

Test Report

Report Number: L16093

Date: Jan 31, 2017

Issued by:

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

Test of one Vigilant Highbay
Unit manufacturer: Dialight Corporation
Unit model number: HEA9RC4KN-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: December 5, 2016 through January 30, 2017

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

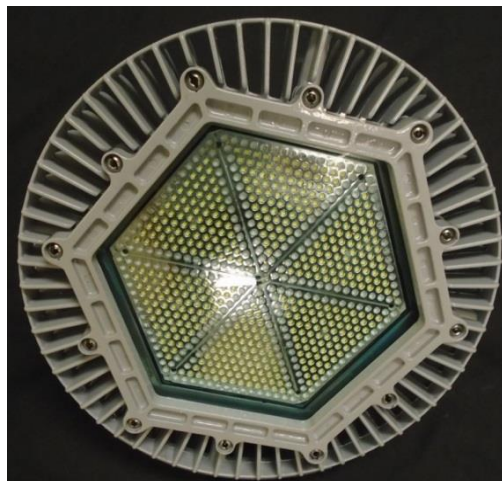
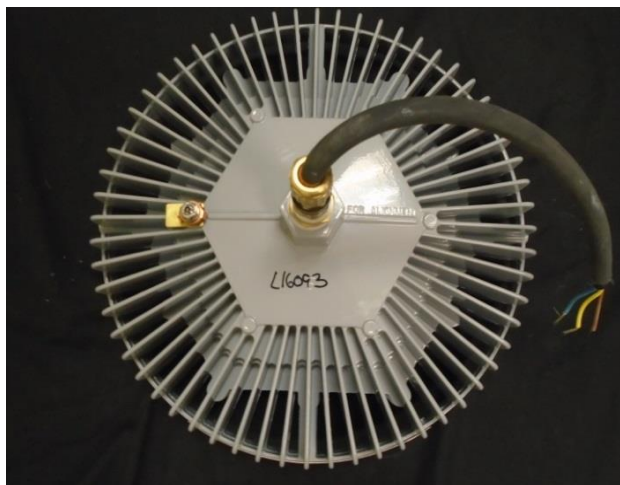
Description of sample:

Sample Number: L16093
Manufacturer: Dialight Corporation
Product Name: Vigilant
Description: Vigilant Highbay
Model Number: HEA9RC4KN-xxx

Report Summary

Sample number L16093
Dialight unit model number HEA9RC4KN-xxx

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	15970 (lumens)	15797 (lumens)
Electrical Power:	144.5 (W)	144.4 (W)
Luminous Efficacy:	110.6 (lumens/W)	109.4 (lumens/W)

Electrical Measurements:

Input Power (120VAC): 144.5 (W)
Power Factor (120VAC): 0.994
Current ATHD % (120VAC): 8.565
Input Power (240VAC): 142.3 (W)
Power Factor (240VAC): 0.969
Current ATHD % (240VAC): 15

Color Measurements:

Correlated Color Temperature (CCT): 5204
Color Rendering Index (CRI): 74.5
Chromaticity Coordinate (x): 0.34
Chromaticity Coordinate (y): 0.358
Chromaticity Coordinate (u'): 0.206
Chromaticity Coordinate (v'): 0.325
DUV: 0.0053

Temperature Measurements:

In Situ LED Source Temperature: 61.5 (°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L16093.

Dialight unit model number HEA9RC4KN-xxx

Test Conditions:

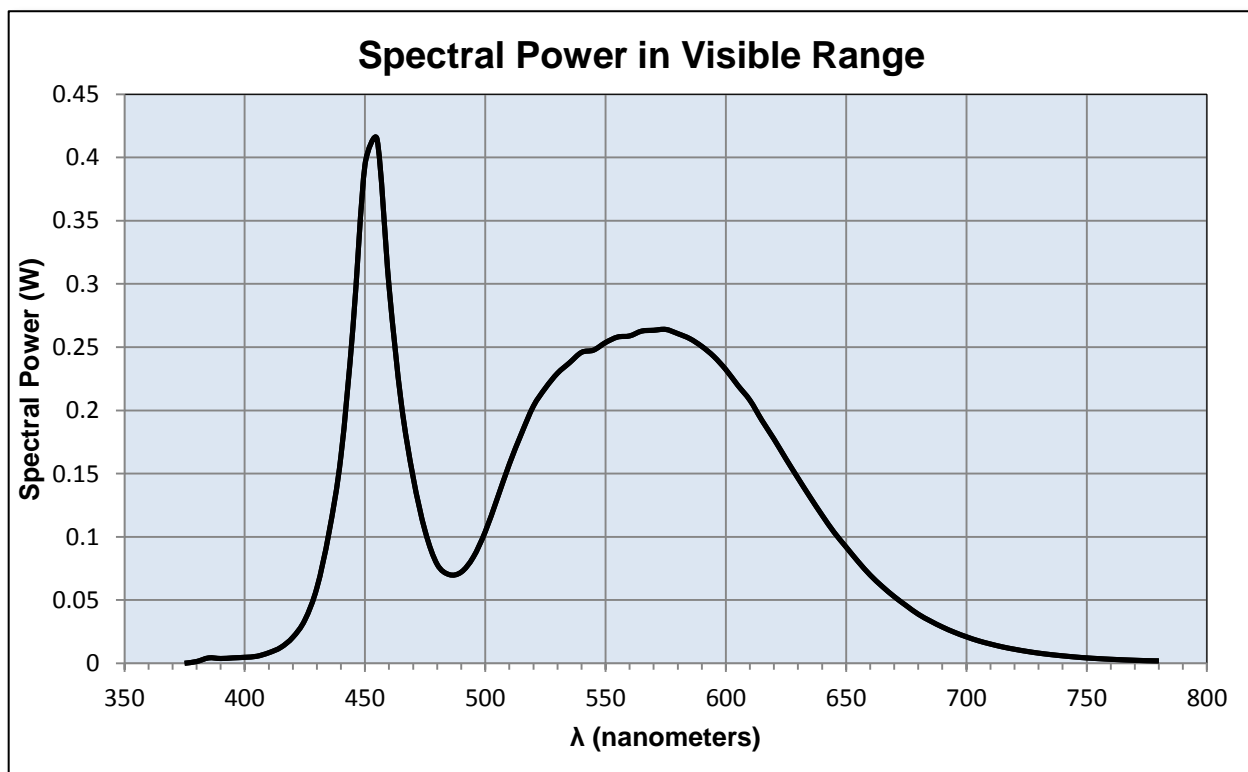
Ambient Temperature: 25 ± 1 (°C)

Electrical Measurements:

Input Voltage: 120 (VAC)
Input Current: 1.208 (A)
Input Power: 144.5 (W)
Input Power Factor: 0.994
Current ATHD: 8.565 (%)

Photometric measurements:

Luminous Flux: 15970 (lumens)
Luminous Efficacy: 110.6 (lumens/W)
Correlated Color Temperature (CCT): 5204 (K)
CRI -Ra: 74.5
CRI -R9: -29
DUV: 0.0053
CIE Coordinate (x): 0.34
CIE Coordinate (y): 0.358
CIE Coordinate (u'): 0.206
CIE Coordinate (v'): 0.325



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	0.000	515	0.181	655	0.080
380	0.001	520	0.203	660	0.070
385	0.004	525	0.218	665	0.061
390	0.004	530	0.229	670	0.053
395	0.004	535	0.238	675	0.046
400	0.005	540	0.246	680	0.039
405	0.006	545	0.248	685	0.034
410	0.008	550	0.254	690	0.029
415	0.013	555	0.258	695	0.025
420	0.021	560	0.259	700	0.021
425	0.034	565	0.263	705	0.018
430	0.060	570	0.263	710	0.015
435	0.103	575	0.264	715	0.013
440	0.164	580	0.261	720	0.011
445	0.266	585	0.257	725	0.009
450	0.394	590	0.251	730	0.008
455	0.415	595	0.243	735	0.007
460	0.298	600	0.232	740	0.006
465	0.207	605	0.220	745	0.005
470	0.147	610	0.208	750	0.004
475	0.105	615	0.192	755	0.004
480	0.078	620	0.177	760	0.003
485	0.070	625	0.162	765	0.003
490	0.072	630	0.146	770	0.002
495	0.084	635	0.131	775	0.002
500	0.104	640	0.117	780	0.002
505	0.130	645	0.104		
510	0.158	650	0.092		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L16093.
Dialight unit model number HEA9RC4KN-xxx

Electrical Measurements:

Input Voltage: 120.1 (VAC)
Input current: 1.21 (A)
Input Power: 144.4 (W)
Power Factor: 0.994

Photometric measurements:

Absolute Luminous Flux: 15797 (lumens)
Luminous Efficacy: 109.4 (lumens/W)

Intensity Summary:

INTENSITY (CANDLEPOWER) SUMMARY						
ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	6157	6157	6157	6157	6157	
5	6213	6213	6213	6213	6213	232
15	6435	6435	6435	6435	6435	1359
25	6991	6991	6991	6991	6991	2702
35	6779	6779	6779	6779	6779	3957
45	4841	4841	4841	4841	4841	4068
55	1960	1960	1960	1960	1960	2573
65	382	382	382	382	382	777
75	38	38	38	38	38	101
85	16	16	16	16	16	26
95	0	0	0	0	0	3
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

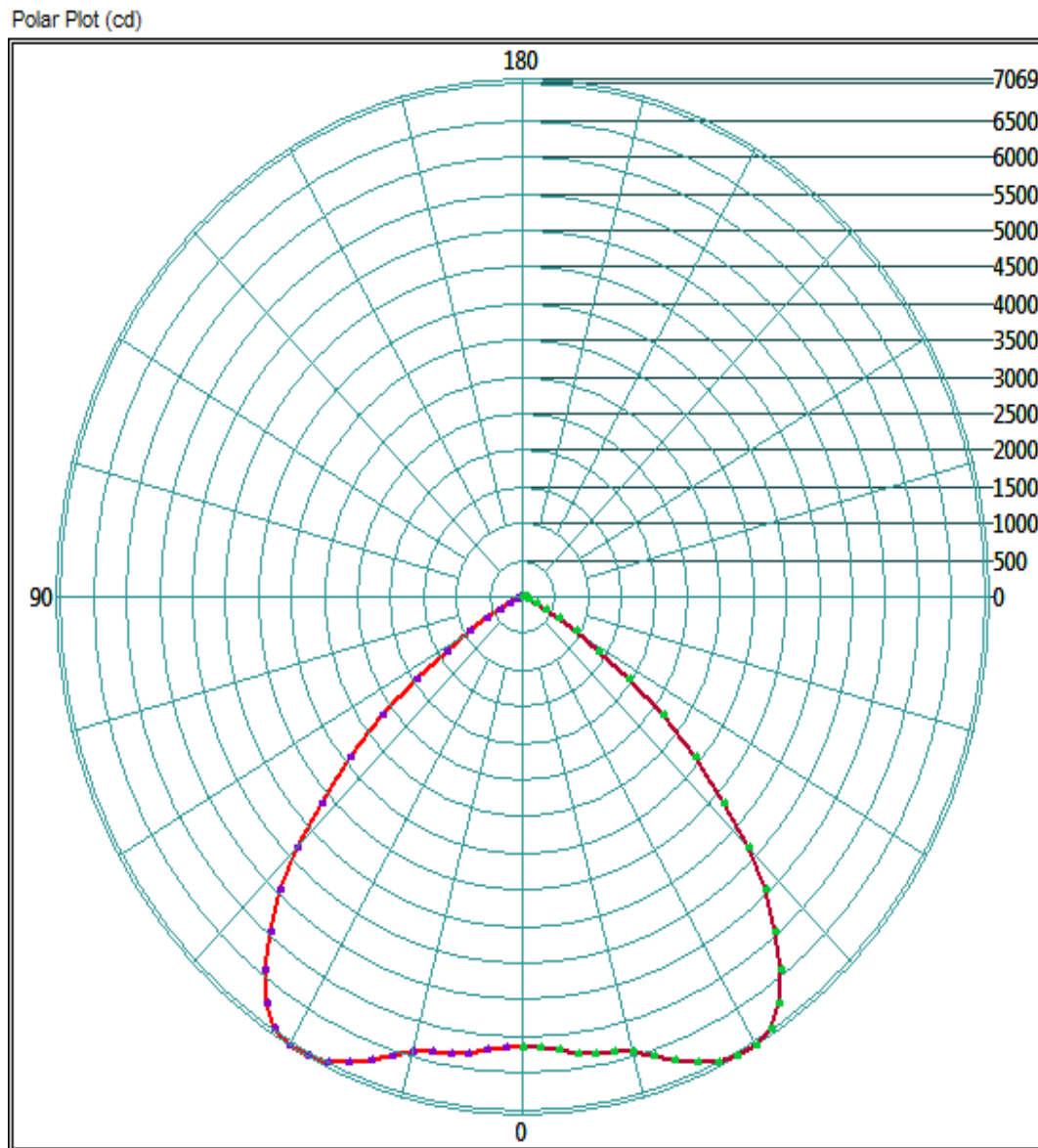
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	6155.04	39.0%
0-40	10372.32	65.7%
0-60	15426.88	97.7%
60-90	589.44	3.7%
0-90	15797.44	100.0%
90-180	0	0.0%
0-180	15797.44	100.0%

Test Results: Goniometer

Results continued from previous page.

Polar Plot:

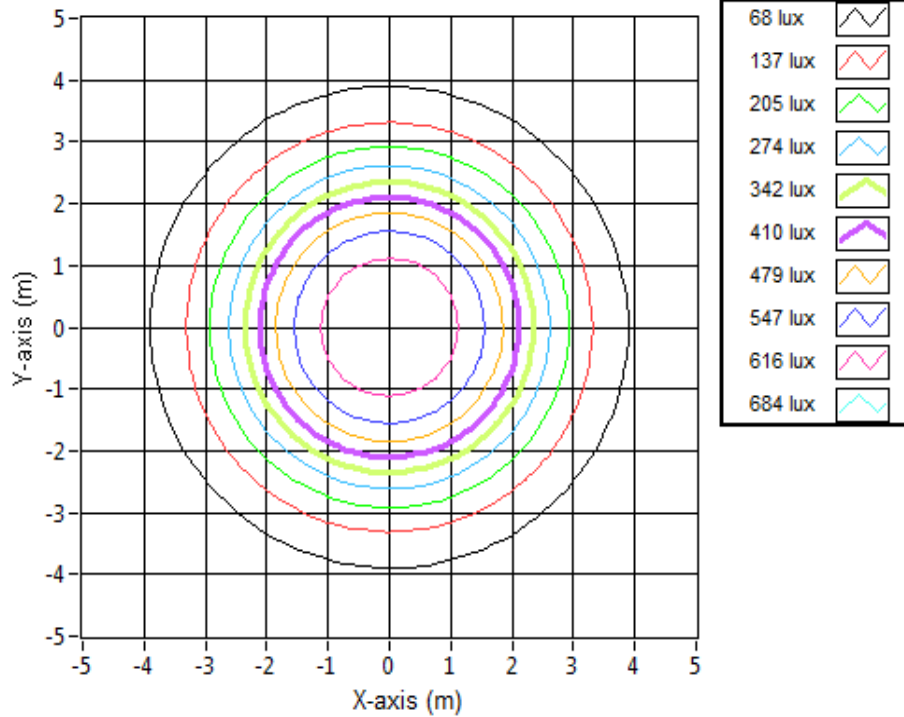


Test Results: Goniometer

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	7.56	7.56	662.7
6.096	15.11	15.11	165.7
9.144	22.67	22.67	73.6
12.192	30.22	30.22	41.4
15.24	37.78	37.78	26.5
18.288	45.34	45.34	18.4
21.336	52.89	52.89	13.5
24.384	60.45	60.45	10.4
27.432	68.00	68.00	8.2
30.48	75.56	75.56	6.6

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L16093.
Dialight unit model number HEA9RC4KN-xxx

LED identified as Nichia part number 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:

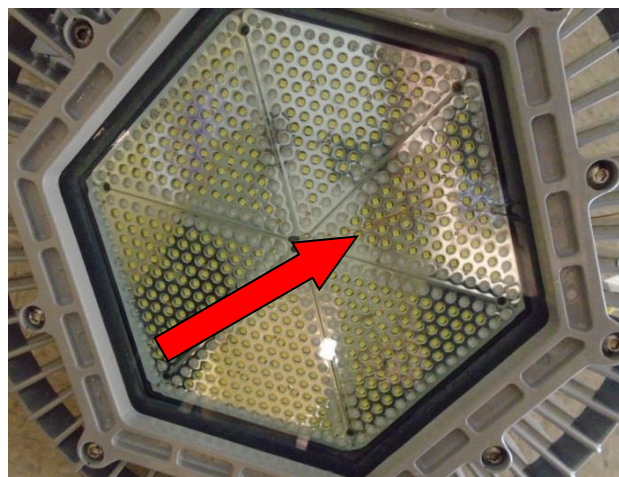
Maximum Power at Indicated Current: 0.35 (W)
Maximum Source Temperature: 113.7 (°C)

Test Conditions:

Temperature Measurement Location: See Photographs Below
Ambient Temperature: $25^{\circ} \pm 5^{\circ}$ (°C)
Ambient temperature at time of measurement: 24.1 (°C)
Relative humidity at time of measurement: 10%

Results:

Measured LED source temperature: 61.5 (°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
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.

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