

Test Report

Report Number: L16069

Date: Aug 8, 2016

Issued by:

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

Test of one Oval Durosite
Unit manufacturer: Dialight Corporation
Unit model number: WP-4C3L-NLGC

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: July 27, 2016 through August 7, 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: L16069
Manufacturer: Dialight Corporation
Product Name: Durosite
Description: Oval Durosite
Model Number: WP-4C3L-NLGC

Report Summary
Sample number L16069
Dialight unit model number WP-4C3L-NLGC

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	2446 (lumens)	2394 (lumens)
Electrical Power:	30.5 (W)	30.3 (W)
Luminous Efficacy:	80.35 (lumens/W)	79.06 (lumens/W)

Electrical Measurements:

Input Power (240VAC): 30.5 (W)
 Power Factor (240VAC): 0.881
 Current ATHD % (240VAC): 17.72
 Input Power (120VAC): 30.7 (W)
 Power Factor (120VAC): 0.99
 Current ATHD % (120VAC): 15.38

Color Measurements:

Correlated Color Temperature (CCT): 5404
 Color Rendering Index (CRI): 76.3
 Chromaticity Coordinate (x): 0.335
 Chromaticity Coordinate (y): 0.339
 Chromaticity Coordinate (u'): 0.209
 Chromaticity Coordinate (v'): 0.318
 DUV: 0.0023

Temperature Measurements:

In Situ LED Source Temperature: 59.2 (°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L16069.

Dialight unit model number WP-4C3L-NLGC

Test Conditions:

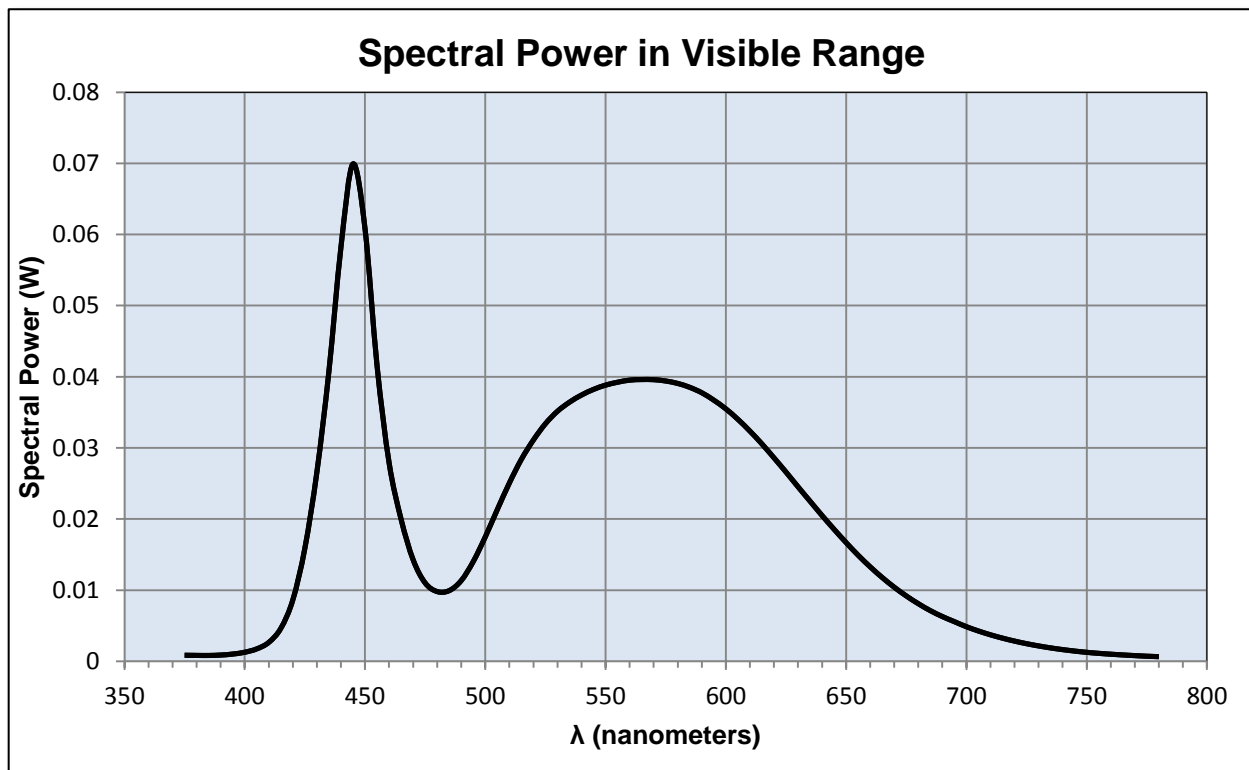
Ambient Temperature: 25 ± 1 (°C)

Electrical Measurements:

Input Voltage: 240 (VAC)
Input Current: 0.144 (A)
Input Power: 30.5 (W)
Input Power Factor: 0.881
Current ATHD: 17.72 (%)

Photometric measurements:

Luminous Flux: 2446 (lumens)
Luminous Efficacy: 80.4 (lumens/W)
Correlated Color Temperature (CCT): 5404 (K)
CRI -Ra: 76.3
CRI -R9: -2.3
DUV: 0.0023
CIE Coordinate (x): 0.335
CIE Coordinate (y): 0.339
CIE Coordinate (u'): 0.209
CIE Coordinate (v'): 0.318



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	0.001	515	0.028	655	0.015
380	0.001	520	0.031	660	0.013
385	0.001	525	0.033	665	0.012
390	0.001	530	0.035	670	0.010
395	0.001	535	0.036	675	0.009
400	0.001	540	0.037	680	0.008
405	0.002	545	0.038	685	0.007
410	0.003	550	0.039	690	0.006
415	0.005	555	0.039	695	0.006
420	0.009	560	0.040	700	0.005
425	0.016	565	0.040	705	0.004
430	0.027	570	0.040	710	0.004
435	0.041	575	0.039	715	0.003
440	0.058	580	0.039	720	0.003
445	0.070	585	0.039	725	0.002
450	0.061	590	0.038	730	0.002
455	0.042	595	0.037	735	0.002
460	0.028	600	0.035	740	0.002
465	0.020	605	0.034	745	0.001
470	0.014	610	0.032	750	0.001
475	0.011	615	0.031	755	0.001
480	0.010	620	0.029	760	0.001
485	0.010	625	0.027	765	0.001
490	0.011	630	0.025	770	0.001
495	0.014	635	0.023	775	0.001
500	0.017	640	0.020	780	0.001
505	0.021	645	0.019		
510	0.025	650	0.017		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L16069.
Dialight unit model number WP-4C3L-NLGC

Electrical Measurements:

Input Voltage: 240 (VAC)
Input current: 0.149 (A)
Input Power: 30.3 (W)
Power Factor: 0.848

Photometric measurements:

Absolute Luminous Flux: 2394 (lumens)
Luminous Efficacy: 79.1 (lumens/W)

Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	25	45	72.5	ACROSS	OUTPUT LUMENS
0	1695	1695	1695	1695	1695	
5	1690	1663	1617	1561	1541	62
15	1594	1394	1120	938	882	282
25	1486	1064	720	558	519	377
35	1473	831	509	397	368	420
45	1573	729	379	263	223	460
55	975	551	280	135	87	394
65	485	334	164	49	29	253
75	183	134	59	12	9	122
85	15	6	3	1	1	24
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

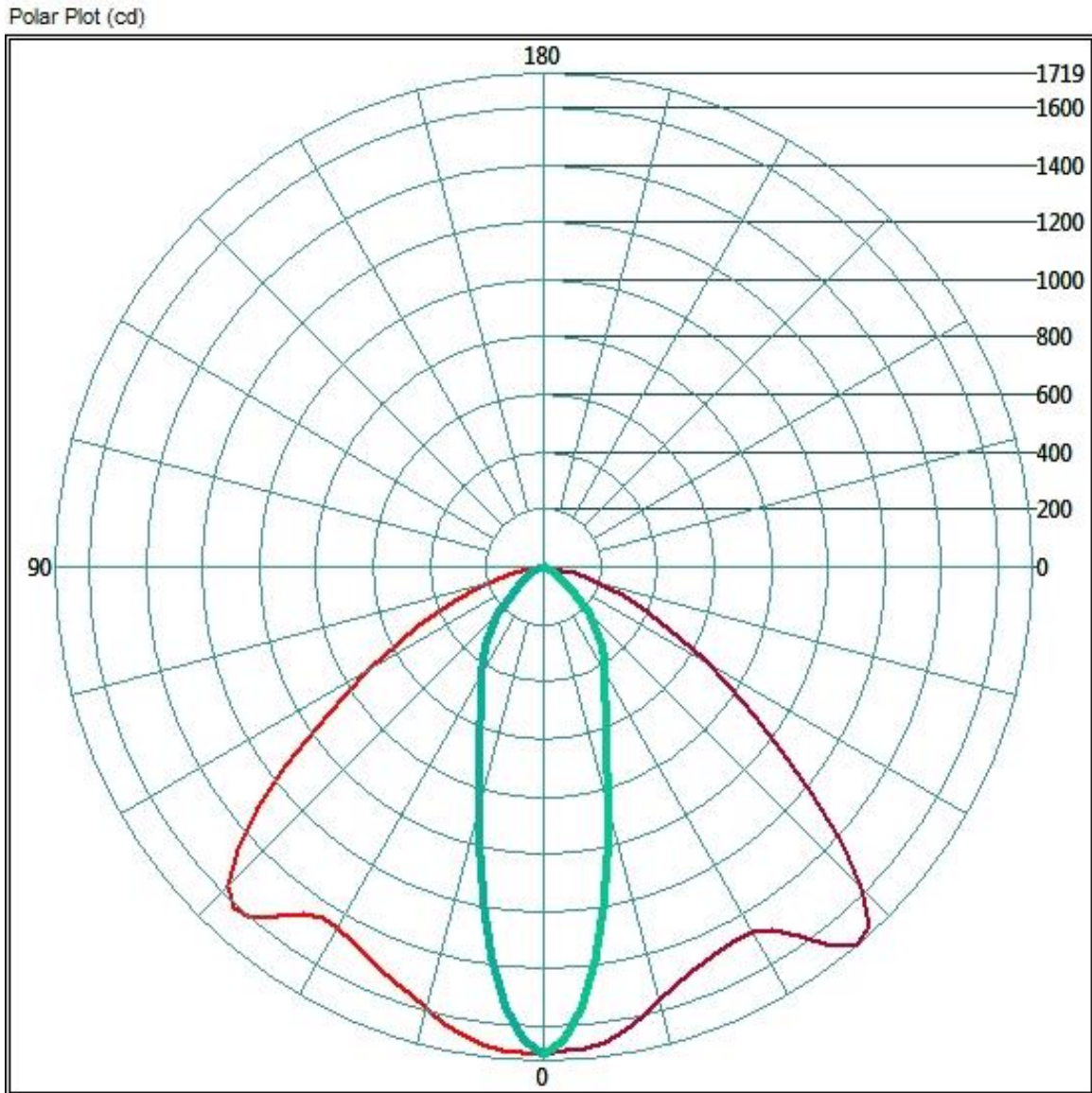
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	925.32	38.6%
0-40	1368.98	57.2%
0-60	2138.37	89.3%
60-90	323.38	13.5%
0-90	2394.22	100.0%
90-180	0	0.0%
0-180	2394.22	100.0%

Test Results: Goniometer

Results continued from previous page.

Polar Plot:

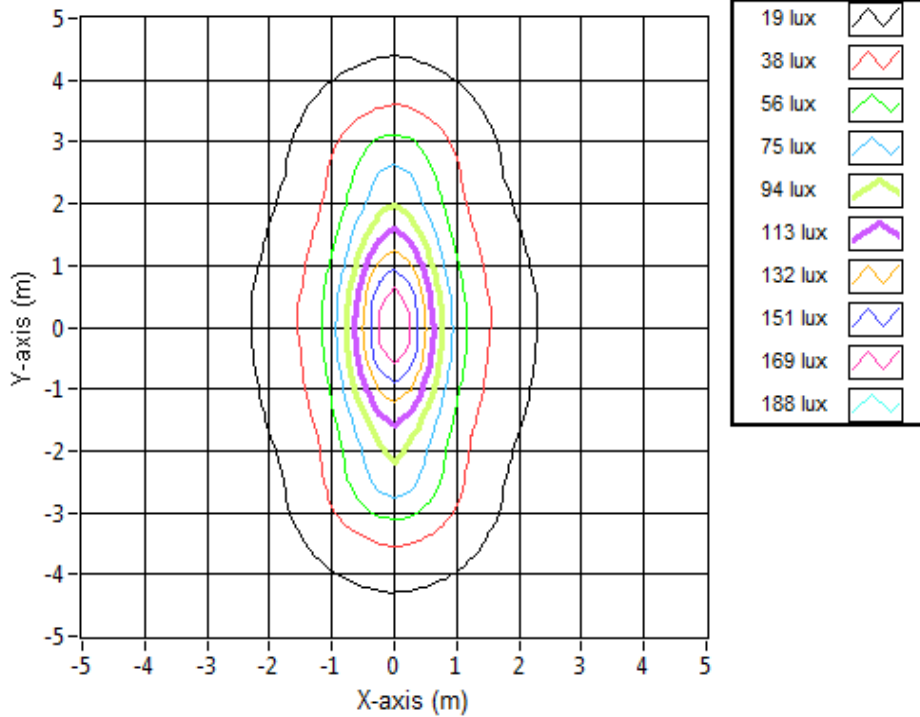


Test Results: Goniometer

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	9.24	1.71	182.4
6.096	18.48	3.42	45.6
9.144	27.72	5.13	20.3
12.192	36.96	6.84	11.4
15.24	46.20	8.55	7.3
18.288	55.43	10.26	5.1
21.336	64.67	11.97	3.7
24.384	73.91	13.68	2.9
27.432	83.15	15.39	2.3
30.48	92.39	17.10	1.8

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L16069.
Dialight unit model number WP-4C3L-NLGC

LED identified as CREE part number XTEAWT-00-0000-0000F0GQ2.

LED drive current (as indicated by customer): 350 (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:

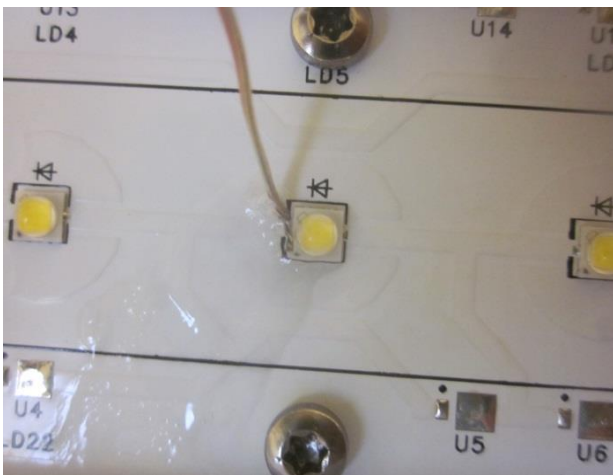
Maximum Power at Indicated Current: 1.225 (W)
Maximum Source Temperature: 143.9 (°C)

Test Conditions:

Temperature Measurement Location: See Photographs Below
Ambient Temperature: $25^{\circ} \pm 5^{\circ}$ (°C)
Ambient temperature at time of measurement: 23.1 (°C)
Relative humidity at time of measurement: 30%

Results:

Measured LED source temperature: 59.2 (°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.

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