6.87	141.3

## Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L16082.  
Dialight unit model number FLx422xC4NP

LED identified as Nichia part number 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:

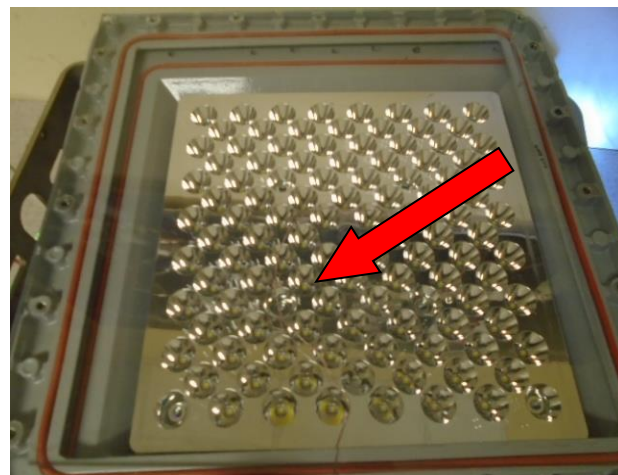
Maximum Power at Indicated Current: 1.36 (W)  
Maximum Source Temperature: 135 (°C)

### Test Conditions:

Temperature Measurement Location: See Photographs Below  
Ambient Temperature:  $25^{\circ} \pm 5^{\circ}$  (°C)  
Ambient temperature at time of measurement: 24.3 (°C)  
Relative humidity at time of measurement: 23%

### Results:

**Measured LED source temperature:** 69.7 (°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
Fluke 971 Humidity Meter	971
Extech Hygro-Thermometer	4/16/3120
Fluke 52II Thermometer	52II Thermometer
Volttech Power Analyzer	PM1000+
BK Precision	1715A
TDK-Lambda	GEN1500W
Fluke 8808A Digit Multimeter	8808A
TPI Digital Thermometer 343	TPI 343
TPI Digital 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. This report shall not be reproduced, except in full, without the express written permission of Dialight Optics Laboratory.

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