

Test Report

Report Number: L16042

Date: May 11, 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: FLx476xC4NP

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: April 29, 2016 through May 5, 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):

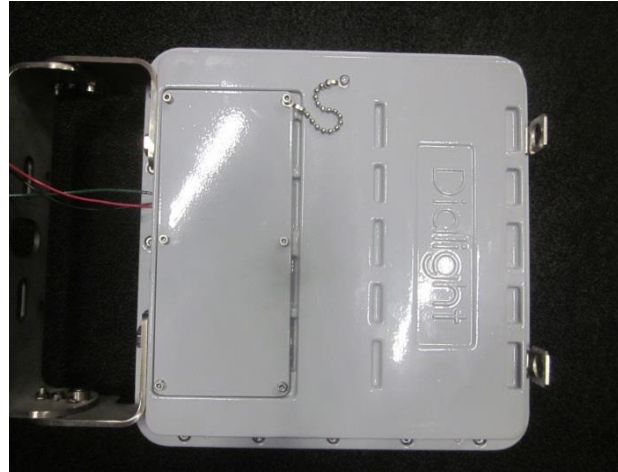
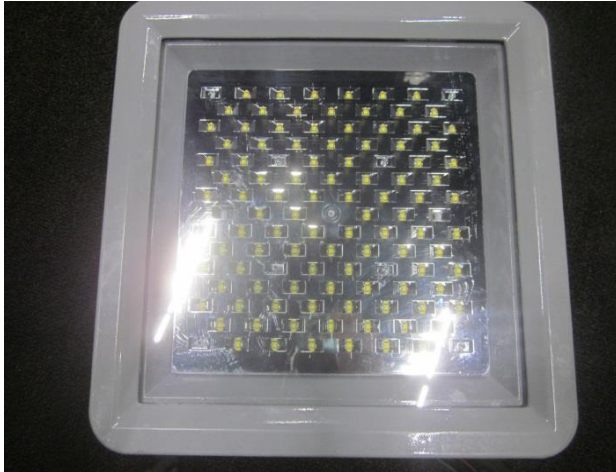
- IES LM-79:2008: Electrical and Photometric Measurements of Solid-State Lighting Products
- ANSI/UL 1598:2008: Underwriters Laboratories Inc. Standard for Safety: Luminaires
- ENERGY STAR Manufacturer's Guide for Qualifying Solid State Lighting Luminaires Version 2.1

Description of sample:

Sample Number: L16042
Manufacturer: Dialight Corporation
Product Name: Die Cast Floodlight
Description: Die Cast Floodlight
Model Number: FLx476xC4NP

Report Summary
Sample number L16042
Dialight unit model number FLx476xC4NP

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	14170 (lumens)	14094 (lumens)
Electrical Power:	140.2 (W)	140.4 (W)
Luminous Efficacy:	101.1 (lumens/W)	100.4 (lumens/W)

Electrical Measurements:

Input Power (120VAC): 140.2 (W)
 Power Factor (120VAC): 0.998
 Current ATHD % (120VAC): 3.26
 Input Power (277VAC): 135.5 (W)
 Power Factor (277VAC): 0.949
 Current ATHD % (277VAC): 7.67

Color Measurements:

Correlated Color Temperature (CCT): 5009
 Color Rendering Index (CRI): 72.8
 Chromaticity Coordinate (x): 0.345
 Chromaticity Coordinate (y): 0.356
 Chromaticity Coordinate (u'): 0.21
 Chromaticity Coordinate (v'): 0.324
 DUV: 0.0019

Temperature Measurements:

In Situ LED Source Temperature: 71.9 (°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L16042.

Dialight unit model number FLx476xC4NP

Test Conditions:

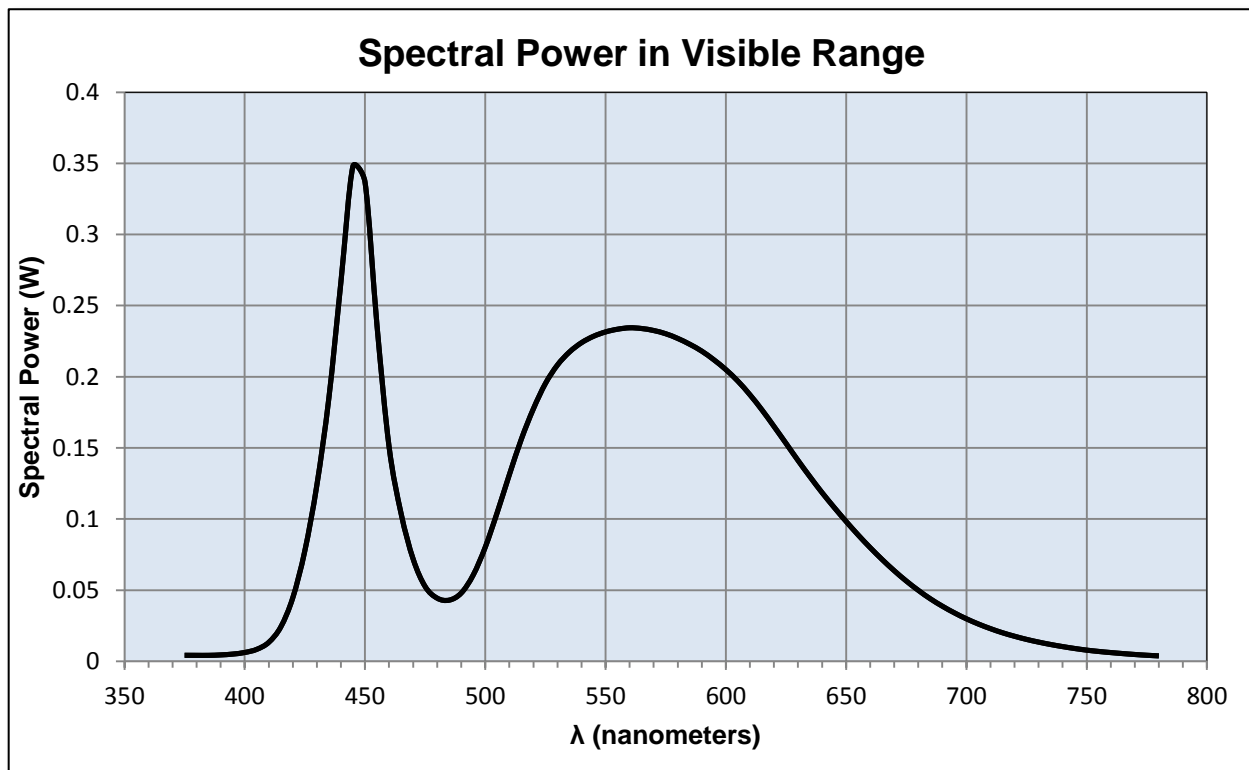
Ambient Temperature: 25 ± 1 (°C)

Electrical Measurements:

Input Voltage: 120 (VAC)
Input Current: 1.169 (A)
Input Power: 140.2 (W)
Input Power Factor: 0.998
Current ATHD: 3.26 (%)

Photometric measurements:

Luminous Flux: 14170 (lumens)
Luminous Efficacy: 101.1 (lumens/W)
Correlated Color Temperature (CCT): 5009 (K)
CRI -Ra: 72.8
CRI -R9: -16.6
DUV: 0.0019
CIE Coordinate (x): 0.345
CIE Coordinate (y): 0.356
CIE Coordinate (u'): 0.21
CIE Coordinate (v'): 0.324



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	0.004	515	0.156	655	0.089
380	0.004	520	0.177	660	0.080
385	0.004	525	0.195	665	0.072
390	0.005	530	0.208	670	0.064
395	0.005	535	0.217	675	0.056
400	0.006	540	0.224	680	0.050
405	0.008	545	0.228	685	0.044
410	0.013	550	0.232	690	0.039
415	0.024	555	0.233	695	0.034
420	0.045	560	0.234	700	0.030
425	0.078	565	0.234	705	0.026
430	0.124	570	0.233	710	0.023
435	0.185	575	0.230	715	0.020
440	0.267	580	0.227	720	0.018
445	0.348	585	0.223	725	0.015
450	0.337	590	0.218	730	0.014
455	0.236	595	0.212	735	0.012
460	0.151	600	0.205	740	0.010
465	0.104	605	0.197	745	0.009
470	0.072	610	0.187	750	0.008
475	0.053	615	0.177	755	0.007
480	0.044	620	0.165	760	0.006
485	0.043	625	0.153	765	0.005
490	0.048	630	0.141	770	0.005
495	0.061	635	0.130	775	0.004
500	0.080	640	0.119	780	0.004
505	0.105	645	0.108		
510	0.131	650	0.098		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L16042.
Dialight unit model number FLx476xC4NP

Electrical Measurements:

Input Voltage: 120 (VAC)
Input current: 1.172 (A)
Input Power: 140.4 (W)
Power Factor: 0.997

Photometric measurements:

Absolute Luminous Flux: 14094 (lumens)
Luminous Efficacy: 100.4 (lumens/W)

Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	30	45	60	ACROSS	OUTPUT LUMENS
0	7865	7865	7865	7865	7865	
5	7580	7648	7679	7712	7758	289
15	6055	6440	6727	7222	8043	1549
25	4956	4953	5478	6453	8009	2527
35	4061	4460	4722	5208	6889	3061
45	2919	3419	3645	4406	6289	3178
55	549	1339	2184	3010	3593	2403
65	43	106	296	1142	1076	966
75	42	45	21	46	25	103
85	3	3	3	3	4	16
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

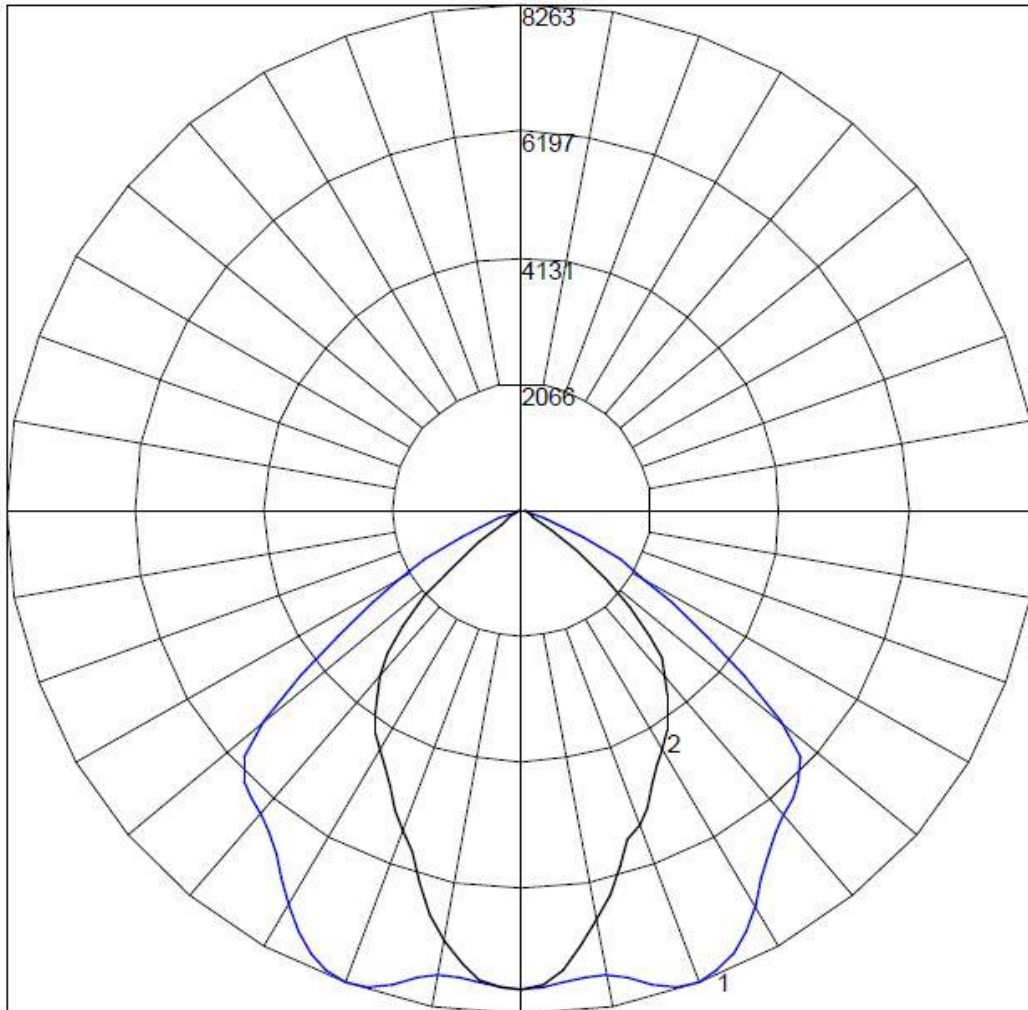
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	5852.4	41.5%
0-40	9032.23	64.1%
0-60	13625.57	96.7%
60-90	741.9	5.3%
0-90	14093.04	100.0%
90-180	0	0.0%
0-180	14093.04	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	72.67	108.09

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
106.72	68.68	134.76	106.82	7	6

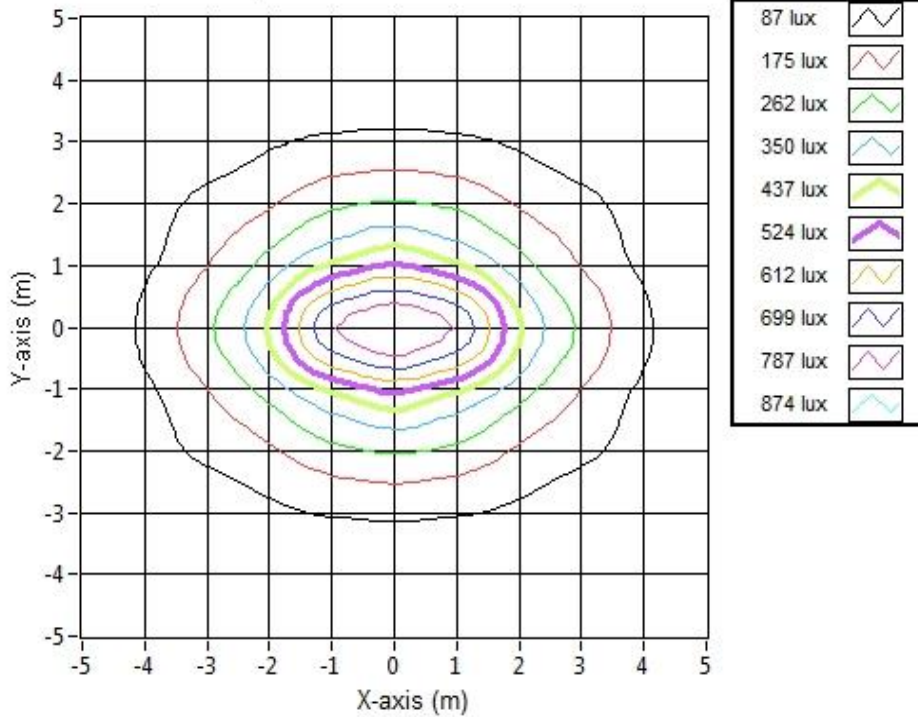
Total Luminous Flux	Field (%)	Field Flux (lm)	Beam Flux (%)	Beam Flux (lm)	Beam Spill (%)	Spill Flux (lm)
13981.42	97.21	13590.86	71.20	9954.33	2.79	390.57

Test Results: Goniometer

Results continued from previous page.

Illuminance Plot:

Illuminance Contour Graph



Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
3.048	4.48	8.40	846.6
6.096	8.97	16.81	211.7
9.144	13.45	25.21	94.1
12.192	17.93	33.62	52.9
15.24	22.42	42.02	33.9
18.288	26.90	50.43	23.5
21.336	31.38	58.83	17.3
24.384	35.87	67.24	13.2
27.432	40.35	75.64	10.5
30.48	44.83	84.04	8.5

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L16042.
Dialight unit model number FLx476xC4NP

LED identified as Cree part number XTE.

LED drive current (as indicated by customer): 380 (mA)

LED Specifications:

LED specifications are taken from LED manufacturer datasheet:

Maximum Forward Current (If): 1500 (mA)
Maximum Rated Power Dissipation: 5.25 (W)
Maximum Junction Temp. (Tj): 150 (°C)
Thermal Resistance (Rth): 5 (°C/W)

Derived Specifications:

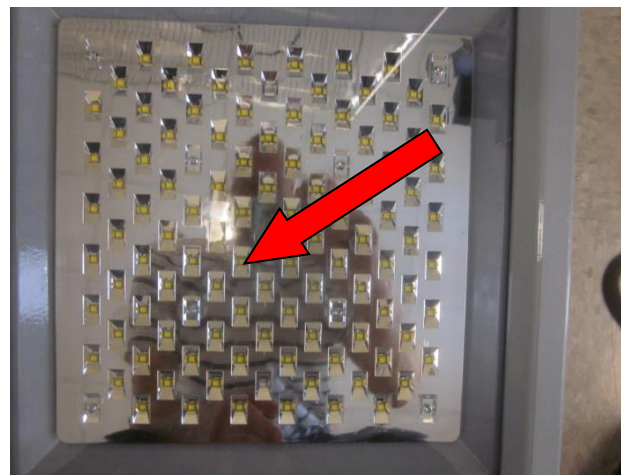
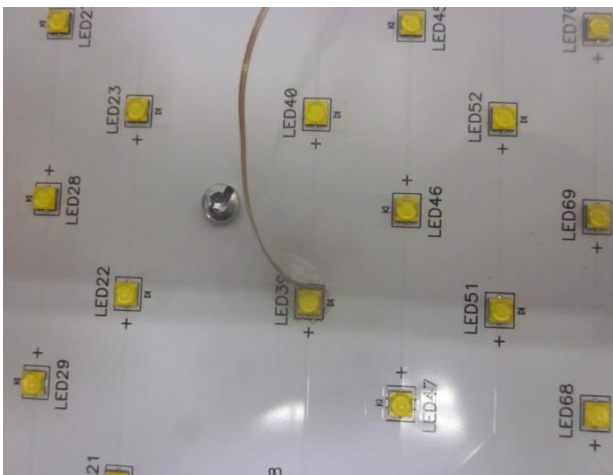
Maximum Power at Indicated Current: 1.33 (W)
Maximum Source Temperature: 143.4 (°C)

Test Conditions:

Temperature Measurement Location: See Photographs Below
Ambient Temperature: $25^{\circ} \pm 5^{\circ}$ (°C)
Ambient temperature at time of measurement: 23.8 (°C)
Relative humidity at time of measurement: 21%

Results:

Measured LED source temperature: 71.9 (°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 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.

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Optical Engineer
Approved Signatory