RAB LIGHTING

NVLAP LAB CODE: 201058-0

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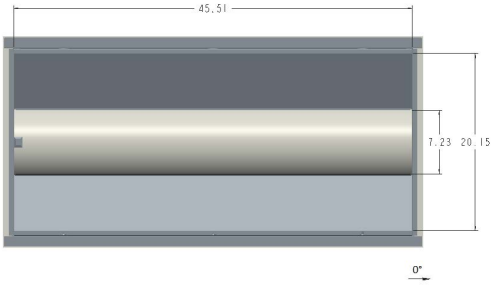
REPORT NUMBER: RAB03243 PAGE: 1 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17
CATALOG NUMBER: RTLED2X4-49NWHC/D10
LUMINAIRE: WHITE PAINTED SHEET METAL HOUSING, 2 WHITE CIRCUIT BOARDS EACH WITH 98 LEDS, MATTE WHITE POLYCARBONATE LENS IN THE CENTER, ROUGH SURFACE FACING OUT. FIXTURE WAS MOUNTED 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	1799	1799	1799	1799	1799	
5	1770	1779	1800	1806	1804	170
15	1699	1711	1737	1748	1752	488
25	1566	1578	1611	1630	1639	740
35	1376	1392	1434	1462	1478	894
45	1145	1163	1214	1256	1278	935
55	889	909	973	1032	1058	869
65	618	645	723	774	801	706
75	350	391	455	521	551	480
85	105	140	192	215	230	188
90	8	13	9	5	2	



ZONAL LUMEN SUMMARY

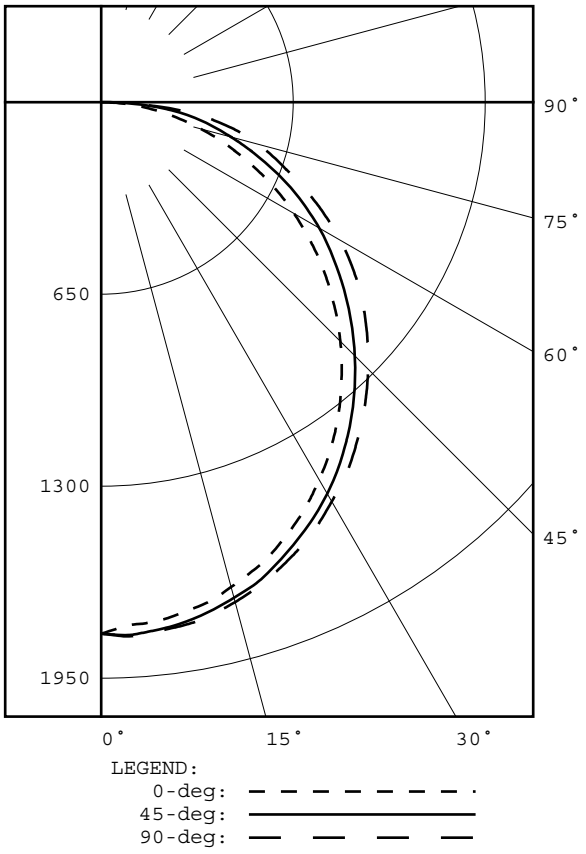
ZONE	LUMENS	%FIXT
0- 30	1399	25.6
0- 40	2293	41.9
0- 60	4097	74.9
0- 90	5472	100.0
90-180	0	0.0
0-180	5472	100.0

TOTAL INPUT WATTS = 49.3
EFFICACY = 111.0 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	2736.	2901.	3054.
55	2619.	2866.	3117.
65	2471.	2891.	3202.
75	2285.	2970.	3597.
85	2036.	3722.	4459.



Checked P.ALBERS

Approved D.WANG-MUNSON

REPORT NUMBER: RAB03243 PAGE: 2 OF 8
ISSUE DATE: 04/27/17 DATE SAMPLE TESTED: 04/27/17
CATALOG NUMBER: RTLED2X4-49NWHC/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 = 49.252 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: 24.2
ACCREDITED LABORATORY CODE 201058-0

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PLANE	:	0-DEG 90-DEG
BEAM ANGLE (50%)	:	108.8 X 122.2 DEGREES
FIELD ANGLE (10%)	:	163.4 X 171.8 DEGREES

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0.0	1799	1799	1799	1799	1799
2.5	1776	1786	1806	1811	1810
5.0	1770	1779	1800	1806	1804
7.5	1760	1768	1791	1798	1797
10.0	1744	1753	1777	1786	1789
12.5	1727	1734	1759	1769	1772
15.0	1699	1711	1737	1748	1752
17.5	1672	1683	1715	1724	1728
20.0	1643	1653	1683	1697	1701
22.5	1605	1617	1648	1665	1671
25.0	1566	1578	1611	1630	1639
27.5	1523	1536	1573	1594	1602
30.0	1476	1491	1530	1554	1561
32.5	1428	1443	1485	1511	1523
35.0	1376	1392	1434	1462	1478
37.5	1322	1338	1383	1414	1429
40.0	1264	1281	1328	1363	1380
42.5	1205	1222	1272	1310	1330
45.0	1145	1163	1214	1256	1278
47.5	1083	1102	1156	1201	1225
50.0	1018	1039	1095	1145	1170
52.5	955	975	1034	1090	1116
55.0	889	909	973	1032	1058
57.5	821	843	914	974	998
60.0	754	779	853	909	935
62.5	688	712	788	844	868
65.0	618	645	723	774	801
67.5	548	579	656	711	733
70.0	481	515	586	641	667
72.5	416	458	520	578	609
75.0	350	391	455	521	551
77.5	285	328	394	466	488
80.0	223	261	335	394	414
82.5	162	198	268	316	333
85.0	105	140	192	215	230
87.5	51	76	94	98	97
90.0	8	13	9	5	2

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ZONAL LUMEN SUMMARY

0- 5	43.
5- 10	127.
10- 15	208.
15- 20	281.
20- 25	344.
25- 30	396.
30- 35	435.
35- 40	459.
40- 45	469.
45- 50	466.
50- 55	449.
55- 60	420.
60- 65	379.
65- 70	327.
70- 75	270.
75- 80	210.
80- 85	139.
85- 90	49.

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5-DEGREE ZONAL LUMEN SUMMARY

0- 5	43
5- 10	127
10- 15	208
15- 20	281
20- 25	344
25- 30	396
30- 35	435
35- 40	459
40- 45	469
45- 50	466
50- 55	449
55- 60	420
60- 65	379
65- 70	327
70- 75	270
75- 80	210
80- 85	139
85- 90	49
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	170
0- 20	659
0- 30	1399
0- 40	2293
0- 50	3228
0- 60	4097
0- 70	4803
0- 80	5283
0- 90	5471
0-100	5472
0-110	5472
0-120	5472
0-130	5472
0-140	5472
0-150	5472
0-160	5472
0-170	5472
0-180	5472

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CATALOG NUMBER: RTLED2X4-49NWHC/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	102	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.

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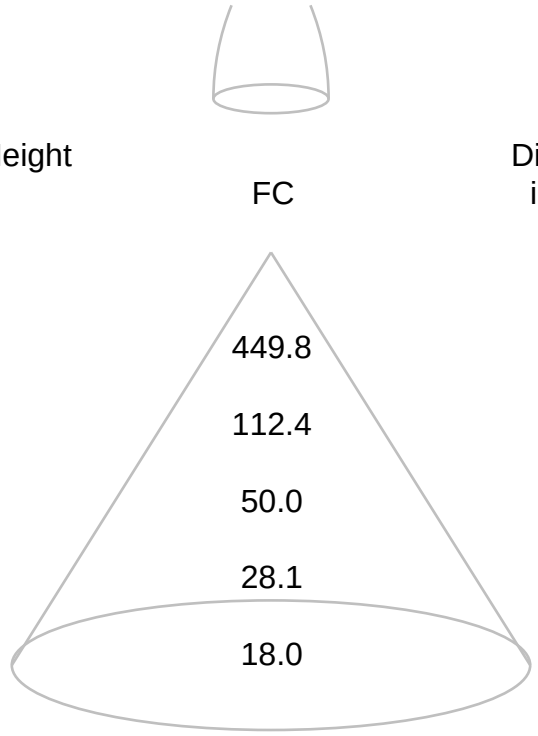
DATE SAMPLE TESTED: 04/27/17

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	449.8	2.5
4.0	112.4	5.0
6.0	50.0	7.6
8.0	28.1	10.1
10.0	18.0	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: RAB03244
DATE: 4/25/2017
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RTLED2X4-49NWHC/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

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RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	5472 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.3753
Chromaticity Ordinate y	0.3695
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2246
Chromaticity Ordinate v'	0.4976
Correlated Color Temp CCT (K)	4091
ANSI C78.377-2008 Duv	-0.002
Total Radiant Flux (milliWatts)	19479 *
ELECTRICAL	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.413
Input Power (Watts)	49.3
Input Power Factor (%)	99.5
Input Current THD (%)	8.2
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	111.0
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.182
Input Power (Watts)	48.2
Input Power Factor (%)	95.4
Input Current THD (%)	8.9
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	94
R1 Light greyish red	96
R2 Dark greyish yellow	94
R3 Strong yellowish green	91
R4 Moderate yellowish green	94
R5 Light bluish green	94
R6 Light blue	91
R7 Light violet	95
R8 Light reddish purple	95
R9 Strong red	85
R10 Strong yellow	85
R11 Strong green	93
R12 Strong blue	73
R13 Light yellowish pink (skin)	95
R14 Moderate olive green (leaf)	94

*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.

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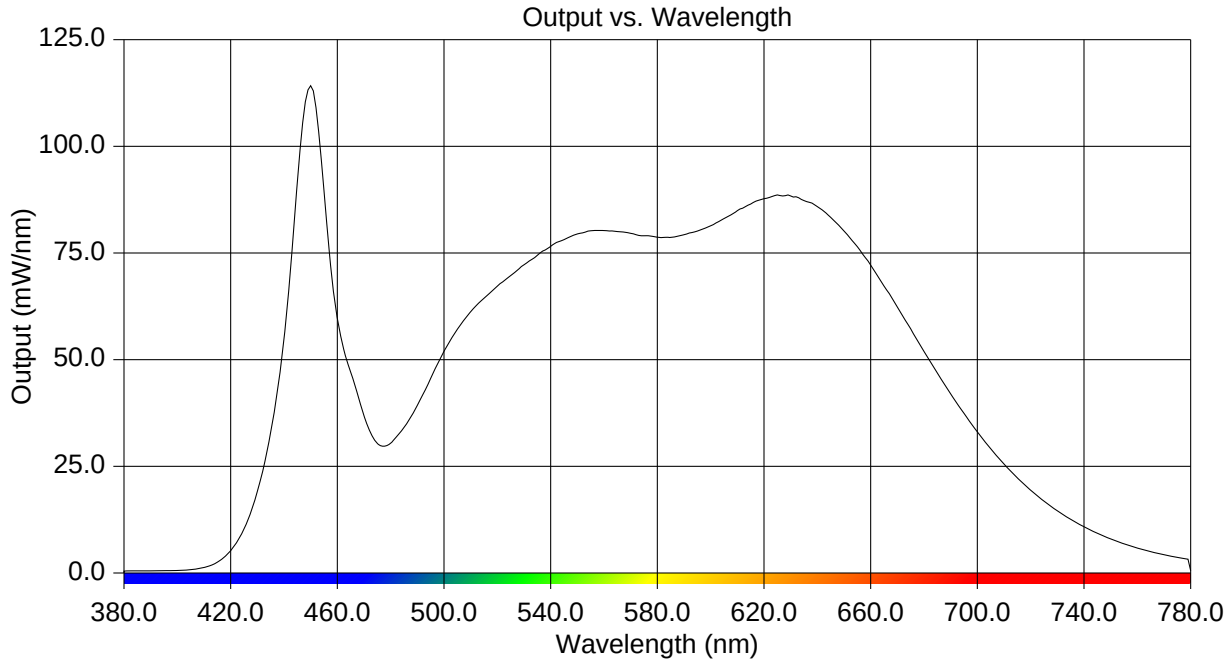
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.443	515	64.355	650	80.194
385	0.493	520	67.230	655	76.485
390	0.522	525	69.760	660	72.221
395	0.533	530	72.236	665	67.254
400	0.625	535	74.458	670	62.289
405	0.807	540	76.539	675	57.243
410	1.278	545	78.127	680	51.875
415	2.534	550	79.454	685	46.960
420	5.217	555	80.209	690	41.944
425	10.274	560	80.269	695	37.424
430	19.117	565	79.998	700	33.088
435	32.827	570	79.609	705	29.120
440	55.182	575	79.040	710	25.505
445	91.346	580	78.711	715	22.288
450	114.208	585	78.613	720	19.408
455	89.585	590	79.282	725	16.857
460	59.586	595	80.137	730	14.586
465	47.075	600	81.349	735	12.551
470	36.843	605	83.071	740	10.787
475	30.378	610	84.921	745	9.323
480	30.425	615	86.471	750	7.995
485	34.097	620	87.727	755	6.836
490	39.291	625	88.611	760	5.861
495	45.612	630	88.371	765	5.020
500	52.032	635	87.285	770	4.290
505	57.080	640	85.853	775	3.665
510	61.271	645	83.355	780	0.547



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CIE Chromaticity Diagram