

Test Report

Report Number: L14138

Date: Nov 5, 2014

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

Test of one Vigilant Highbay Fixture
Unit manufacturer: Dialight Corporation
Unit model number: HEC9MC4PN-xxx

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 31, 2014 through November 5, 2014

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

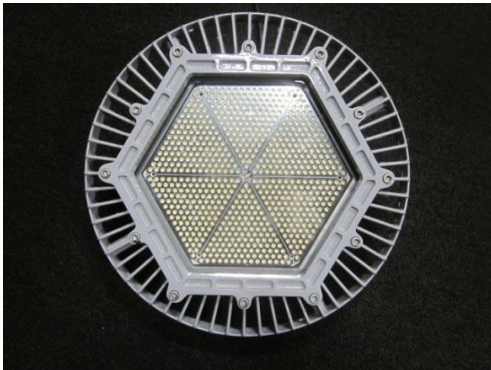
Description of sample:

Sample Number: L14138
Manufacturer: Dialight Corporation
Product Name: Vigilant
Description: Vigilant Highbay Fixture
Model Number: HEC9MC4PN-xxx

Report Summary

Sample number L14138
Dialight unit model number HEC9MC4PN-xxx

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	23700 (lumens)	23710 (lumens)
Electrical Power:	212.7 (W)	212.7 (W)
Luminous Efficacy:	111.4 (lumens/W)	111.5 (lumens/W)

Electrical Measurements:

Input Power (120VAC): 212.7 (W)
Power Factor (120VAC): 0.998
Current ATHD % (120VAC): 4.942
Input Power (277VAC): 205.7 (W)
Power Factor (277VAC): 0.965
Current ATHD % (277VAC): 11.019

Color Measurements:

Correlated Color Temperature (CCT): 5007
Color Rendering Index (CRI): 77.7
Chromaticity Coordinate (x): 0.3451
Chromaticity Coordinate (y): 0.3539
Chromaticity Coordinate (u'): 0.2106
Chromaticity Coordinate (v'): 0.3238
DUV: 0.0011

Temperature Measurements:

In Situ LED Source Temperature: 59.5 (°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L14138.

Dialight unit model number HEC9MC4PN-xxx

Test Conditions:

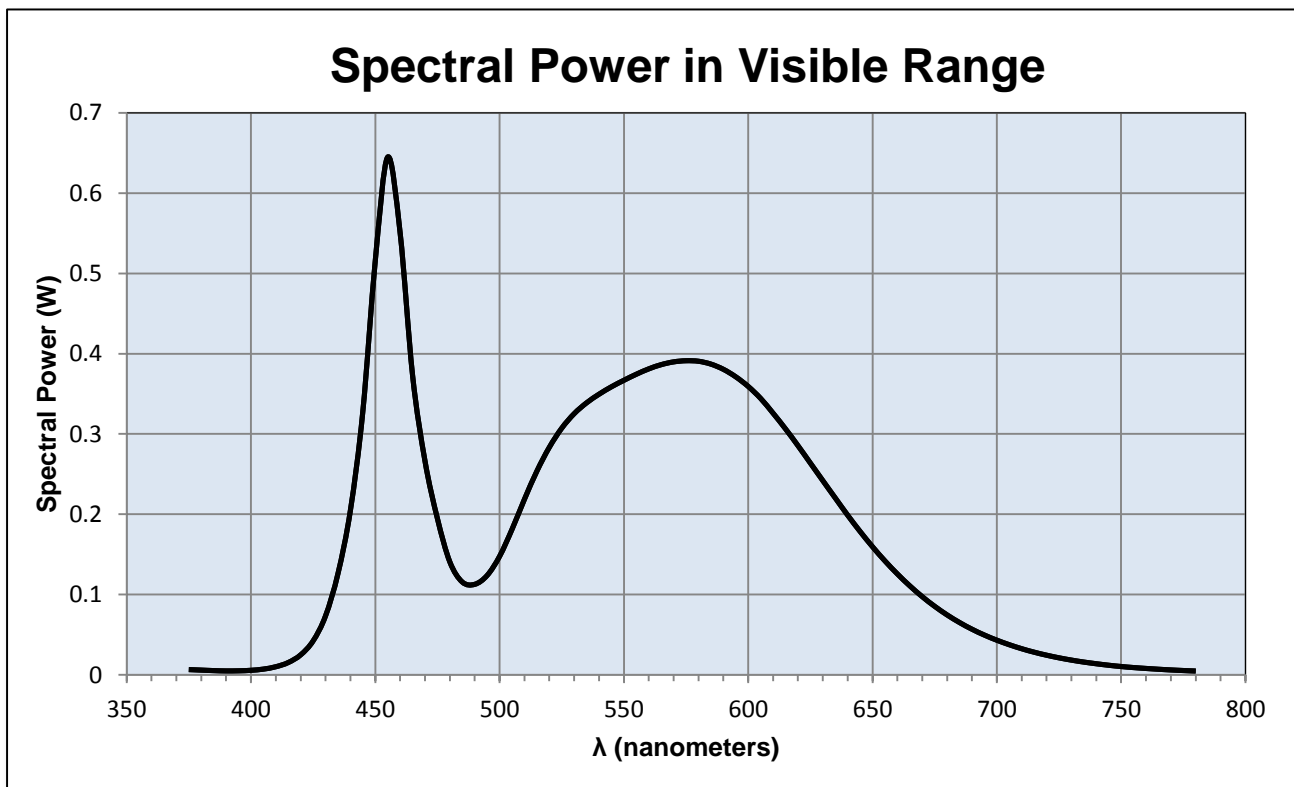
Ambient Temperature: 25 ± 1 (°C)

Electrical Measurements:

Input Voltage: 120 (VAC)
 Input Current: 1.774 (A)
 Input Power: 212.7 (W)
 Input Power Factor: 0.998
 Current ATHD: 4.942 (%)

Photometric measurements:

Luminous Flux: 23700 (lumens)
 Luminous Efficacy: 111.4 (lumens/W)
 Correlated Color Temperature (CCT): 5007 (K)
 CRI -Ra: 77.7
 CRI -R9: -11
 DUV: 0.0011
 CIE Coordinate (x): 0.3451
 CIE Coordinate (y): 0.3539
 CIE Coordinate (u'): 0.2106
 CIE Coordinate (v'): 0.3238



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	0.007	515	0.254	655	0.142
380	0.006	520	0.283	660	0.126
385	0.005	525	0.307	665	0.111
390	0.005	530	0.325	670	0.097
395	0.005	535	0.339	675	0.085
400	0.006	540	0.350	680	0.075
405	0.007	545	0.359	685	0.065
410	0.01	550	0.367	690	0.057
415	0.015	555	0.374	695	0.050
420	0.025	560	0.381	700	0.043
425	0.042	565	0.386	705	0.038
430	0.073	570	0.390	710	0.033
435	0.126	575	0.391	715	0.028
440	0.205	580	0.391	720	0.025
445	0.328	585	0.387	725	0.021
450	0.516	590	0.381	730	0.018
455	0.645	595	0.371	735	0.016
460	0.55	600	0.359	740	0.014
465	0.373	605	0.344	745	0.012
470	0.266	610	0.326	750	0.010
475	0.195	615	0.306	755	0.009
480	0.141	620	0.286	760	0.008
485	0.116	625	0.264	765	0.007
490	0.113	630	0.242	770	0.006
495	0.124	635	0.220	775	0.005
500	0.148	640	0.199	780	0.005
505	0.181	645	0.179		
510	0.219	650	0.160		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L14138.
Dialight unit model number HEC9MC4PN-xxx

Electrical Measurements:

Input Voltage: 120 (VAC)
Input current: 1.776 (A)
Input Power: 212.7 (W)
Power Factor: 0.997

Photometric measurements:

Absolute Luminous Flux: 23710 (lumens)
Luminous Efficacy: 111.5 (lumens/W)

Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	22.5	45	67.5	ACROSS	OUTPUT LUMENS
0	9919	9919	9919	9919	9919	
5	9955	9945	9943	9941	9943	371
15	9729	9816	9742	9730	9918	2107
25	9995	9775	9963	10020	9832	3929
35	9566	9585	9583	9650	9793	5570
45	7174	7360	7315	7293	7368	6013
55	3336	3391	3357	3353	3438	4147
65	588	596	590	578	604	1322
75	93	93	93	93	93	196
85	25	24	25	25	25	55
95	0	0	0	0	0	1
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

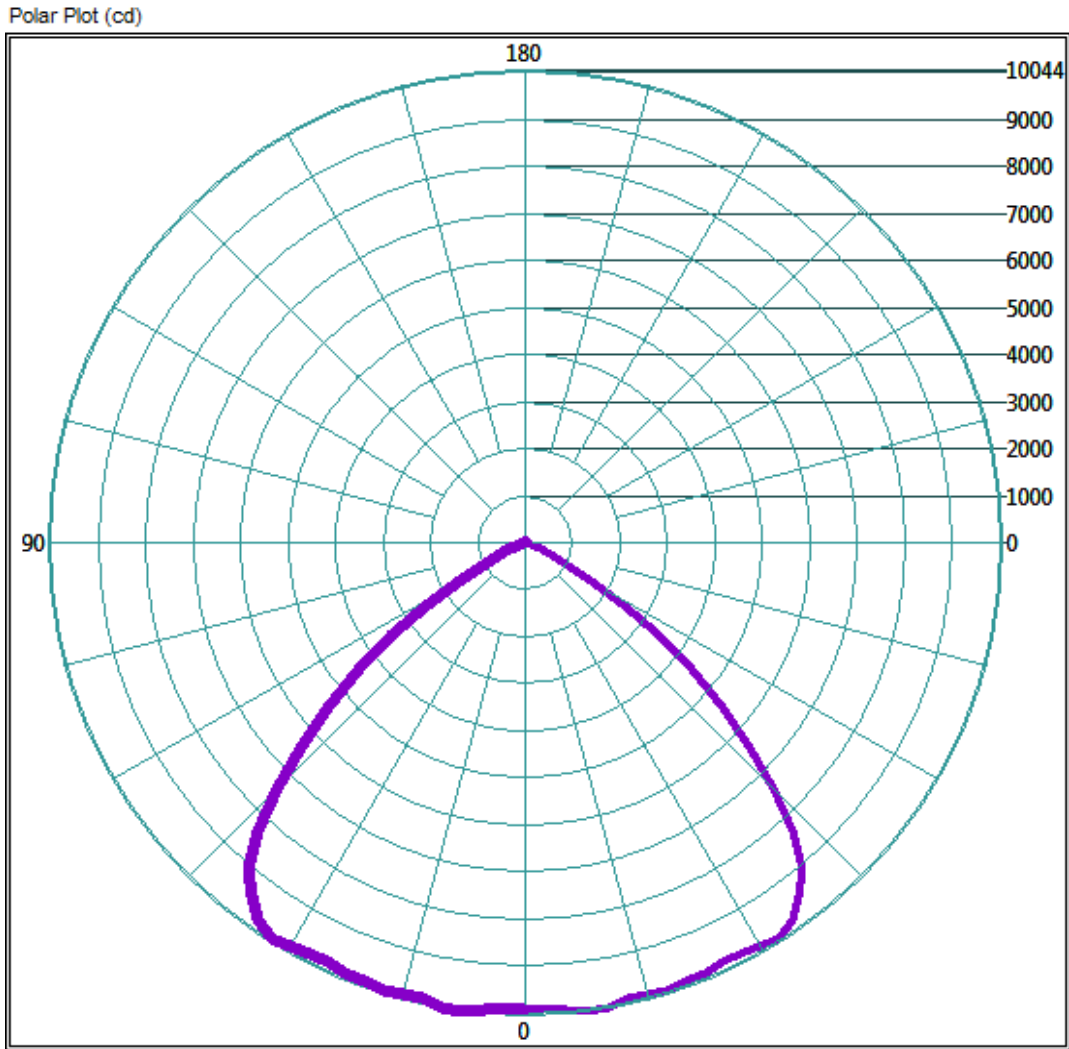
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	9014.3	38.0%
0-40	15069.9	63.6%
0-60	23068.48	97.3%
60-90	1018.18	4.3%
0-90	23710.36	100.0%
90-180	0	0.0%
0-180	23710.36	100.0%

Test Results: Goniometer

Results continued from previous page.

Polar Plot:

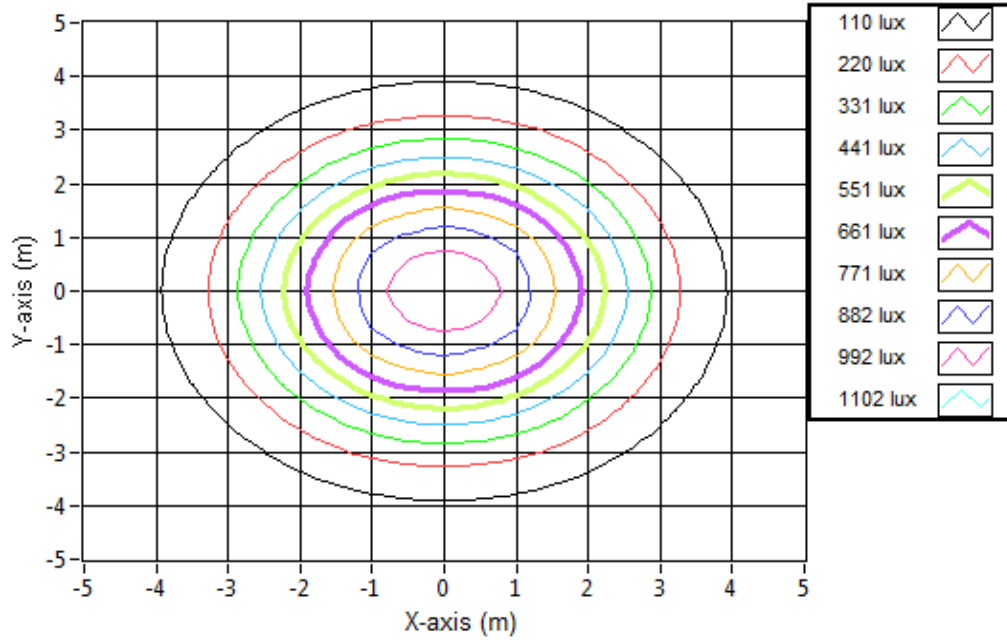


Test Results: Goniometer

Results continued from previous page.

Illuminance Plots:

Illuminance Contour Graph



Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
3.048	7.49	7.58	1067.7
6.096	14.97	15.16	266.9
9.144	22.46	22.75	118.6
12.192	29.94	30.33	66.7
15.24	37.43	37.91	42.7
18.288	44.92	45.49	29.7
21.336	52.40	53.08	21.8
24.384	59.89	60.66	16.7
27.432	67.37	68.24	13.2
30.48	74.86	75.82	10.7

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L14138.

Dialight unit model number HEC9MC4PN-xxx

LED identified as Nichia part number Nichia NT2W757DT .

LED drive current (as indicated by customer): 100 (mA)

LED Specifications:

LED specifications are taken from LED manufacturer datasheet:

Maximum Forward Current (If):	300	(mA)
Maximum Rated Power Dissipation:	1.05	(W)
Maximum Junction Temp. (Tj):	120	(°C)
Thermal Resistance (Rth):	18	(°C/W)

Derived Specifications:

Maximum Power at Indicated Current:	0.35	(W)
Maximum Source Temperature:	113.7	(°C)

Test Conditions:

Temperature Measurement Location: See Photographs Below

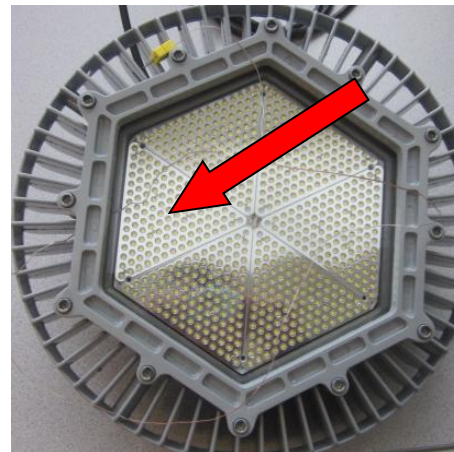
Ambient Temperature: $25^{\circ} \pm 1^{\circ}$ (°C)

Ambient temperature at time of measurement: 25.1 (°C)

Relative humidity at time of measurement: 15%

Results:

Measured LED source temperature: 59.5 (°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 Precision	1715A	-
TDK-Lambda	GEN1500W	-
Fluke 8808A Digit Multimeter	8808A	4/14/2015
TPI Digital Thermometer 343	343	4/17/2015
TPI Digital 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.

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Test Report Issued By:

Richard Huegi
Dialight Optics Laboratory
Senior Optical Engineering Technician
Lighting Division

Test Report Reviewed and Approved By:

Cecil Thomas
Dialight Optics Laboratory
Optical Engineering Manager
Approved Signatory