

Test Report

Report Number: L19024

Date: Apr 15, 2019

Issued by:

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

Test of one High Bay

Unit manufacturer: Dialight Corporation
Unit model number: RRE-4MC2-Jxxx-xxN

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 12, 2019 through April 12, 2019

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: L19024
Manufacturer: Dialight Corporation
Product Name: Reliant High Bay
Description: High Bay
Model Number: RRE-4MC2-Jxxx-xxN

Report Summary

Sample number L19024
Dialight unit model number RRE-4MC2-Jxxx-xxN

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	33410 (lumens)	33519 (lumens)
Electrical Power:	230.0 (W)	230.0 (W)
Luminous Efficacy:	145.3 (lumens/W)	145.7 (lumens/W)

Electrical Measurements:

Input Power (230VAC): 230.0 (W)
Power Factor (230VAC): 0.99
Current ATHD % (230VAC): 8.765
Input Power (110VAC): 240.2 (W)
Power Factor (110VAC): 0.998
Current ATHD % (110VAC): 3.99

Color Measurements:

Correlated Color Temperature (CCT): 5063
Color Rendering Index (CRI): 87.1
Chromaticity Coordinate (x): 0.344
Chromaticity Coordinate (y): 0.353
Chromaticity Coordinate (u'): 0.21
Chromaticity Coordinate (v'): 0.324
DUV: 0.0015

Temperature Measurements:

In Situ LED Source Temperature: 56.6 (°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L19024.

Dialight unit model number RRE-4MC2-Jxxx-xxN

Test Conditions:

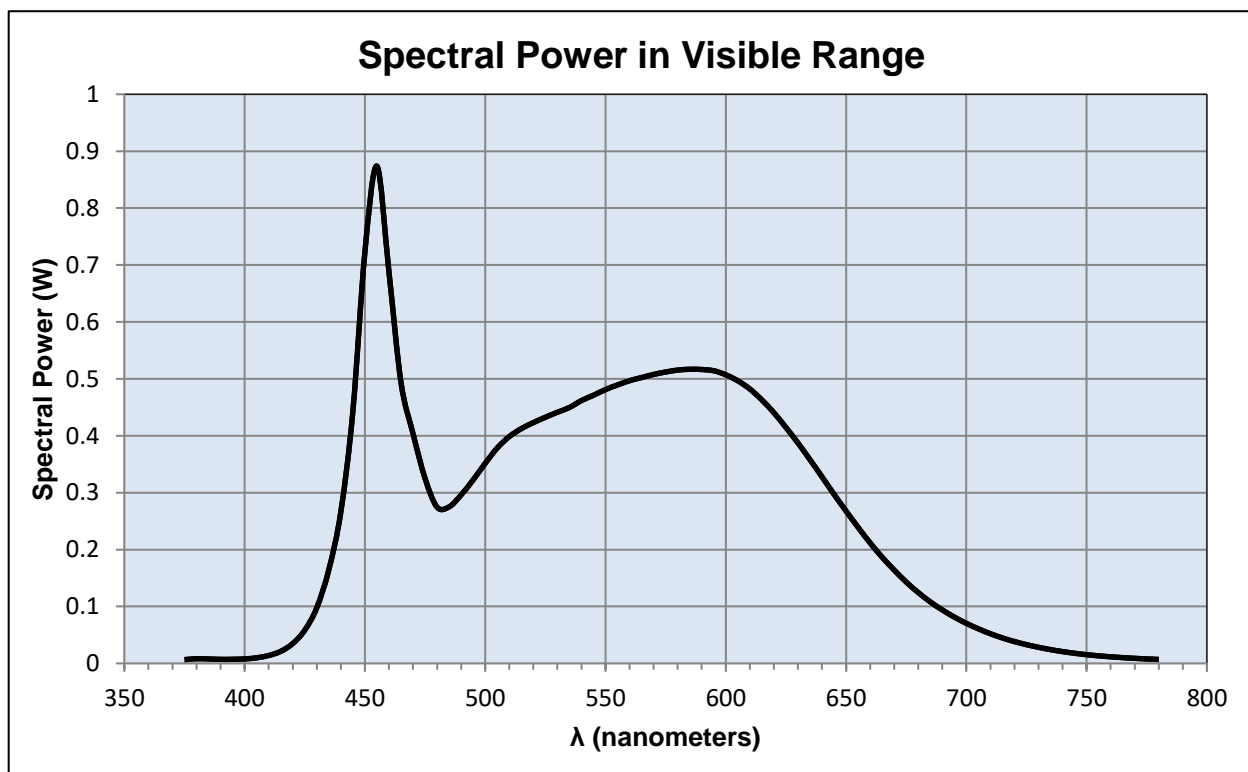
Ambient Temperature: 25 ± 1 (°C)

Electrical Measurements:

Input Voltage: 230 (VAC)
 Input Current: 1.016 (A)
 Input Power: 230.0 (W)
 Input Power Factor: 0.99
 Current ATHD: 8.765 (%)

Photometric measurements:

Luminous Flux: 33410 (lumens)
 Luminous Efficacy: 145.3 (lumens/W)
 Correlated Color Temperature (CCT): 5063 (K)
 CRI -Ra: 87.1
 CRI -R9: 26.1
 DUV: 0.0015
 CIE Coordinate (x): 0.344
 CIE Coordinate (y): 0.353
 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:

λ (nm)	(W/nm)	λ (nm)	(W/nm)	λ (nm)	(W/nm)
375	0.007	515	0.412	655	0.239
380	0.008	520	0.423	660	0.212
385	0.008	525	0.432	665	0.187
390	0.007	530	0.441	670	0.164
395	0.007	535	0.450	675	0.143
400	0.008	540	0.462	680	0.125
405	0.010	545	0.471	685	0.108
410	0.014	550	0.481	690	0.094
415	0.021	555	0.489	695	0.082
420	0.035	560	0.497	700	0.070
425	0.058	565	0.502	705	0.061
430	0.098	570	0.508	710	0.052
435	0.165	575	0.512	715	0.045
440	0.267	580	0.515	720	0.038
445	0.444	585	0.517	725	0.033
450	0.723	590	0.516	730	0.028
455	0.874	595	0.514	735	0.024
460	0.687	600	0.507	740	0.021
465	0.494	605	0.497	745	0.018
470	0.404	610	0.482	750	0.015
475	0.325	615	0.463	755	0.013
480	0.275	620	0.441	760	0.012
485	0.275	625	0.415	765	0.010
490	0.296	630	0.387	770	0.009
495	0.323	635	0.358	775	0.008
500	0.352	640	0.328	780	0.007
505	0.379	645	0.297		
510	0.399	650	0.268		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L19024.
Dialight unit model number RRE-4MC2-Jxxx-xxN

Electrical Measurements:

Input Voltage: 230 (VAC)
Input current: 1.015 (A)
Input Power: 230.0 (W)
Power Factor: 0.985

Photometric measurements:

Absolute Luminous Flux: 33519 (lumens)
Luminous Efficacy: 145.7 (lumens/W)

Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	23	45	67.5	ACROSS	OUTPUT LUMENS
0	12645	12645	12645	12645	12645	
5	12610	12610	12610	12610	12610	471
15	12671	12671	12671	12671	12671	2696
25	13455	13455	13455	13455	13455	5213
35	13649	13649	13649	13649	13649	7826
45	10471	10471	10471	10471	10471	8551
55	5353	5353	5353	5353	5353	6272
65	866	866	866	866	866	2090
75	144	144	144	144	144	310
85	45	45	45	45	45	81
95	0	0	0	0	0	8
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

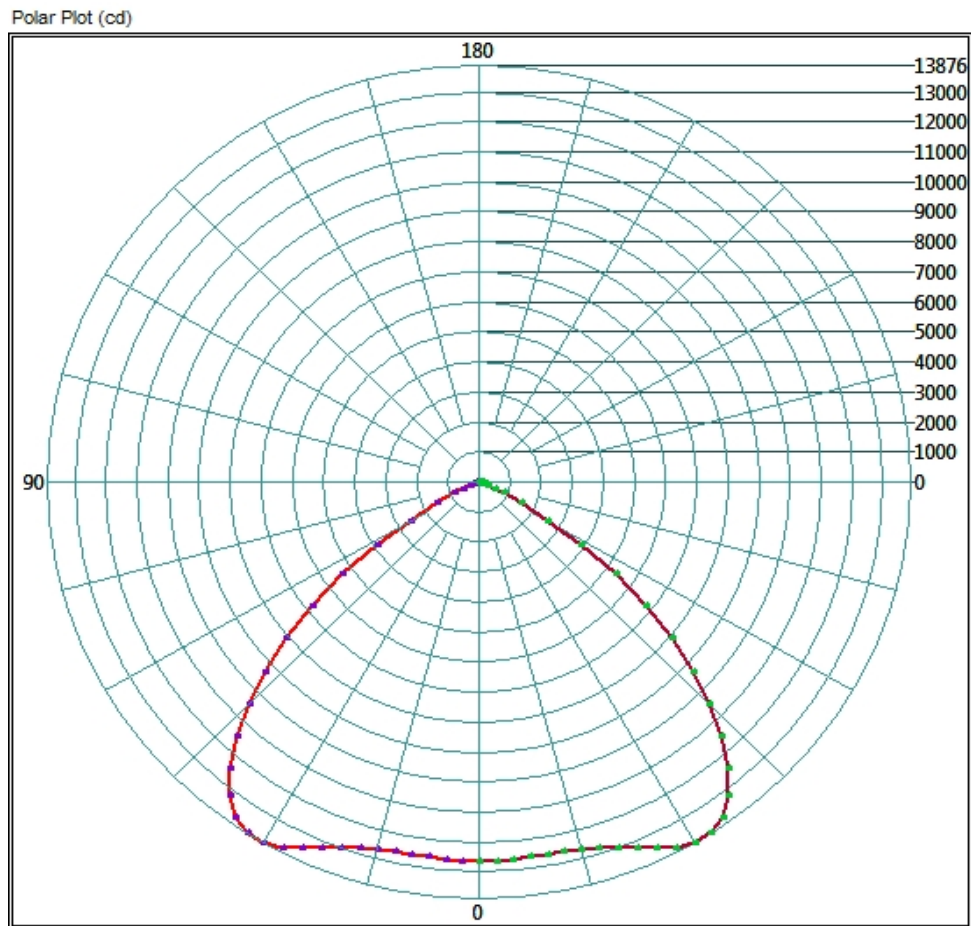
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	12016.8	35.9%
0-40	20597.76	61.5%
0-60	32537.76	97.1%
60-90	1586.72	4.7%
0-90	33518.56	100.0%
90-180	0	0.0%
0-180	33518.56	100.0%

Test Results: Goniometer

Results continued from previous page.

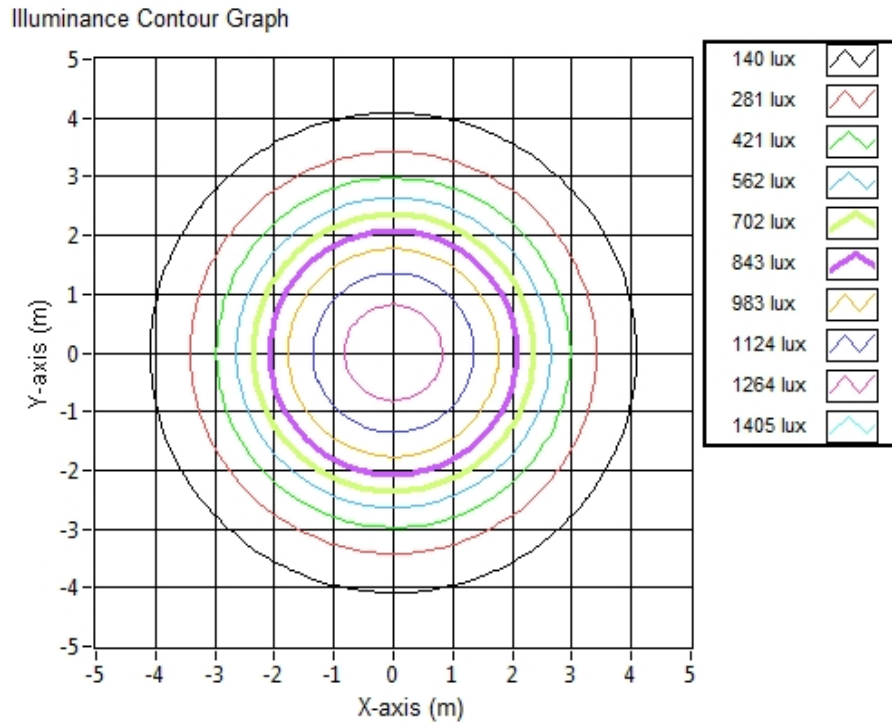
Polar Plot:



Test Results: Goniometer

Results continued from previous page.

Illuminance Plot:



Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
3.048	8.18	8.18	1361.1
6.096	16.35	16.35	340.3
9.144	24.53	24.53	151.2
12.192	32.71	32.71	85.1
15.24	40.88	40.88	54.4
18.288	49.06	49.06	37.8
21.336	57.23	57.23	27.8
24.384	65.41	65.41	21.3
27.432	73.59	73.59	16.8
30.48	81.76	81.76	13.6

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L19024.
Dialight unit model number RRE-4MC2-Jxxx-xxN

LED identified as Seoul Semiconductor part number SAW8C22B.

LED drive current (as indicated by customer): 35 (mA)

LED Specifications:

LED specifications are taken from LED manufacturer datasheet:

Maximum Forward Current (If): 250 (mA)
Maximum Rated Power Dissipation: 1.5 (W)
Maximum Junction Temp. (Tj): 125 (°C)
Thermal Resistance (Rth): 17 (°C/W)

Derived Specifications:

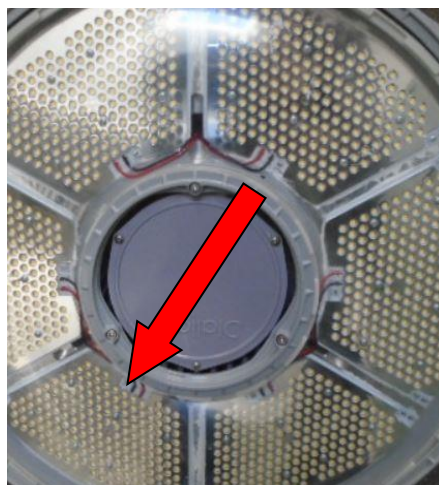
Maximum Power at Indicated Current: 0.21 (W)
Maximum Source Temperature: 121.4 (°C)

Test Conditions:

Temperature Measurement Location: See Photographs Below
Ambient Temperature: $25^{\circ} \pm 5^{\circ}$ (°C)
Ambient temperature at time of measurement: 25.5 (°C)
Relative humidity at time of measurement: 23%

Results:

Measured LED source temperature: 56.6 (°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