

# Test Report

Report Number: L20066

Date: Sep 25, 2020

Issued by:

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

Test of one Vigilant Bulkhead  
Unit manufacturer: Dialight Corporation  
Unit model number: BHx4BC23xxxxN

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:** September 24, 2020 through September 25, 2020

**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: L20066  
Manufacturer: Dialight Corporation  
Product Name: BH CL CIR CW 3klm  
Description: Vigilant Bulkhead  
Model Number: BHx4BC23xxxxN

## Report Summary

Sample number L20066  
Dialight unit model number BHx4BC23xxxxxN

### Photograph(s) of sample:



\*Photographs not to scale. For reference only.

### Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	3205 (lumens)	3306 (lumens)
Electrical Power:	21.6 (W)	21.3 (W)
Luminous Efficacy:	148.6 (lumens/W)	154.9 (lumens/W)

### Electrical Measurements:

Input Power (240VAC): 21.6 (W)  
 Power Factor (240VAC): 0.944  
 Current ATHD % (240VAC): 12.86  
 Input Power (120VAC): 21.4 (W)  
 Power Factor (120VAC): 0.996  
 Current ATHD % (120VAC): 13.74

### Color Measurements:

Correlated Color Temperature (CCT): 4987  
 Color Rendering Index (CRI): 82  
 Chromaticity Coordinate (x): 0.346  
 Chromaticity Coordinate (y): 0.354  
 Chromaticity Coordinate (u'): 0.211  
 Chromaticity Coordinate (v'): 0.324  
 DUV: 0.0012

### Temperature Measurements:

In Situ LED Source Temperature: 37.0 (°C)

## Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L20066.

Dialight unit model number BHx4BC23xxxxxN

### Test Conditions:

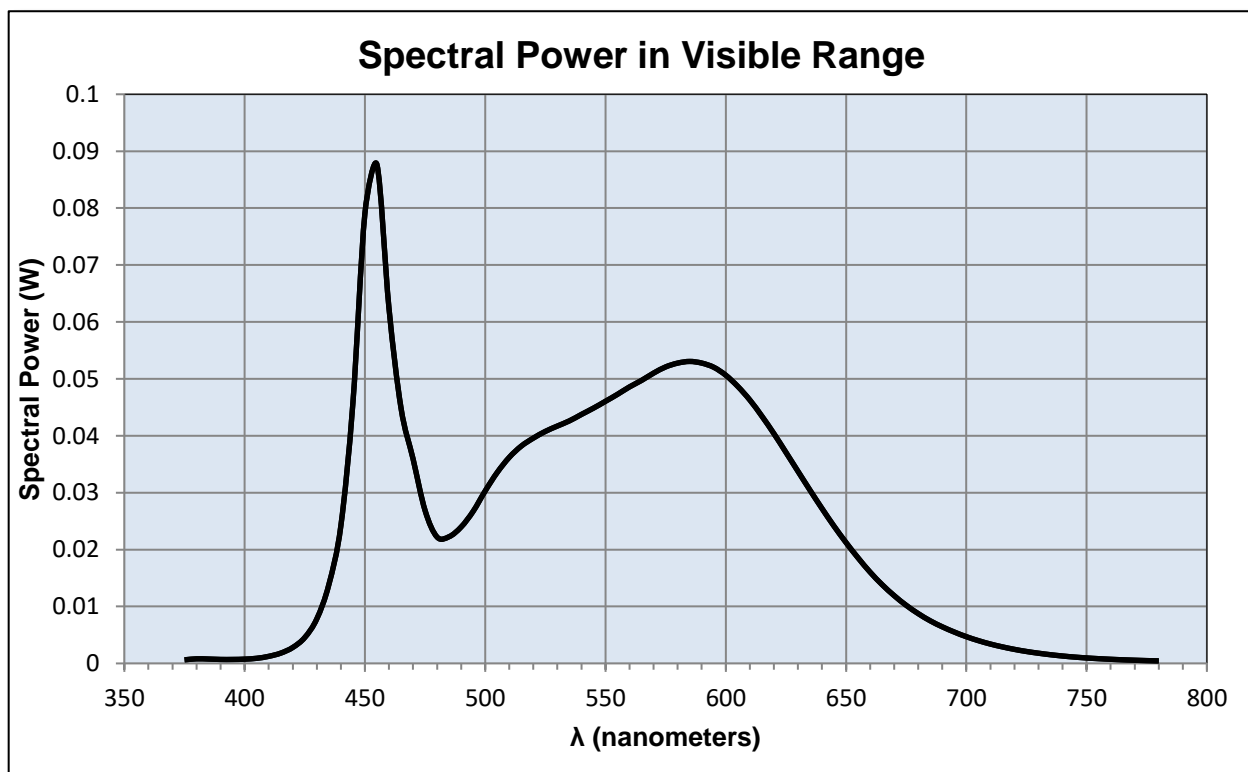
Ambient Temperature:  $25 \pm 1$  (°C)

### Electrical Measurements:

Input Voltage: 240 (VAC)  
 Input Current: 0.095 (A)  
 Input Power: 21.6 (W)  
 Input Power Factor: 0.944  
 Current ATHD: 12.86 (%)

### Photometric measurements:

Luminous Flux: 3205 (lumens)  
 Luminous Efficacy: 148.6 (lumens/W)  
 Correlated Color Temperature (CCT): 4987 (K)  
 CRI -Ra: 82  
 CRI -R9: -3.2  
 DUV: 0.0012  
 CIE Coordinate (x): 0.346  
 CIE Coordinate (y): 0.354  
 CIE Coordinate (u'): 0.211  
 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	0.001	515	0.038	655	0.019
380	0.001	520	0.040	660	0.016
385	0.001	525	0.041	665	0.014
390	0.001	530	0.042	670	0.012
395	0.001	535	0.043	675	0.010
400	0.001	540	0.044	680	0.009
405	0.001	545	0.045	685	0.007
410	0.001	550	0.046	690	0.006
415	0.002	555	0.047	695	0.006
420	0.003	560	0.049	700	0.005
425	0.005	565	0.050	705	0.004
430	0.008	570	0.051	710	0.003
435	0.014	575	0.052	715	0.003
440	0.024	580	0.053	720	0.002
445	0.046	585	0.053	725	0.002
450	0.079	590	0.053	730	0.002
455	0.088	595	0.052	735	0.002
460	0.062	600	0.051	740	0.001
465	0.045	605	0.049	745	0.001
470	0.036	610	0.046	750	0.001
475	0.027	615	0.043	755	0.001
480	0.022	620	0.040	760	0.001
485	0.022	625	0.037	765	0.001
490	0.024	630	0.034	770	0.001
495	0.027	635	0.030	775	0.000
500	0.030	640	0.027	780	0.000
505	0.034	645	0.024		
510	0.036	650	0.021		

## Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L20066.  
Dialight unit model number BHx4BC23xxxxxN

### Electrical Measurements:

Input Voltage: 240 (VAC)  
Input current: 0.094 (A)  
Input Power: 21.3 (W)  
Power Factor: 0.941

### Photometric measurements:

Absolute Luminous Flux: 3306 (lumens)  
Luminous Efficacy: 154.9 (lumens/W)

### Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	25	45	72.5	ACROSS	OUTPUT LUMENS
0	1347	1347	1347	1347	1347	
5	1345	1345	1345	1345	1345	50
15	1336	1336	1336	1336	1336	286
25	1322	1322	1322	1322	1322	527
35	1312	1312	1312	1312	1312	746
45	1248	1248	1248	1248	1248	933
55	335	335	335	335	335	607
65	73	73	73	73	73	119
75	16	16	16	16	16	36
85	0	0	0	0	0	2
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

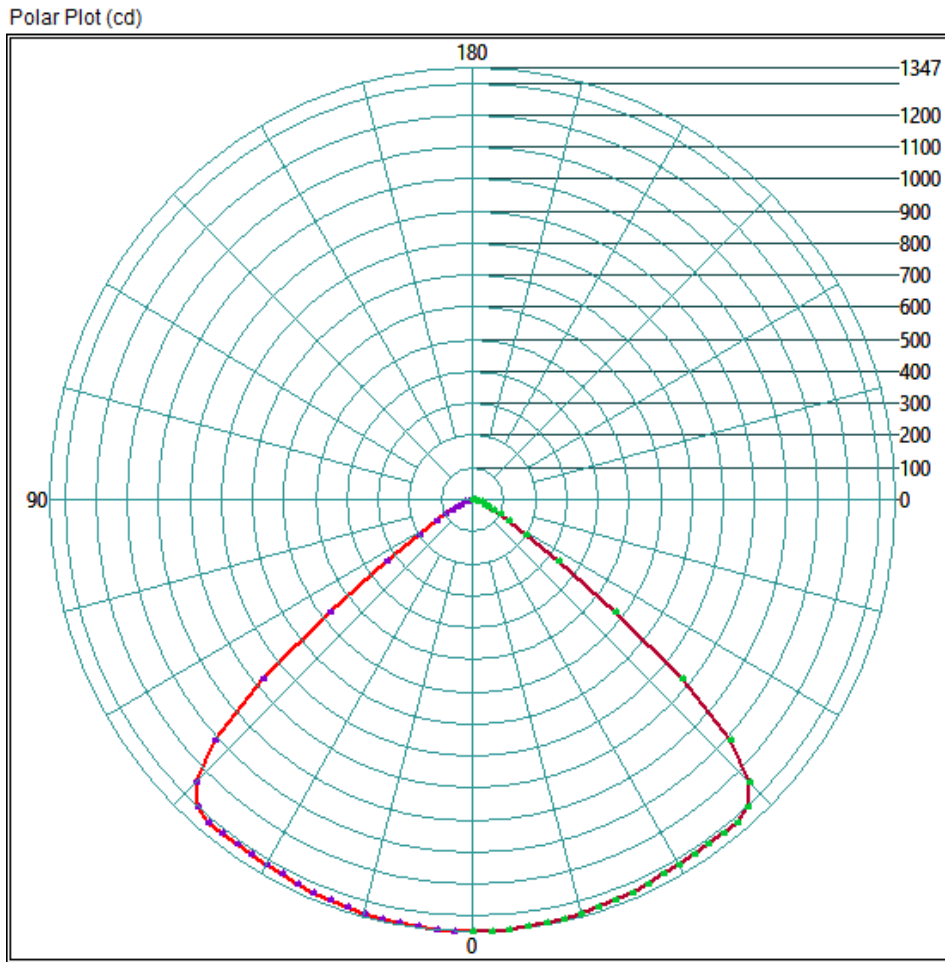
### ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	1209.22	36.6%
0-40	2058.88	62.3%
0-60	3226.44	97.6%
60-90	110.64	3.3%
0-90	3305.64	100.0%
90-180	0	0.0%
0-180	3305.64	100.0%

## Test Results: Goniometer

Results continued from previous page.

### Polar Plot:

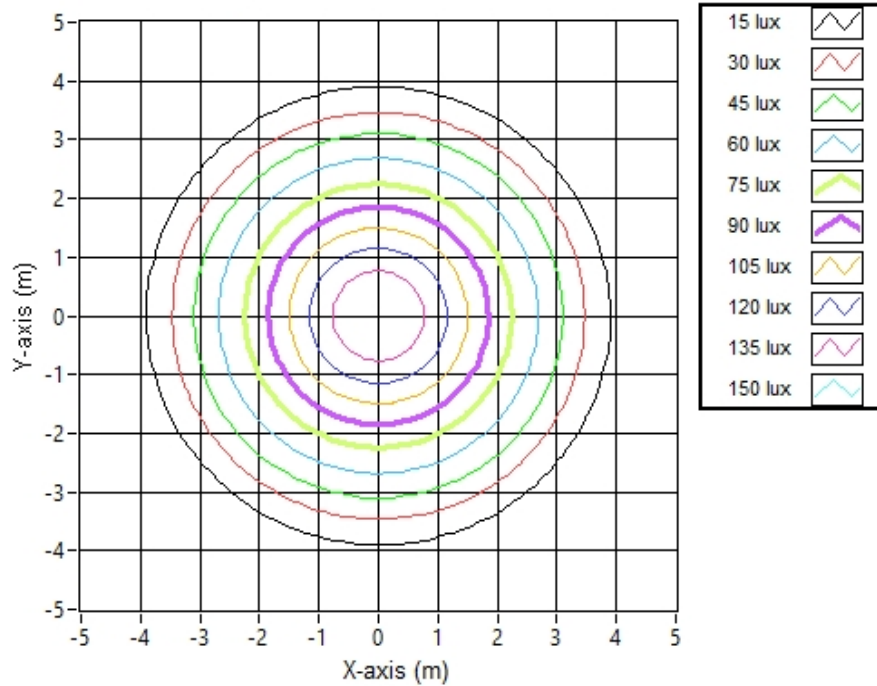


## Test Results: Goniometer

Results continued from previous page.

### Illuminance Plot:

Illuminance Contour Graph



### Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone	Projected Illuminance (lux)
3.048	7.71	7.71	145.0
6.096	15.42	15.42	36.2
9.144	23.12	23.12	16.1
12.192	30.83	30.83	9.1
15.124	38.24	38.24	5.9
18.288	46.25	46.25	4.0
21.336	53.95	53.95	3.0
24.384	61.66	61.66	2.3
27.432	69.37	69.37	1.8
30.48	77.08	77.08	1.4

## Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L20066.

Dialight unit model number BHx4BC23xxxxxN

LED identified as SOUL part number STW8C12C-E0.

LED drive current (as indicated by customer): 87.5 (mA)

### LED Specifications:

LED specifications are taken from LED manufacturer datasheet:

Maximum Forward Current (If): 200 (mA)  
Maximum Rated Power Dissipation: 0.6 (W)  
Maximum Junction Temp. (Tj): 125 (°C)  
Thermal Resistance (Rth): 7.5 (°C/W)

Derived Specifications:

Maximum Power at Indicated Current: 0.263 (W)  
Maximum Source Temperature: 123 (°C)

### Test Conditions:

Temperature Measurement Location: See Photographs Below

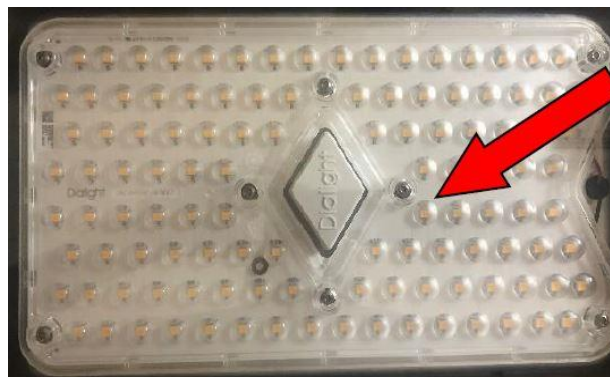
Ambient Temperature:  $25^{\circ} \pm 5^{\circ}$  (°C)

Ambient temperature at time of measurement: 23.9 (°C)

Relative humidity at time of measurement: 40%

### Results:

Measured LED source temperature: 37 (°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
Delta Elektronika DC Power Supply	SM.300-5
Instek AC Power Supply	APS-9501
Sorensen DC Power Supply	XHR150-7
TPI Digital Thermometer	TPI 343
Fluke 52II Thermometer	068158
Fluke 971 Humidity Meter	971
Volttech Power Analyzer	PM1000+
Volttech Universal Breakout Box	PM1000+
BK Precision	1715A
Step-Up Transformer	
Omega TC	Dpi8-C24
Agilent True RMS OLED Multimeter	U1273A
ITL Osram Calibraton lamps for Goniometer	J9a8
ITL Osram Calibraton lamps for Goniometer	J9a8
ITL Osram Calibraton lamps for Goniometer	J9a8
Adaptive Power Systems AC Power Supply	FC-210
Xitron Power Analyzer	XT2640
GwINSTEK DC Power Supply	GEP172679
Osram Sylvania Calibration Lamp for Sphere	STD-20WF-3

**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