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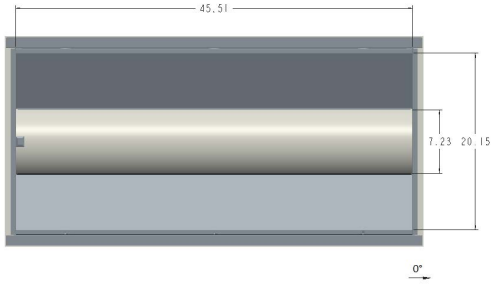
NVLAP LAB CODE: 201058-0

REPORT NUMBER: RAB03245 PAGE: 1 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17
CATALOG NUMBER: RTLED2X4-49YNW/D10
LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 98 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT. FIXTURE WAS MOUNTED IN Lithonia Lighting Model #2GT8 4 32 A12 MVOLT 1/4 MVISPWS1836LP741 HOUSING.
LAMPS: ONE HUNDRED AND NINETY-SIX LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.
(SEE PAGE 2 FOR MORE INFORMATION)

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0	FLUX
0	2168	2168	2168	2168	2168	
5	2132	2143	2169	2176	2174	205
15	2048	2064	2095	2108	2112	589
25	1890	1905	1947	1966	1975	893
35	1662	1683	1733	1765	1782	1080
45	1384	1409	1468	1521	1544	1131
55	1076	1104	1176	1250	1277	1053
65	745	786	874	942	969	856
75	423	474	547	630	668	580
85	125	169	229	253	268	223
90	12	15	13	5	2	



ZONAL LUMEN SUMMARY

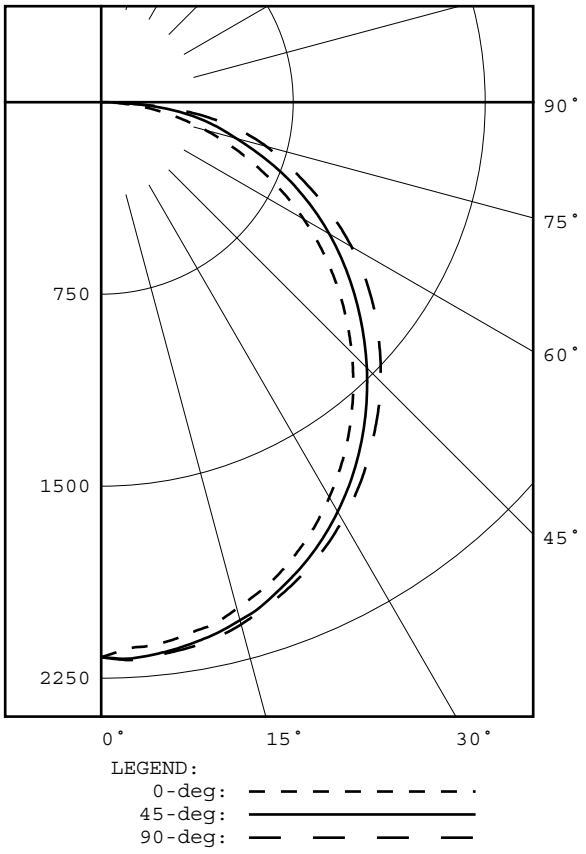
ZONE	LUMENS	%FIXT
0- 30	1687	25.5
0- 40	2767	41.9
0- 60	4951	74.9
0- 90	6611	100.0
90-180	0	0.0
0-180	6611	100.0

TOTAL INPUT WATTS = 48.9
EFFICACY = 135.2 Lm/W
CIE TYPE - DIRECT

PLANE	: 0-DEG	90-DEG
SPACING CRITERIA	: 1.2	1.3
PLANE	: 0-DEG	90-DEG
LUMINOUS LENGTH	:45.510	20.150

LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	3307.	3508.	3689.
55	3170.	3464.	3762.
65	2979.	3494.	3874.
75	2761.	3571.	4361.
85	2423.	4439.	5196.



Checked P.ALBERS
Approved D.WANG-MUNSON

REPORT NUMBER: RAB03245 PAGE: 2 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17
CATALOG NUMBER: RTLED2X4-49YNW/D10

ADDITIONAL INFORMATION

NOTE: THIS REPORT WITH THE USE OF THE NVLAP LOGO SHALL NOT BE USED BY THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL GOVERNMENT.
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
TOTAL INPUT WATTS = 48.883 W AT 120.0 VAC.
LED DRIVER: RD-050-EUH-A1050
TEST PROCEDURE: IESNA LM-79-08
LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
AMBIENT: 24.6
ACCREDITED LABORATORY CODE 201058-0

REPORT NUMBER: RAB03245 PAGE: 3 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17
CATALOG NUMBER: RTLED2X4-49YNW/D10

PLANE	:	0-DEG 90-DEG
BEAM ANGLE (50%)	:	109.1 X 122.4 DEGREES
FIELD ANGLE (10%)	:	163.4 X 171.5 DEGREES

REPORT NUMBER: RAB03245 PAGE: 4 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17
CATALOG NUMBER: RTLED2X4-49YNW/D10

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	2168	2168	2168	2168	2168
2.5	2139	2151	2176	2181	2181
5.0	2132	2143	2169	2176	2174
7.5	2119	2130	2157	2167	2165
10.0	2099	2111	2140	2152	2154
12.5	2082	2092	2121	2133	2136
15.0	2048	2064	2095	2108	2112
17.5	2015	2029	2068	2078	2081
20.0	1980	1995	2029	2046	2049
22.5	1936	1951	1990	2008	2014
25.0	1890	1905	1947	1966	1975
27.5	1838	1855	1900	1923	1933
30.0	1782	1801	1847	1876	1885
32.5	1723	1744	1792	1823	1835
35.0	1662	1683	1733	1765	1782
37.5	1596	1618	1670	1709	1724
40.0	1528	1550	1605	1648	1665
42.5	1457	1480	1537	1585	1606
45.0	1384	1409	1468	1521	1544
47.5	1309	1336	1397	1455	1479
50.0	1233	1259	1324	1387	1413
52.5	1156	1184	1250	1319	1347
55.0	1076	1104	1176	1250	1277
57.5	996	1026	1104	1179	1206
60.0	913	946	1030	1103	1129
62.5	830	867	953	1024	1050
65.0	745	786	874	942	969
67.5	660	706	795	859	888
70.0	581	626	712	777	810
72.5	501	547	627	701	737
75.0	423	474	547	630	668
77.5	344	396	477	559	589
80.0	269	315	407	472	499
82.5	195	239	325	375	399
85.0	125	169	229	253	268
87.5	59	91	110	103	103
90.0	12	15	13	5	2

REPORT NUMBER: RAB03245 PAGE: 5 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17
CATALOG NUMBER: RTLED2X4-49YNW/D10

ZONAL LUMEN SUMMARY

0- 5	52.
5- 10	154.
10- 15	250.
15- 20	339.
20- 25	415.
25- 30	478.
30- 35	525.
35- 40	555.
40- 45	567.
45- 50	563.
50- 55	544.
55- 60	509.
60- 65	459.
65- 70	397.
70- 75	326.
75- 80	253.
80- 85	166.
85- 90	57.

REPORT NUMBER: RAB03245 PAGE: 6 OF 8
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CATALOG NUMBER: RTLED2X4-49YNW/D10

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	52
5- 10	154
10- 15	250
15- 20	339
20- 25	415
25- 30	478
30- 35	525
35- 40	555
40- 45	567
45- 50	563
50- 55	544
55- 60	509
60- 65	459
65- 70	397
70- 75	326
75- 80	253
80- 85	166
85- 90	57
90- 95	1
95-100	0
100-105	0
105-110	0
110-115	0
115-120	0
120-125	0
125-130	0
130-135	0
135-140	0
140-145	0
145-150	0
150-155	0
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	205
0- 20	794
0- 30	1687
0- 40	2767
0- 50	3898
0- 60	4951
0- 70	5807
0- 80	6386
0- 90	6609
0-100	6611
0-110	6611
0-120	6611
0-130	6611
0-140	6611
0-150	6611
0-160	6611
0-170	6611
0-180	6611

REPORT NUMBER: RAB03245 PAGE: 7 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17

CATALOG NUMBER: RTLED2X4-49YNW/D10

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	108	103	98	94	105	100	96	92	96	92	89	92	89	86	88	86	84	82
2	97	89	81	75	95	87	80	74	83	77	73	80	75	71	77	73	69	67
3	89	77	69	62	86	76	68	61	73	66	60	70	64	59	67	62	58	56
4	81	68	59	52	79	67	58	52	64	57	51	62	56	50	60	54	50	47
5	74	61	52	45	72	60	51	45	58	50	44	56	49	44	54	48	43	41
6	69	55	46	39	67	54	45	39	52	44	38	50	43	38	49	43	38	36
7	64	50	41	34	62	49	40	34	47	40	34	46	39	34	44	38	33	31
8	59	45	37	31	58	45	36	30	43	36	30	42	35	30	41	35	30	28
9	55	42	33	27	54	41	33	27	40	32	27	39	32	27	38	31	27	25
10	52	38	30	25	50	38	30	25	37	30	25	36	29	25	35	29	24	23

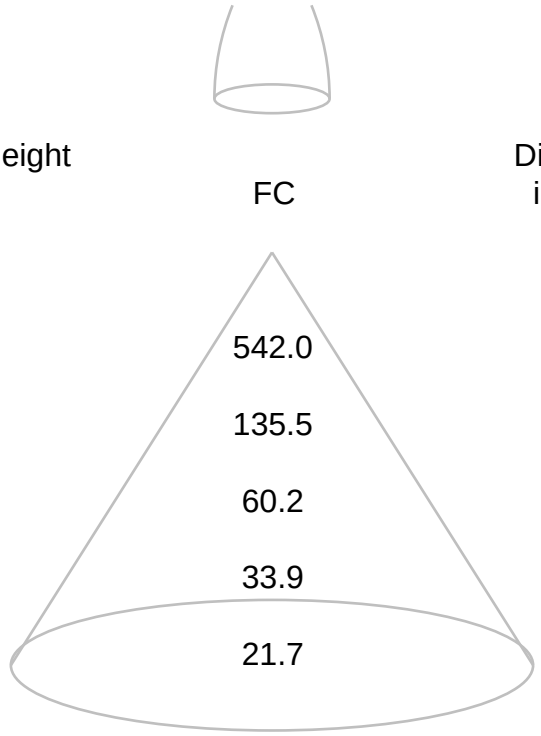
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

REPORT NUMBER: RAB03245
ISSUE DATE: 04/27/17
CATALOG NUMBER: RTLED2X4-49YNW/D10

DATE SAMPLE TESTED: 04/27/17

CONE OF LIGHT DIAGRAM

(diameter shown is where fc value is half the fc at nadir)



Mounting Height in feet	FC	Diameter in feet
2.0	542.0	2.5
4.0	135.5	5.0
6.0	60.2	7.6
8.0	33.9	10.1
10.0	21.7	12.6

Note: The candela values used to generate this diagram were obtained by averaging the photometric data into a single plane.

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REPORT NUMBER: RAB03246
DATE: 4/25/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED2X4-49YNW/D10

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 98 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT. FIXTURE WAS MOUNTED IN Lithonia Lighting Model #2GT8 4 32 A12 MVOLT 1/4 MVISPWS1836LP741 HOUSING.

LAMP: ONE HUNDRED AND NINETY-SIX LIGHT EMITTING DIODES (LEDS), VERTICAL BASE-UP POSITION.

DRIVER: RD-050-EUH-A1050

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (120.0 AND 277.0 VAC, 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:	Calibration Due:
GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	N/A
CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/01/18
OCEAN OPTICS QE65PRO Spectroradiometer	04/10/18
RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	04/10/18

OBJECT OF TEST: Measure the Absolute Flux in lumens*, Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRIa,1-14), Chromaticity Coordinates (x,y; u'v'), ANSI C78.377 Duv, and electrical data including ANSI C82.77-2002 Power Factor (PF), and Total Harmonic Distortion (THD) to the test sample. Measure electrical data including Total Harmonic Distortion (THD) at maximum nominal rated input voltage. Report Off-State Power.

PROCEDURE: The test sample was mounted inside the integrating sphere, energized, and allowed to stabilize. After stabilization occurred, measurements were taken. In order to measure mean performance, multiple data sets were recorded and averaged. Readings were taken with the test sample operating at 60 HZ input in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. Electrical data was also recorded at maximum nominal rated input voltage (277.0 VAC). All data are traceable to the National Institute of Standards and Technology. Off-State Power was reported with no voltage applied to the sample.

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

RESULTS: (continued subsequent pages)

Checked X.CAO
Approved D.WANG-MUNSON
Lighting Engineer

RAB LIGHTING

NVLAP LAB CODE: 201058-0

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REPORT NUMBER: RAB03246
DATE: 4/25/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED2X4-49YNW/D10

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	6611 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4048
Chromaticity Ordinate y	0.3890
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2361
Chromaticity Ordinate v'	0.5105
Correlated Color Temp CCT (K)	3496
ANSI C78.377-2008 Duv	-0.001
Total Radiant Flux (milliWatts)	20065 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.410
Input Power (Watts)	48.9
Input Power Factor (%)	99.4
Input Current THD (%)	8.2
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	135.2
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.182
Input Power (Watts)	47.9
Input Power Factor (%)	95.1
Input Current THD (%)	9.3
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

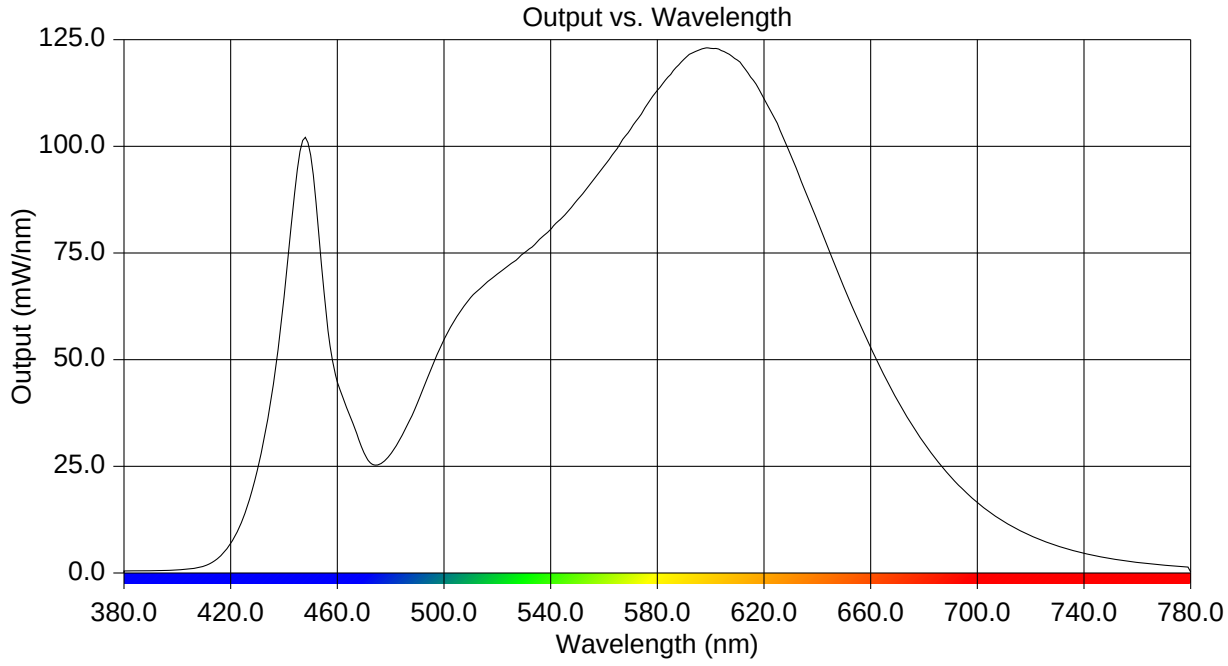
COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	84
R1 Light greyish red	82
R2 Dark greyish yellow	89
R3 Strong yellowish green	96
R4 Moderate yellowish green	83
R5 Light bluish green	83
R6 Light blue	87
R7 Light violet	85
R8 Light reddish purple	63
R9 Strong red	9
R10 Strong yellow	76
R11 Strong green	84
R12 Strong blue	72
R13 Light yellowish pink (skin)	83
R14 Moderate olive green (leaf)	98

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

REPORT NUMBER: RAB03246 Page 3 of 4
DATE: 4/25/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED2X4-49YNW/D10

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.474	515	67.514	650	67.022
385	0.506	520	70.069	655	59.723
390	0.552	525	72.496	660	52.870
395	0.589	530	74.988	665	46.388
400	0.739	535	77.650	670	40.495
405	0.988	540	80.549	675	35.302
410	1.614	545	83.720	680	30.453
415	3.326	550	87.437	685	26.284
420	6.873	555	91.301	690	22.529
425	13.322	560	95.352	695	19.366
430	24.095	565	99.512	700	16.537
435	40.127	570	104.043	705	14.119
440	64.878	575	108.610	710	12.045
445	94.546	580	113.116	715	10.253
450	97.940	585	116.835	720	8.742
455	65.747	590	120.410	725	7.452
460	44.738	595	122.413	730	6.355
465	36.423	600	122.965	735	5.405
470	28.173	605	122.222	740	4.626
475	25.307	610	120.221	745	3.968
480	27.917	615	116.221	750	3.389
485	33.021	620	111.201	755	2.901
490	39.791	625	105.387	760	2.489
495	47.572	630	97.949	765	2.125
500	54.791	635	90.200	770	1.821
505	60.281	640	82.520	775	1.579
510	64.562	645	74.657	780	0.235



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CIE Chromaticity Diagram